

July 14, 2003

Jane M. Kenny
Regional Administrator
Environmental Protection Agency, Region 2
290 Broadway
New York, NY 10007-1866

Dear Administrator Kenny:

We are writing to register our objection that EPA has failed to comply with the proper, legally mandated public process in its assessment and cleanup of hazardous substances released in the WTC disaster.

A central requirement of EPA's mandate under the National Contingency Plan is the implementation of a transparent public process. We call on you today to implement a full public process in accordance with the law, that includes establishing a publicly available administrative record and proper mechanisms for the involvement of affected communities in decision-making on matters that impact their health and their environment.

Second, we object to EPA's once again delegating to a private company its responsibility to assess community and worker risks from exposure to WTC toxic substances. As a private company, Versar, Inc. is exempt from the full measure of accountability that is fundamental to EPA's mandate to protect public health.

Third, we find that neither EPA nor its contractor Versar has conducted public outreach for today's meeting to peer review the EPA/National Center for Environmental Assessment Draft Document "Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster." Thus, EPA has excluded the public from having input in constituting the panel. Community-based organizations and advocacy groups have been denied an opportunity to which they are entitled to nominate qualified experts to serve on the panel.

In addition, panelists' CVs should have been made publicly available well in advance of the meeting, so that any imbalances in the panel might have been corrected. Timely public oversight is critical for ensuring that protecting people's health will be the decisive factor in the panel's deliberations and that those who serve on the panel will render independent and unbiased judgments.

At this time, we have concerns about the inclusion on the peer panel of individuals with close ties to, or who are directly employed by major polluting industries regulated by the EPA. We question whether these individuals are in a position to objectively weigh the hazards of chemicals their own companies or

clients produce, use or discharge into the environment.

Likewise, we are concerned that one or more individuals on the panel may have recent or continuing contractual relationships with EPA. If true, this too would constitute a potential conflict of interest. Such individuals by virtue of their ties to EPA may have already taken a position on EPA's scientific investigations in response to the WTC disaster.

On May 8, 2002, when the EPA announced that it would assume its responsibility as the lead agency for the residential cleanup, Congressman Jerrold Nadler stated: "I am also pleased that the EPA has promised to establish a citizens advisory group to monitor this project." Despite the demands to form such a group, made by 9/11 Environmental Action and other organizations representing affected communities in meetings with Kathy Callahan, no CAG was ever allowed to be established.

In the last seven months, EPA has carried out an emergency removal action in lower Manhattan in the absence of public oversight of assessment, testing and cleanup. There has been no peer review of the agency's cleanup protocols.

By refusing to provide the prescribed mechanisms for public participation, public oversight and expert scrutiny, EPA has failed to safeguard the public health and the public interest. In addition, by failing to hire even one Chinese-speaking staff person to conduct outreach in Chinatown, EPA has violated its own Environmental Justice principles.

The result has been a set of testing and cleanup protocols and an outreach and education plan so flawed and inadequate that billions of federal dollars have been misspent, while affected communities remain at still-undetermined levels of risk.

The EPA/NCEA study, and very likely the long-delayed peer review meeting, appear to us as attempts to ratify after-the-fact what has been an inept and haphazard cleanup of only 18% of lower Manhattan residences potentially contaminated at levels of concern.

The people of New York City, who are entitled to a restoration of all the neighborhoods affected by the September 11th attack, deserve better.

As we did in our letters of June 20 and October 21, 2002, to which you have not replied, we are again calling upon EPA, as the lead agency in the cleanup of hazardous substances released in the destruction of the WTC, to immediately institute a legitimate public process and a genuinely comprehensive cleanup, including all affected workplaces. In doing so, we are asking for nothing other than that your agency obey the federal environmental and worker safety laws that govern its response to disasters that pose a threat to human health and

the environment.

We are grateful for your consideration and await your early reply.

Sincerely,
Kimberly Flynn
on behalf of 9/11 Environmental Action

cc: Kathy Callahan, EPA Region 2; Matthew Lorber, EPA/NCEA; Traci Bludis, Versar, Inc.

Members of the Senate Environment and Public Works Committee
Senator Charles Schumer, US Representatives Jerrold Nadler, Carolyn Maloney, Major Owens, Charles Rangel, Nydia Velazquez, City Council members Alan Gerson, Margarita Lopez, James Gennaro and Christine Quinn, David Yassky (Hard copies will be faxed.)

New York Committee for Occupational Safety and Health, New York Environmental Law and Justice Project, Concerned Stuyvesant Community, Rebuild with a Spotlight on the Poor Coalition, Beyond Ground Zero Network, Good Old Lower East Side, University Settlement, New York City Coalition to End Lead Poisoning, Puerto Rican Legal Defense and Education Fund, Asian American Legal Defense and Education Fund, Chinese Progressives Association, Urban Justice Center, New York Lawyers for the Public Interest, World Trade Center Residents Coalition, Asthma Moms, Clean Air Campaign, NYPIRG, Sierra Club, Natural Resources Defense Council, Physicians for Social Responsibility, Little Italy Neighbors Association, Mothra, Met Council on Housing, LSNY, Red Hook Tenants Association, Community Board 1 Quality of Life Committee, Community Board 2 Environment Committee

Jenna Orkin
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comments for the conference:

Having had access to only a few sections of the EPA document currently being considered, I will address them alone. My comments will be from the point of view of a parent of a Stuyvesant High School student.

The omissions in the sections I have read are striking:

1. The references to the work of Dr. Thomas Cahill do not mention that in early October, a few days before Stuyvesant reopened, he found very- and ultrafine particulates at Varick Street (fifteen blocks further than Stuyvesant from Ground Zero) that were higher than at the Kuwaiti oil fields. These were some of the highest levels ever recorded.

P.M. 2.5

2. p. 32 says "PM concentrations at the WTC perimeter sites fell to typical background levels by late November/early December, 2001."

Stuyvesant is beyond the perimeter yet until February P.M. 2.5 was frequently higher than at Ground Zero. For half those days it was higher than the level recommended for sensitive populations. None of this is mentioned.

3. p.35 says: "the 'WTC signature' appears to have varied over time in terms of its specific elemental composition."

This should not be surprising. No one mixed all the ingredients of the WTC in a great mixing bowl in the sky. They were of different weights and therefore dispersed with different patterns. Also there were different amounts of each and they burned at different rates and temperatures. What is surprising is the contortions scientists go through as they try to find a 'fingerprint' or 'signature.' The metaphors are inapt and the effort, therefore, misguided. As I wrote also for the TERA conference, fingerprints are only clues. It is not fingerprints which commit crimes whereas it IS the contaminants which will 'commit the crime' of making people ill. The EPA should drop the metaphor and clean up the contaminants as it has thus far failed to do, especially in workspaces, ventilation systems and Brooklyn, where the plume went on September 11 itself, when 95% of the airborne debris fell.

The current document supports the notion of further cleanup of indoor spaces in several statements:

p.40: USGS "rais[ed] the possibility of greater risk of acute irritation symptoms being associated with indoor exposures to WTC dusts than with outdoor dusts leached by rainfall."

p. 40: "Liroy et al. (2002) more broadly highlighted indoor exposures to WTC-derived dust PM as posing potential increased health risks. Individuals visiting, residing or working in buildings not adequately cleaned before reoccupation could have been subject to repeated, long-duration exposure."

p.33 "Liroy... also noted that penetration of substantial quantities of WTC-derived dust into indoor office or residential spaces likely notably increased the potential for indoor exposures (via ingestion or by inhalation of re-entrained particles) to high levels of constituent elements and compounds."

Asbestos

3. This section is also troubling.

p.86 says "The widely accepted definition of the asbestiform fiber is a particle having a length of at least five microns."

No, that is not so widely accepted. It is disputed and was the subject of fevered discussion at the ATSDR conference in October. Some doctors argued that shorter microns could be just as damaging as longer.

p.88 mentions "the requirement to count fibers with an aspect ratio of 5:1." I don't know if that is because AHERA looks at different aspect ratios from other tests. But on p. 86 the document itself discusses the agreed upon ratio as being 3:1.

4. The document admits "this standard [AHERA] is not health based but rather technology based." It is therefore questionable why AHERA is used for schools or anywhere else people gather.

5. No mention is made of whether the air tests conducted were aggressive. If they were not, they are not likely to be as valid.

6. However, the most glaring omission is of any mention of tests for dust or fabrics. Ultrasonication, an EPA test, is not mentioned although it found 2.4 million structures per sq. cm in the carpet of the Stuyvesant auditorium. Most experts at the time agreed that with such a high reading, remediation was advisable.

ASTM microvac, another widely recognized test, is not mentioned nor was it used by EPA.

7. On the cleanup, p.131 says it "uses certified contractors."

At other times EPA has referred to its contractors as "certified asbestos abatement contractors." However their certification is irrelevant as they weren't doing certified asbestos abatements. The vast majority of residents received the less stringent cleanup which consisted of HEPA vacuuming and wet wiping with no worker protection and anyone over the age of twelve allowed

to be present. In other words, the cleanup was a lick and a promise.

When asked why they weren't telling residents to throw out potentially contaminated furniture as EPA recommended on its website, EPA said, "If you feel your furniture may be contaminated, throw it out." This response places the burden on residents who are not expert in these matters. Nor is contamination a matter of feeling. It is a matter of fact which it is EPA's job to research. Considering the documented cases in which people have died from asbestos-related disease after being exposed to their fathers' workclothes, it is disturbing to find such a cavalier attitude at EPA.

8. p.132 alleges that the COPC document "Contaminants of Potential Concern" was prepared "to assist the Pilot Cleaning Effectiveness Initiative"

In fact the cleanup was well underway when the COPC document was peer-reviewed at the TERA conference in October. Nor did EPA change its cleanup methods in response to many of the suggestions made at the conference.

Enclosed:

1. DOH/ATSDR Study of Indoor Air in Lower Manhattan (Executive Summary)
2. Letter from DOH to Nina Lavin, resident of 105 Duane St. #5A (designated as Residence 1).
3. Results of Air and Settled Dust Sampling at 105 Duane Street, noting that there was no asbestos detected in air or settled dust in Residence 1.
4. Indoor Air Quality Survey of 105 Duane St. #5A noting elevated levels of asbestos on the entry doorframe and on the fan coil unit of the living room air conditioner (123, 000 structures per square centimeter and 37,000 structures per square centimeter respectively)
5. Indoor Air Quality Survey of 105 Duane Street #5A noting an elevated level of asbestos in a window well (136,960 structures per square centimeter)>

Note: 105 Duane Street is a new building built without ACM.

Final health report
of 144 investigators to
Assess Post 9/11
to Airborne Settled
Dust near in people
Areas of lower part
Sgt 2002
NYC Dept of Health and
Hygiene

ATSDR
as part of WTC Environmental
Assessment.

September 11, 2001

In remembrance of those who were lost on September 11, 2001, and to the families and friends who will love them forever and keep their memories alive.

In grateful recognition of the countless responders and the many who supported their efforts.

New York City Department of Health and Mental Hygiene

U.S. Agency for Toxic Substances and Disease Registry

EXECUTIVE SUMMARY

From November 4 through December 11, 2001, environmental samples were collected in and around 30 residential buildings in lower Manhattan. In addition, four buildings above 59th Street were sampled and used as a comparison area for this investigation. The New York City Department of Health and Mental Hygiene (NYC DOHMH) and the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) conducted this limited investigation with support and collaboration from the U.S. Public Health Service Commissioned Corps Readiness Force and the World Trade Center Environmental Assessment Working Group. The purpose of the sampling was to assess the composition of both outdoor and indoor settled surface and airborne dust within residential areas around the World Trade Center. This information was used to help determine whether additional public health actions are needed to address any remaining World Trade Center-related dust inside residential areas. The information collected could also be used to compare the findings from the locations that were known or were likely to have received dust directly from the collapse of the World Trade Center towers, to findings from areas that were unlikely to have received dust directly from the disaster (comparison areas).

Attention was given to those materials reasonably expected to be in the original dust cloud and in dust generated by ongoing activities at the World Trade Center. The focus was on building materials that have been shown to have irritant properties (e.g., synthetic vitreous fibers [SVF] and gypsum) and be associated with long-term health concerns (i.e., crystalline silica and asbestos). The samples collected during this investigation were analyzed for the following materials: asbestos, SVF, mineral components of concrete (crystalline silica, calcite, and portlandite), and mineral components of building wallboard (gypsum, mica, and halite). Efforts were made to get as much information as possible with the sampling that could be conducted, given accessibility and equipment limitations.

Results from this investigation do not necessarily reflect conditions that would be found in other buildings, at other times just following the collapse, or after the sampling period. The measurements reflect conditions present at the time of the sampling (November 4–December 12, 2001) in the buildings and areas sampled. The limited number of results obtained from the comparison areas above 59th Street was an attempt to determine the New York City-specific background levels of asbestos, SVF, mineral components of concrete (quartz, calcite, and portlandite), and mineral components of building wallboard (gypsum, mica, and halite).

Sampling Overview

U.S. Public Health Service Commissioned Corps Readiness Force Officers were detailed to the New York City Department of Health and Mental Hygiene and composed the sampling teams for this investigation. The teams completed a survey form for each sampling location. The information collected by the survey was obtained from direct

observations and from owners or representatives of building management when available. The survey form and photographs were reviewed along with the analytical results to put the sampling results into the context of where and how the samples were obtained and to determine the general conditions of the sampling locations.

Air and settled surface dust samples were collected and analyzed for the following materials used in WTC construction components: asbestos, SVF, crystalline silica, calcite, portlandite, gypsum, mica, and halite. SVF (e.g., fiberglass) is used in thousands of products because of its chemical resistance, strength, and ability to insulate against heat and sound. All of the crystalline minerals analyzed in this project are commonly used in building construction materials. *Quartz*, a form of crystalline *silica*, is a naturally occurring mineral and is a component of cement. *Cristobalite* and *tridymite* are different crystalline forms of silica. *Calcite* and *portlandite* are naturally occurring, high pH minerals used in cements and mortars. *Gypsum* is a naturally occurring mineral used in plaster, wallboard, and in some cements. *Mica* is a group of naturally occurring minerals that are used in paint, joint cements, plastics, roofing, and rubber. *Halite* (also known as rock salt or sodium chloride) is used in ceramic glazes, fire extinguishing, metallurgy, and highway de-icing and table salt.

In addition to analyzing the samples for the fibers and minerals found in common building materials, when a sufficient quantity of settled surface dust was present, it was mixed with water and the pH of the resulting mixture was measured.

Air Samples

Air samples were collected using vacuum pumps to draw air through a filter positioned at an adult's breathing level. In addition to a filter for fiber analysis, multiple particulate samplers were placed at each sampling location to collect different particle sizes including respirable (PM4 and PM2.5), thoracic (PM10), and total inhalable (PM100). This resulted in the collection of overlapping, or nested, particulate size fractions.

The particle size determines how deeply a particle can travel into the respiratory tract. Respirable particles with diameters of 4 microns or less (PM4) are very small particles that can be breathed in and can travel deeply into the air sacs of the lung. At some locations another sampler was used that collected a smaller set of respirable particles, those with diameters of 2½ microns (PM2.5) or less. Another sampler collected particles with diameters of 10 microns (PM10) or less. This sampler would collect not only respirable particles, but also those slightly larger particles that tend to land in the upper regions of the respiratory tract, including the throat. A fourth sampler collected a larger set of particles, those 100 microns (PM100) or less in diameter. The larger particles in this fraction can land in the nose and throat. Where a particle lands determines what types of health effects might be experienced. Particles too large to travel into the narrower passages of the lower respiratory tract might deposit in the upper airways (e.g., the nose and throat) and cause irritation. Similarly, larger particles might cause eye irritation. If

the settled surface dust contains sufficient amounts of particles of a very small size, then effects consistent with particles reaching the lower respiratory tract might occur (coughing, shortness of breath).

Each of the particulate air sample fractions was analyzed for crystalline minerals (quartz, cristobalite, tridymite, calcite, portlandite, gypsum, mica, and halite). X-ray diffraction analysis (XRD) identifies a mineral by the unique diffraction pattern given off when the x-ray strikes its surface. The diffraction pattern serves as a “fingerprint” to identify the mineral present.

Other air samples were screened for fibers using phase contrast microscopy (PCM) to count the total number of all fibers present. If the concentration of total fibers was higher than the maximum concentration of fibers found in the comparison homes (0.003 fibers per cubic centimeter of air) the sample was re-analyzed for asbestos by transmission electron microscopy (TEM). Additionally, scanning electron microscopy (SEM) was used to look for SVF if the PCM fiber counts was higher than 0.003 fibers per cubic centimeter (f/cc) and if the settled surface dust sample from that area contained SVF.

Settled Surface Dust Samples

The composition of settled surface dust reflects particles and fibers that have been tracked into an area or that were present in the air and have with time, deposited on surfaces. Settled surface dust was collected indoors using a specialized vacuum cleaner. Outside settled surface dust was collected by scooping any visible dust-type material into a container. As with the air samples, the settled surface dust samples were analyzed to assess the presence of fibers and minerals. The analysis performed does not allow the determination of what size particles are present in the dust. The composition of the settled surface dust was evaluated to determine if, on the basis of its composition, it could be an irritant if it became airborne or came in contact with skin or eyes during cleaning activities.

The dust samples were analyzed for the presence of asbestos and SVF using polarized light microscopy (PLM). PLM can distinguish between fiber types by their unique appearance and color when viewed under different wavelengths of light. In addition, TEM analysis was conducted on all dust samples that showed asbestos content by PLM as less than 1%. TEM analysis is very specific, can detect smaller fibers of asbestos, and is subject to less interference than PLM.

The dust samples were also analyzed for mineral content using XRD as described previously for the air samples. For the dust samples, the mineral and the fiber results are expressed as a percent, indicating the weight percent each component represents in the portion of the dust sample analyzed. The different analytical techniques, XRD and microscopy (PLM, TEM, SEM), help to characterize what was in the settled surface dust; however the results from the two methods each performed on a portion of the dust

collected, cannot simply be added together to “sum up” what was in the dust. XRD results are based upon the weight of the dust sample analyzed. While, PLM, TEM, and SEM results are based on the surface area viewed under the microscope.

Limitations

While the goal of the sampling was to evaluate the air and dust samples for a range of contaminants, there is no one sample collection method or analysis that can provide all of the determinations that were desired. The analysis strategy was to identify what components were present in order to provide the public with information quickly if any of the analyses revealed a significant concern. In order to strive for both of those goals, some modifications to conventional protocols were made which limited some analyses from determining the precise level of the materials in the sample (e.g., XRD conducted on air and dust samples). Whenever an analysis is expanded beyond its specific intent, there is the potential loss of sensitivity and an increase in the variability in the data. Those particular analytical results are reported as estimated values and marked with a “J.”

Results for the airborne particulate matter were rejected due to issues found during the quality assurance analysis. However, the XRD analysis for airborne minerals that used the same filter samples as the particulate matter analysis are considered valid because the analysis method does not depend on the filter sample weighing process used to determine the particulate matter concentration. The XRD mineral air concentrations are based on individual mineral weight standard curves—not the weight of the dust sample collected on the filters. These standard curves are not impacted by pre- and post-sampling filter weight variability.

Air Sampling Results

Total fiber counts of air samples taken in lower Manhattan were similar to the comparison areas above 59th Street sampled during this investigation. The six lower Manhattan areas that had elevated total fiber counts were re-examined by TEM and SEM to determine the types of fibers. The TEM and SEM results indicated that neither asbestos nor synthetic vitreous fibers (e.g., fiberglass) contributed to the elevated total fiber counts.

Air sampling results for minerals detected quartz (a form of crystalline silica) and other building-related materials in lower Manhattan. The other forms of crystalline silica were not detected in any air samples except for a one-time detection of cristobalite. The estimated concentrations of these minerals in air were low. In some locations, mineral components of concrete (quartz, calcite, and portlandite) and mineral components of building wallboard (gypsum, mica, and halite) were detected in air samples at higher estimated levels in lower Manhattan residential areas than in samples taken at comparison residential areas above 59th Street. The levels of minerals seen in airborne dust do not

pose potential health hazards even for a continuous year of exposure at the highest levels detected.

Settled Surface Dust Results

Results of the settled surface dust analysis indicate the composition of settled surface dust in lower Manhattan is different than the dust analyzed from the comparison areas above 59th Street. Although the materials found are consistent with materials expected from the World Trade Center collapse, these results cannot determine the actual source of the materials present because these materials are common building components and can come from other sources in a busy urban area.

In lower Manhattan, asbestos was found in indoor dust in 15 of 83 (18%) samples from residential units and common areas at levels ranging from less than 1% (<1%) to 1.5%. Asbestos was detected in 6 of 14 (43%) outdoor samples at levels ranging from <1% to 3.4%. Indoor settled surface dust contained SVF in 40 of 83 (48%) locations ranging from 2% to 35% of the dust content. SVF was detected in 11 of 14 (79%) outdoor locations at levels ranging from 1% to 72%. No asbestos or SVF was detected in dust in the comparison areas above 59th Street.

The XRD analysis for crystalline minerals in settled surface dust is semiquantitative (estimated values, indicated by “J”). However, quartz, calcite, portlandite and gypsum appear to make up a higher percentage of dust in some buildings in lower Manhattan when compared to settled surface dust samples from buildings above 59th Street. Quartz was detected up to an estimated 31%J versus up to 2%J found in the comparison areas above 59th Street. Neither cristobalite nor tridymite was detected in any of the settled surface dust samples. Similarly gypsum was found at a maximum estimated concentration of 30%J in settled surface dust, higher than the 4%J estimated in the comparison areas above 59th Street. Calcite and portlandite had maximum concentrations of 21%J and 8%J respectively. At lower Manhattan locations sampled, quartz was detected in 81% of common areas and 53% of residences. Gypsum was seen in 88% of common areas and 79% of residences. Minerals were found in all lower Manhattan outdoor settled surface dust samples at estimated values ranging as high as 27%J quartz, 19%J calcite, 6%J portlandite, and 27%J gypsum. No visible settled outdoor dust was available in the comparison areas above 59th Street.

Several of the minerals detected in the settled surface dust samples, such as portlandite and calcite, can make the dust more alkaline, or raise the pH. Only two dust samples provided enough material for the determination of pH. The samples, collected from two outdoor locations in lower Manhattan, had pH levels of 8.6 and 9.8. On the pH scale, values less than 7 are considered acidic, a value of 7 is neutral, and values above 7 are alkaline or basic. Based on the results of the pH analyses, these dust samples are slightly alkaline. This is consistent with the detection of portlandite and calcite (alkaline minerals present in concrete) in the mineral analysis of the dust sample from the same location.

Conclusions

Based upon the analytical results of samples taken between November 4 through December 11, 2001, and information collected during the sampling effort, the New York City Department of Health and Mental Hygiene and the U.S. Agency for Toxic Substances and Disease Registry make the following conclusions (not in order of importance).

- Total fiber counts of air samples taken in lower Manhattan were similar to the comparison areas above 59th Street sampled during this investigation. The six lower Manhattan areas that had elevated total fiber counts were re-examined by transmission electron microscopy (TEM) and scanning electron microscopy (SEM). The TEM and SEM results indicated that neither asbestos nor SVF contributed to the elevated fiber counts.
- Low levels of asbestos were found in some settled surface dust, primarily below Chambers Street. Many of the lower Manhattan locations sampled had been previously cleaned prior to this investigation. No asbestos was detected in the comparison indoor dust samples taken north of 59th Street. The City of New York has conducted follow-up activities at the locations where asbestos was detected in settled surface dust. Only two follow-up locations, outdoor areas, required professional asbestos abatement. Following-up activity at the other locations did not find any asbestos containing materials.
- When compared with the results obtained from the comparison sampling locations, the lower Manhattan residential areas sampled by this investigation tended to have a greater percentage of SVF (primarily fiberglass), mineral components of concrete (quartz, calcite, and portlandite), and mineral components of building wallboard (gypsum, mica, and halite) in settled surface dust. However, the frequency of detections and prevalence patterns of these minerals are similar in both residential areas.
- Exposure to significant amounts of synthetic vitreous fibers (SVF), mineral components of concrete (quartz, calcite, and portlandite), and mineral components of building wallboard (gypsum) may cause skin rashes, eye irritation, and upper respiratory irritation, all of which have been voiced as concerns by citizens and first responders. If the reported irritant effects are associated with World Trade Center related materials, these effects will subside once exposure to SVF, mineral components of concrete, and mineral components of building wallboard end. Some people with pre-existing heart or lung disease (e.g., asthma) or a previous history of very high levels of exposures (occupational) to SVF, mineral components of concrete, and mineral components may be more sensitive to the

irritant effects of SVF, mineral components of concrete, and mineral components of building wallboard.

- Sometimes mineral components of concrete (calcite and portlandite) and mineral components of building wallboard (gypsum, mica, and halite) were detected in air samples at higher estimated levels in lower Manhattan residential areas than in samples taken at comparison residential areas. These detected mineral levels are orders of magnitude below occupational standards. Although the occupational standards do not account for sensitive individuals or extended periods of exposure, they provide a comparison to an established health guidance value. The levels of minerals seen in airborne dust do not pose potential health hazards even for a continuous year of exposure at the highest levels detected.
- Some settled surface dust could become airborne if disturbed. Therefore, people could potentially inhale the asbestos, SVF, mineral components of concrete (quartz, calcite, and portlandite), and mineral components of building wallboard (gypsum, mica, and halite) found in settled surface dust of some lower Manhattan residences. Because we did not determine the weight of dust present in the areas sampled, it is not possible to determine whether any particular residence had an elevated dust loading. Appropriate continued frequent cleaning should minimize exposures.
- Several worst-case assumptions were made in order to assess the potential long-term public health risks of airborne asbestos and quartz. Some of the assumptions were that no cleaning of indoor spaces has occurred or will occur, all fibers found in air were asbestos fibers, and the highest levels detected last fall in air represent long-term air levels. Using these worst-case assumptions, prolonged exposure (decades) to airborne asbestos and quartz *may* increase the long-term, theoretical risk of people developing lung cancer and other adverse lung health effects (more than 1 additional case in 10,000 people exposed). For individuals who conduct frequent cleaning of their residences, as recommended in this report, or participate in the U.S. Environmental Protection Agency cleaning/sampling program, it is unlikely that their exposure would resemble these worst-case conditions.
- A review of the building sampling results from this investigation indicates that there is not a consistent spatial distribution pattern of asbestos, SVF, mineral components of concrete, and mineral components of wallboard in air and settled surface dust. This indicates that the materials are heterogeneously distributed. There are many factors that may contribute to the heterogeneous distribution, including whether the area was cleaned (indoors and outdoors), cleaning method, date since last cleaning, and how much dust was initially in the area. It is not clear which factors contributed to this pattern.
- Results from this investigation do not necessarily reflect conditions that would

be found in other buildings, at other times just following the collapse, or after the sampling period. The measurements reflect conditions present at the time of the sampling (November 4–December 12, 2001) in the buildings and areas sampled. The limited number of results obtained from the comparison areas above 59th Street may or may not reflect the New York City-specific background levels of asbestos, SVF, mineral components of concrete (quartz, calcite, and portlandite), and mineral components of building wallboard (gypsum, mica, and halite).

Recommendations

Based upon the conclusions of this investigation, the New York City Department of Health and Mental Hygiene and the U.S. Agency for Toxic Substances and Disease Registry make the following recommendations.

- Because more asbestos, synthetic vitreous fibers (e.g., fiberglass), mineral components of concrete (quartz, calcite, and portlandite), and mineral components of building wallboard (gypsum, mica, and halite) were found in settled surface dust in lower Manhattan residential areas when compared to comparison residential areas, the New York City Department of Health and Mental Hygiene and the U.S. Agency for Toxic Substances and Disease Registry are recommending that people continue to conduct frequent cleaning with HEPA vacuums and damp cloths/mops to reduce the potential for exposure.
- To ensure that the recommended frequent cleaning is effective and to ensure that the health of the people of New York City is protected, the New York City Department of Health and Mental Hygiene and the U.S. Agency for Toxic Substances and Disease Registry are recommending additional monitoring of residential areas in lower Manhattan. In addition, an investigation should be conducted to better define background levels specific to the city of New York for asbestos, synthetic vitreous fibers, mineral components of concrete (quartz, calcite, and portlandite), and mineral components of building wallboard (gypsum, mica, and halite).
- Lower Manhattan residents concerned about possible World Trade Center-related dust in their residential areas can request cleaning and/or testing from the U.S. Environmental Protection Agency (EPA) by logging on to the agency's World Trade Center Web page at www.epa.gov/wtc or by calling the EPA hotline at 1-877-796-5471.



THE CITY OF NEW YORK

DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Michael R. Bloomberg
Mayor

Thomas R. Frieden, M.D., M.P.H.
Commissioner

nyc.gov/health

Nina Levin
105 Duane Street
Apartment 5A
New York, New York 10007

September 2002

Dear Ms. Levin:

As part of an ongoing effort to assess environmental impacts following the collapse of the World Trade Center, the New York City Department of Health and Mental Hygiene and the U.S. Agency for Toxic Substances and Disease Registry conducted air and surface settled dust sampling in the fall of 2001 at selected residences in lower Manhattan. Samples were analyzed for the presence of fibers (e.g. asbestos and fiberglass) and minerals commonly found in building construction materials.

Enclosed are the sampling results from your building. Please note that in the summary tables your apartment is identified as 'Residence 1'. Results from air and dust sampling for asbestos were also provided in a previous letter (January/February 2002). Also enclosed is a copy of the Executive Summary from the *Final Technical Report of the Public Health Investigation to Assess Potential Exposures to Airborne and Settled Surface Dust in Residential Areas of Lower Manhattan*. A complete copy of this report, which includes the sampling results for the entire assessment, can be found on our web page at www.nyc.gov/health.

The results of air sampling in your building, and for all of the buildings that were sampled in lower Manhattan, did not show the presence of a public health hazard. However, because of the increased presence of contaminants in many of the settled dust samples (as compared to sampled residences outside of lower Manhattan), we are recommending that residents continue to conduct frequent cleaning using vacuums with HEPA (high efficiency particulate air) filtration and damp cloths/mops to reduce the potential for making the dust airborne.

Lower Manhattan residents concerned about possible World Trade Center-related dust in their residential areas can receive information and request cleaning and/or testing from the U.S. Environmental Protection Agency (EPA) by logging on to the agency's World Trade Center Web page at www.epa.gov/wtc or by calling the EPA hotline at 1-(877)-796-5471. If you have questions about this information, please do not hesitate to contact me at (212) 788-4290.

Sincerely,

Nancy Loder Jeffery, RN, MPH
Environmental and Occupational Disease Epidemiology Unit

Enclosures:

1. Results of Air and Settled Dust Sampling at 105 Duane Street
2. Executive Summary: Final Report of the Public Health Investigation to Assess Potential Exposures To Airborne and Settled Surface Dust in Residential Areas of Lower Manhattan

Results of Air and Settled Dust Sampling at 105 Duane Street

Introduction

As part of an ongoing effort to assess environmental impacts following the collapse of the World Trade Center, the New York City Department of Health and Mental Hygiene (DOHMH) and the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) conducted air and surface settled dust sampling in and around 30 residential buildings in lower Manhattan between November 4 and December 12, 2001. On December 4, 2001, settled dust samples were collected from inside two residential units, one common area, and from one outdoor area close to your building. The samples were analyzed for fibers and minerals commonly found in building construction materials. The results of samples collected from your building, along with the results of the samples collected from comparison residential buildings above 59th Street in Manhattan, are reported below. For a more complete discussion of the results, their limitations, and their meaning we encourage you to read the enclosed Executive Summary or view the complete report on our web page at www.nyc.gov/health.

Results and Discussion

Many people from the communities affected by the collapse of the buildings at the World Trade Center reported irritation of the skin, eyes and respiratory tract. For that reason, the air and dust sampling included analysis of substances that may be irritants. Analysis was also conducted of substances (i.e., crystalline silica and asbestos) that are associated with long-term health concerns such as lung disease and lung cancer.

The development of health effects from an exposure to a contaminant depends on how much of the contaminant may be present; how concentrated the contaminant is; how the contaminant enters the body (breathed in, eaten, skin contact); how long a person may be exposed; and the individual differences among people. Unfortunately, there is a lack of environmental exposure standards for most of the materials sampled in this study. Much of what is known about the relationship between mineral and fiber exposures and health effects comes from occupational studies where people have been exposed to varying contaminant levels and periods of time. These studies provide information about the levels at which different health effects have been noted.

Total dust in sampled areas was not measured; however, investigators noted if visible dust was none, slight, or heavy. Most visible dust in sampled areas was slight to none. Data on individual sampling areas are available in the full report. The following tables contain the results of samples collected from your building and those of comparison buildings.

Crystalline Minerals

Potential Health Effects

Exposure to the minerals calcite, portlandite, and gypsum can result in eye, skin, nose, and throat irritation. All of these irritant effects are generally temporary and begin to resolve once exposure ceases. These minerals do not pose long-term health hazards. Exposure to large amounts of the mineral halite (rock salt) can damage tissues. Inhaled mica and crystalline silica (quartz and cristobalite) can become lodged in the lungs and over time irritate the lung tissue and cause scarring. Chronic (on-going) exposure to silica may also contribute to other respiratory illnesses such as lung cancer, emphysema, and obstructive airway disease.

Crystalline Minerals in Air

Table 1a shows the presence or absence of crystalline minerals in the air in your building. All of the crystalline minerals analyzed in this project are commonly used in building construction materials. *Quartz*, a form of crystalline *silica*, is a naturally occurring mineral and is a component of concrete. *Cristobalite* and *tridymite* are different crystalline forms of silica. *Calcite* and *portlandite* are naturally occurring, alkaline minerals used in cements and mortars. *Gypsum* is a naturally occurring mineral used in plaster, wallboard, and in some concrete. *Mica* is a group of naturally occurring minerals used in paint, joint cements, plastics, roofing, and rubber. *Halite* (also known as rock salt or sodium chloride) is used in ceramic glazes, fire extinguishers, metallurgy, highway de-icing, and table salt.

The particle size determines how deeply a particle can travel into the respiratory tract. Inhalable particles (particulate matter with a average diameter less than 100 micrometers, or PM100) include larger particles that can land in the nose and throat and cause irritation. Smaller thoracic-respirable particles (PM10-PM2.5) can travel deep inside the lungs. The method used to analyze the samples could only estimate the quantity of minerals present in air. These estimated quantities were low for all minerals. Therefore, in the tables below, results are shown as detected or not detected (see full report for estimated values).

Trace amounts of halite were detected in only a few samples and do not indicate potential for health concerns. The levels of mica found were many times lower than occupational health standards and are not likely to contribute to adverse health effects. Short-term exposures to quartz, even for a continuous year of exposure at the highest estimated level found in the air, is not expected to result in any adverse health effects.

Overall, the mineral components of concrete (quartz, calcite, and portlandite) and wallboard (gypsum, mica, and halite) were sometimes detected in air samples at higher estimated levels in lower Manhattan residential areas than in samples taken at comparison residential areas, where only gypsum was detected. Although sometimes higher than comparison buildings, these levels are still low and do not pose potential health hazards (see Conclusions/Recommendations).

Table 1a Crystalline Minerals in Air for 105 Duane Street and the upper Manhattan Comparison Area

Minerals in Air	105 Duane Street		Comparison Area	
	Inhalable (PM100)	Thoracic - Respirable (PM10-PM2.5)	Inhalable (PM100)	Thoracic - Respirable (PM10-PM2.5)
Quartz	Detected	Detected	ND	ND
Cristobalite	ND	ND	ND	ND
Tridymite	NA	NA	NA	NA
Calcite	ND	ND	ND	ND
Portlandite	ND	ND	ND	ND
Gypsum	ND	Detected	Detected	Detected
Mica	ND	ND	ND	ND
Halite	ND	ND	ND	ND

NA = not analyzed ND = not detected

Crystalline Minerals in Settled Dust

Table 1b shows the estimated percentages of minerals in settled dust samples that were collected inside your building and when possible in the near vicinity outside of your building. Generally, levels in and around lower Manhattan residences were higher than comparison locations. These findings point to the continued need for frequent cleaning with HEPA vacuums and damp cloths/mops to reduce the potential for exposure.

Table 1b Crystalline Minerals in Settled Dust for 105 Duane Street and the upper Manhattan Comparison Area (percent of mineral in sample)

Minerals in Settled Dust	105 Duane Street*				Comparison Area*		
	Common Area	Outdoor	Residence #1	Residence #2	Common Area	Outdoor	Residences
Quartz	1	8	0.2	ND	1	NS	2
Cristobalite	ND	ND	ND	ND	ND	NS	ND
Tridymite	ND	ND	ND	ND	ND	NS	ND
Calcite	0.09	3	ND	ND	0.4	NS	0.9
Portlandite	0.06	2	ND	ND	0.05	NS	0.08
Gypsum	2	2	1	ND	3	NS	4
Mica	ND	0.3	ND	ND	ND	NS	0.08
Halite	ND	0.07	ND	ND	ND	NS	0.4

*Results are maximum values found in location

NS = not sampled ND = not detected

Fibers: Asbestos and Synthetic Vitreous Fibers

Potential Health Effects

Exposure to airborne asbestos is known to increase lung cancer and other diseases mostly among occupational groups in the construction, shipyard, and some manufacturing industries. Risk for disease increases as the level of asbestos exposure and the length of time of exposure increase. Although low level, brief exposures to asbestos are very unlikely to result in disease, it is advisable to avoid any exposure. Synthetic vitreous fibers, such as fiberglass, are manmade materials. The primary short-term health effects of exposure to synthetic vitreous fibers (SVF) are skin, upper respiratory tract and eye irritation. Textile and cellulose fibers were also detected in some of the samples. These fibers can also be irritants at very high levels.

Fibers in Air

Table 2a describes the results of air sampling for fibers at your building. Phase contrast microscopy (PCM) is used to identify fibers based on size and shape. This technique cannot identify the specific type of fiber. Therefore, the fibers seen by PCM include asbestos fibers as well as other fibers, such as textiles, fiberglass, and cellulose, which might be present. If the results were above the comparison background level using the PCM methodology, additional analysis was performed to determine whether any of the fibers were asbestos (TEM methodology) or synthetic vitreous fibers (SEM methodology).

Overall, when elevated air levels of fibers were found in lower Manhattan (in six areas) the additional analysis showed that the elevations were more likely due to cellulose, textiles, and other fibers rather than asbestos or fibrous glass. Upper respiratory tract irritation due to inhaled fibers has been reported in instances when fiber concentrations were far greater than any of the amounts found in the results of this investigation.

Table 2a Fibers in Air for 105 Duane Street and the upper Manhattan Comparison Area
(fibers per cubic centimeter of air)

Fibers in Air	105 Duane Street*				Comparison Area*		
	Common Area	Outdoor	Residence #1	Residence #2	Common Area	Outdoor	Residences
Total Fibers (PCM)	<0.001	<0.001	<0.001	<0.001	0.002	0.001	0.003
Asbestos (TEM)	NA	NA	NA	NA	NA	NA	NA
SVF(SEM)	NA	NA	NA	NA	0.00004	0.00004	0.00009

*Results are maximum values found in location

PCM = phase contrast microscopy

TEM = transmission electron microscopy

SEM = scanning electron microscopy

NA = not analyzed

SVF = synthetic vitreous fibers

Fibers in Settled Dust

Table 2b describes the sampling results for fibers in settled dust at your building. Low levels of asbestos were found in some settled dust samples in Lower Manhattan, primarily below Chambers Street. Polarized light microscopy (PLM), a method that can distinguish between fiber types, was used to determine the presence of synthetic vitreous fibers (SVF) and asbestos. If the presence of asbestos was found at levels of less than 1%, a more sensitive method (TEM methodology) was used to determine the presence of asbestos. Occasionally it was not possible to analyze the material by TEM methodology (e.g. not enough material present). The presence of SVF (primarily fiberglass) was identified in many of the samples collected in lower Manhattan. No SVF or asbestos was detected in the settled dust in comparison areas.

Although the airborne levels of asbestos and SVF did not present a health concern (see Conclusions/Recommendations), the presence of these materials in the settled dust in some locations indicates the need for continued frequent cleaning with HEPA vacuums and damp cloths/mops to reduce the potential for exposure.

Table 2b Fibers in Settled Dust for 105 Duane Street and the upper Manhattan Comparison Area (percent of fibers in sample)

Fibers In Dust	105 Duane Street*				Comparison Area*		
	Common Area	Outdoor	Residence #1	Residence #2	Common Area	Outdoor	Residences
Asbestos (PLM)	ND	ND	ND	ND	ND	NS	ND
Asbestos (TEM)	ND	ND	ND	ND	ND	NS	ND
SVF (PLM)	ND	ND	ND	ND	ND	NS	ND

*Results are maximum values found in location

PLM = polarized light microscopy

TEM = transmission electron microscopy

NS = not sampled

ND = not detected

SVF = synthetic vitreous fibers

Conclusions/Recommendations

The results of air and settled dust samples were compared to a variety of health-based standards and guidelines. Theoretical exposure scenarios were also developed to determine potential impacts. The results of air sampling in your building, and for all of the buildings that were sampled in lower Manhattan, did not show the presence of a public health hazard. However, based on unlikely worst-case assumptions, it is not possible to rule out adverse health effects from chronic, 30 year, exposures to crystalline silica and asbestos.

More asbestos, SVF (primarily fiberglass), mineral components of concrete (quartz, calcite, and portlandite), and mineral components of building wallboard (gypsum, mica, and halite) were found in settled surface dust in many lower Manhattan residential areas when compared to comparison residential areas. The DOHMH and ATSDR, therefore, recommend that people living in lower Manhattan continue frequent cleaning with HEPA vacuums and damp cloths/mops to reduce the potential for exposure. These cleaning methods can prevent substances from becoming airborne and lower the possibility of exposure and long-term health effects.

Lower Manhattan residents concerned about possible World Trade Center-related dust in their residences can request information, cleaning, and/or testing from the U.S. Environmental Protection Agency (EPA) on the agency's World Trade Center web page at www.epa.gov/wtc and from the EPA hotline, 1-(877)-796-5471.

For a more complete discussion of the results, their limitations, and their meaning we encourage you to read the enclosed Executive Summary or view the complete report on our web page at www.nyc.gov/health.

S & B ENVIRONMENTAL, LLC

40 Valley Field Road South
Sandy Hook, Ct. 06482
Phone (203) 426-3704; Fax (203) 426-3497

Environmental Sampling Report

for

**105 Duane Street, Apartment 5A
New York, New York 10007**

Field work performed by: Vernon C. Rohde II
Dates of project: 21 February 2003

Report Prepared by: Vernon C. Rohde II
Date: 3 March 2003

Introduction:

At the request of Ms. Jo polett, S & B Environmental's representative, Vernon C. Rohde performed environmental sampling in apartment 5 A of 105 Duane Street, New York, New York. The building is located a few blocks North of the former World Trade Center complex. The sampling was performed in order to determine if airborne contaminants from the collapse of the World Trade Center towers an subsequent Ground Zero clean up project had reached this building.

Summary:

After the disaster of 11 September 2001, the EPA released information regarding airborne contaminants in and around the site of the former World Trade Center. The clean up at ground zero is now complete. Based on information released by the EPA, and concerns raised, a sampling strategy was developed to examine the apartment to determine if any residual contamination may be present, and effecting the air quality in the apartment building.

S & B Environmental, LLC was contracted to collect a variety of samples from the apartment for Asbestos.

Discussion of Sample Parameters:

Asbestos - Asbestos is know to have been present in the fireproofing on the steel in some areas of the Trade Center. Data collected after the disaster showed that the debris cloud generated from the collapse did carry asbestos with it for many blocks. The gross debris was cleaned up in the first couple nights by the EPA, and their contractors, but the disaster site itself still contains much debris, which contains asbestos. Until the entire demolition and removal of the debris is completed, asbestos can be disturbed, and released as a result of the activities at the site. Asbestos is known to cause a disease called asbestosis, lung cancer and mesothelioma. Asbestosis is a scaring of the lung creating reduced lung effectiveness. Mesothelioma is a very rear form of cancer which attacks the lining of the lung. This disease is currently always fatal, and death can occur as shortly as six months from the time of diagnosis. The disease is only associated with exposure to asbestos fibers, and the current belief is that any exposure to asbestos fibers could cause it. The onset of the disease could be thirty to forty years after the exposure.

Results:

The following tables present the data from the sampling.

Table 1 - Asbestos Dust Samples

Sample Location	Result (str/cm ²)	Comment
Apartment 5 A - Window Well	136,960	Chrysotile

NSD - No asbestos structures detected in sample; Chrysotile - Chrysotile asbestos fibers detected

Conclusions:

After the events of 11 September 2001, and the subsequent clean up efforts at the site of the former World Trade Center, the news reported on several contaminants being released as a result of those events. The Federal Environmental Protection Agency, and Occupation Safety and Health Administration have conducted ongoing sampling programs in and around the area. Although they have recorded spikes now and then, a majority of the readings reported are below any level of concern.

This survey was conducted in apartment 5A located in 105 Duane Street. This site is several blocks to the North of the disaster site.

The asbestos samples revealed very high levels of dust in the window. Based on the levels of asbestos found, it is apparent that high levels of asbestos were present in this apartment. Normal cleaning in the course of living in this apartment has probably reduced the levels of asbestos on interior surfaces, but has not eliminated it. This reveals that since the events of 11 September 2001, asbestos fibers have been present in this apartment, and cleaning activities have continued to move them around. As a result, those areas where dust builds up can be expected to have very high concentrations of asbestos fibers. These areas where the high levels could reasonably be expected to be are inside computers, and other electronic items, behind, and beneath appliances that are not often moved, and all porous materials such as rugs, carpeting, and upholstery covered furnishings.

Recommendations:

1. Given the extremely high levels of asbestos detected in the dust, a professional contractor should be retained to clean the entire apartment. As part of this cleaning, all porous materials should be discarded, and all furniture should be moved to allow the surfaces behind, and below the furniture to be cleaned. Any electronic equipment should also be opened, and cleaned on the inside.

Attached here after are copies of all laboratory reports.



SCILAB

SCIENTIFIC LABORATORIES, INC.

117 EAST 30TH STREET
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-9392

February 23, 2003

S & B Environmental
Attn: Vernon Rohde
40 Valley Field Road South
Sandy Hook, CT 06482

RE: S & B Environmental
Job Number 203022729
P.O. #
105 Duane Street

Dear Vernon Rohde:

Enclosed are the results for TEM asbestos analysis of the following S & B Environmental samples received at SCILAB on Friday, February 21, 2003, for a 3 day turnaround:

V-9

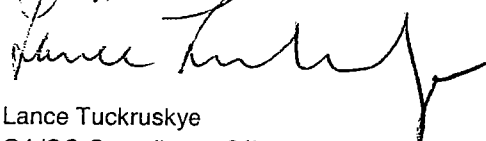
The 1 samples were collected "on site" and sent to SciLab via Hand Delivered. With no official EPA protocol for dust samples, SciLab follows ASTM Method D 5755/5756-95 guidelines for indirect preparation and TEM analysis of microvacuum dust samples. Tape and Wipe samples are ashed prior to preparation by ASTM method.

Table I represents a summary of all pertinent information used for the calculations. Included are the size of each structure counted, the fiber density and concentration, type of asbestiform material detected and the analytical sensitivity, which represents the concentration by the detection of one fiber in the TEM fiber count, total asbestos structures, total asbestos structures per area sampled, total asbestos mass per area sampled or total asbestos weight percent. Appendix A contains copies of the Fiber Count Sheets, showing the raw data for examination. These data sheets contain information for fiber length/width, fiber type, structure morphology and pertinent information on EDS, SAED and photography.

This report relates ONLY to the sample analysis expressed as structure density. SciLab assumes no responsibility for customer supplied data such as "sample location" or "area sampled". This report must not be used to claim product endorsement by SciLab, NVLAP, ELAP or any agency of the U. S. Government. The National Institute of Standards and Technology Accreditation requirements, mandates that this report must not be reproduced, except in full without the approval of the laboratory.

SciLab appreciates this opportunity to serve your organization. Please contact us for any further assistance or questions.

Sincerely,



Lance Tuckrusky
QA/QC Compliance Officer

Client Name: S & B Environmental

Table I



Summary of Transmission Electron Microscopy (TEM) Results for Asbestos (ASTM D5755 Dust Microvac)

105 Duane Street

SciLab Sample #	Client Sample #	Surface Area Sampled (sq. cm)	Dilution Factor	Asbestos Structures Detected	* Analytical Sensitivity on Grid (Str / sq mm)	Structure Density on Grid (Str / sq mm)	* Analytical Sensitivity on Surface (Str / sq. cm)	Limit Of Detection (Str/ sq. cm)	Structure Density on Surface (Str/ sq. cm)	Type of Asbestos
01	V-9 Apt 5A Window Well	100.0	0.00031	2	10	20.0	68,480	68,480	136,960	chrysotile

* structure density represented by the detection of 1 structure
** not analyzed

NSD: No Asbestos Structures Detected

Reviewed By:  ; Analyzed By:  Date: 2/23/03

Mark Peysakhov

10

Report for

Nina Lavin - 566-2887
105 Duane Street
Apartment 5A
New York, NY

**Indoor Air Quality Survey
105 Duane Street Apartment 5A
New York, NY**

Prepared by:

Edward Olmsted, CIH, CSP
July 28, 2002

Introduction

At the request of Nina Lavin, an indoor air quality investigation was made in her apartment 5A located at 105 Duane Street in Manhattan. The survey included a visual inspection of the apartment, and sampling dust for the presence of asbestos and testing sheetrock for the presence of mold. Edward Olmsted, CIH, CSP performed the survey on July 11, 2002. The purpose of this survey was to determine levels of contamination in the apartment that may have been caused by the collapse of the twin towers of the Trade Center. Asbestos is the most prevalent air contaminant produced during the collapse and as such this contaminant serves as a good surrogate for assessing exposure to other air contaminants. Asbestos also will settle in the building as a dust and is likely to remain a problem unless cleaning is done.

Background

The World Trade Center (WTC) burned and collapsed on September 11, 2001. The buildings were constructed of cement, steel, glass, gypsum wallboard, acoustical tile ceilings, sprayed-on insulation (asbestos-containing and non-asbestos types) and contained wood, plastic and metal furniture, computers and fixtures and paper products. Most of these materials were either physically destroyed (compressed, pulverized) or burned in the collapse of the building. This process gave rise to particulate matter ranging from a very fine dust to larger sized, quicker settling particles. The dust settled out onto roofs and other surfaces of nearby buildings. The cleaning effort to remove the dust from these buildings has varied and is dependent upon the efforts of the building owner.

Tribeca Towers located at 105 Duane Street is a high rise residential building located on Duane Street adjacent to Broadway. The building was constructed in the early 1990's and does not have asbestos materials in it. The building is of steel and concrete construction and has a brick façade. Each apartment has operable windows that permit outside air into the apartment. The apartment has a fan coil unit in the bedroom and in the living room. The unit provides heating in the winter and cooling in the summer. Each fan coil unit has an outside air damper. There is a supply air duct that provides ventilation air into the public corridor. The soot on the supply air grill on the 10th floor in the hallway was found in December to have asbestos contamination. The supply air shaft and grilles were cleaned in the winter of 2001 / 2002. There is an exhaust grill in the bathroom and in the kitchen. These remove air from the two areas and discharge the air outdoors. There is no exhaust duct serving the bathrooms. There is an exhaust plenum which is a shaft constructed with sheetrock. There was suspect mold growth on the sheetrock in the bathroom exhaust plenum. The moist air from the bathroom contacts the sheetrock in the shaft and condensation occurs. This may cause mold growth on the damp sheetrock.

Methods

Surface dust samples for the presence of asbestos were collected according to the method 5755-95 published by the American Society of Testing and Materials (ASTM). This involves drawing dust from a surface area of 100 square centimeters on a 0.8 micron mixed cellulose ester filter. The dust was collected using a personal sampling pump operated at 2 liters per minute. The filter is analyzed by transmission electron

microscopy for asbestos fibers. All of the samples were shipped overnight and analyzed by IATL.

A sample of water damaged sheetrock was taken from inside the exhaust ventilation plenum in the bathroom. There was evidence of visible mold growth on the sheetrock walls of the plenum in the bathroom exhaust shaft. The bulk sample was analyzed by P&K Microbiology Services, Inc using microscopic methods and by culturing on 2% malt extract agar.

Exposure Criteria

Asbestos in Dust

The ASTM method is intended for guidance on examining dust contamination of building surfaces and is intended as a general assessment of the building. There is no suggestion in the ASTM method that it can be used to assess general health risk from asbestos exposure, nor does it suggest that all building surfaces be maintained to the levels published in the standard. The method is generally applicable for the estimate of the concentration of asbestos fibers on surfaces starting from approximately 1000 fibers per square centimeter (f/cm²). This method does not provide information on the level of airborne exposure, but instead provides an assessment of the level of asbestos settled onto surfaces. As such it can only be used to assess the potential of exposure should contaminated dust become airborne.

It is important to note that asbestos "structures" (as defined by EPA) are not equivalent to asbestos "fibers" as defined by the Occupational Safety and Health Administration (OSHA). Asbestos fibers regulated by OSHA must be greater than 5.0 micrometers (microns) in length, of large enough in diameter to be seen under PCM, and must have an aspect ratio of 3:1 or greater. Asbestos structures can be much smaller than "fiber" (since they are measured using TEM); "structures" generally include all asbestos fibers longer than 0.5 microns with an aspect ratio greater than 3:1 or in some cases, 5:1. The health effects of very small asbestos fibers are less clear cut than those known to be caused by fibers greater than 5 microns in length, but, in general, toxicity studies have shown that fibers shorter than 5 μ m are less toxic than longer fibers.¹

Some studies of settled dust measured via the microvac method have been reported in the literature. Millette and Hays review surface data through the early 1990's finding that typical carpet dust values in buildings with Asbestos Containing Material ranged from a few to millions of structures/cm² via the microvac method. Overall, Millette and Hays suggest that levels of asbestos in settled dust determined by the microvac should be considered low if below 1,000 s/cm², above background if >10,000 s/cm², and high when >100,000 s/cm². They also conclude that levels are highly dependent upon frequency of cleaning, with levels clearly lower when cleaning is frequent.

¹ Health Effects Institute-Asbestos Research. Asbestos in public and commercial buildings: A literature review and synthesis of current knowledge. Cambridge, MA, 1991.

A more recent study by Ewing, et al,² looked at some 85 buildings and found geometric mean asbestos levels for the following categories: outside dust--5,100 s/cm²; buildings with no surfacing ACM--1,000 s/cm²; buildings with ACM acoustical plaster--160,000 s/cm²; buildings with ACM fireproofing (no suspended ceilings)--3,600,000 s/cm²; and buildings with ACM fireproofing (above suspended ceilings)--3,800,000 s/cm².

Mold Samples

The bulk samples are taken to determine whether water damage has promoted the growth of bacteria or fungi in the affected material. Bulk samples are cultured in growth media and results are reported in colony forming units per gram of material (CFU/g). The analysis includes identification of mold species. Although there are no regulatory or reference levels of mold growth in materials, in our experience most building clean materials have mold levels below 10,000 CFU/g. Levels over 100,000 are indicative of moderately elevated levels of colonization. Levels over 1 million CFU per gram or square inch are indicative of elevated microbial contamination. Microscopic analysis results are interpreted differently. The presence of mold spores, hyphae, and conidiophores are indicative of fungal colonization of the material. Levels are reported as trace, a few, many, numerous, and massive.

Findings

Asbestos in Settled Dust sample results

Three microvac dust sample and a blank were collected to determine levels of asbestos dust in the carpets. The lab report from IATL is attached to this report. The following summarizes the findings:

Field Blank – The field blank was opened and handled with the other samples but no sample was collected on it. The sample verifies that the sample media was not a source of contamination. The field blank had no detectable structures of asbestos.

Living Room AC Unit - Sample number C758840 was taken inside the fan coil unit at the base behind the filter. The sample had 37,000 structures per square centimeter.

Dust on Entry Door Frame – There was a layer of dirt on the door frame on the inside of the apartment entry door. A sample was taken across 40 square centimeters of the frame where the dirt was heaviest. The sample C7758891 had 123,000 structures per square centimeter.

Dust on the Hallway Supply Air Grill – The grill on the 5th floor was reportedly cleaned in December 2001. The sample was taken across the grill and found to have 9,250 structures per square centimeter.

Mold Sample

The mold sample analysis report from P&K Microbiology is attached to this report. By microscopic analysis the sample was found to have a few spores, conidiophores, and

² Ewing, WM, TA Dawson, GP Alber. Observations of settled asbestos dust in buildings. EIA Technical Journal, Summer 1996.

hyphae of *Stachybotrys chartarum*. This results indicate that fungal growth has occurred in the sheetrock. Certain species of mold are indicators of indoor fungal colonization. These include *Aspergillus versicolor* and *Stachybotrys chartarum*. The fact that *S. chartarum* was found in the sample is significant. This species of mold is associated with allergy and produces a mycotoxin, which can cause health effects that are not allergy or immune system related. This species of mold produces a mycotoxin called satratoxin which may cause serious health effects including immune system effects, respiratory damage, weight loss, and central nervous system effects.

Culturing in MEA did not reveal elevated mold levels. This suggests that the fungi on the sheetrock are not viable. This may be a result of old growth.

Discussion

Asbestos fibers can be present on surfaces for three main reasons: 1) asbestos can be a minor contaminant in some materials, 2) asbestos may deposit from the air onto surfaces, or 3) asbestos may be transported by mechanical means (e.g., from contact with ACM bulk materials, tracking dust from other areas onto carpeting, etc.). For this survey the samples in the unit ventilator were above 10,000 structures per square centimeter. This is above background for most buildings that do not have asbestos. The dust on the door frame was sampled and found to have 123,000 structures per square centimeter. This is also above the background level for most buildings. The sample on the supply air grill was 9,250 structures per square centimeter. This is within the background levels for buildings. The grill had been cleaned in December 2001. The presence of the low levels of material may be a result of newly deposited fibers from outdoors or the duct may not have been completely cleaned.

The growth of mold in the sheetrock inside the exhaust plenum would not be expected to pose an exposure risk provided the exhaust fan is operated continuously. However the presence of mold in the sheetrock may be a result of water condensation in the plenum. The construction of the exhaust plenum using sheetrock was a poor design choice. Bathroom exhaust should be constructed with materials that are not porous and would not promote mold growth. It is possible that mold growth has occurred in many areas of the sheetrock in the exhaust plenum. Ultimately this may cause deterioration of the sheetrock.

Recommendations

The entire apartment and contents should be cleaned by a professional company using wet wiping and using HEPA filter equipped vacuum cleaning.

The flow of exhaust air in the bathroom was very limited. This may be a contributing factor in the growth of mold in the plenum. The exhaust fan should be serviced to verify that it is working properly.

CERTIFICATE OF ANALYSIS

Client: Olmsted Environmental Svcs.
1992 Route 9
Garrison NY 10524

Report Date: 07/31/2002
Project: 105 Duane, 5A-Lavin, 7-13-02
Project No.:

TEM DUST SAMPLE ANALYSIS SUMMARY

<u>Lab No</u>	<u>Client No.</u>	<u>Location</u>	<u>Result</u>	<u>Asbestos Types</u>
1538322	C758840	Microvac Dust	37000.0000 Structures/cm2	Chrysotile
1538323	C758891	Microvac Dust	123000.0000 Structures/cm2	Chrysotile
1538324	C758883	Microvac Dust	9250.0000 Structures/cm2	Chrysotile Actinolite
1538325	C758864	Microvac Dust	Blank Structures/cm2	None Detected

5th Floor
hallway supply
air grill

Member AIHA Analysts Registry AIHA Lab No. 444 NIST-NVLAP No. 1165 NYS-DOH No. 11021

Methodology: ASTM D5755-95 Standard Test Method For Microvacuum Sampling And Indirect Analysis
Of Settled Dust By TEM For Asbestos

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP or any agency of the U.S. government.

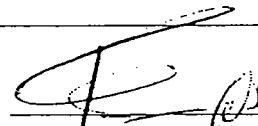
Comments: TEM settled dust results are dependent on several factors including sampling technique. IATL can supply references that may aid in the interpretation of these results.

Analysis Performed By:



Craig A. Liska, AIHA-AAR 4001

Approved By:



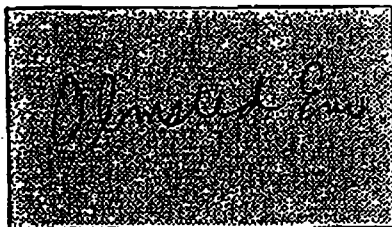
Frank E. Ehrenfeld, III
Laboratory Director

Date: JUL 23 2002

IATL International Asbestos Testing Laboratories
16000 Horizon Way, Unit 100
Mt. Laurel, NJ 08054

Tel. 856 231-9449
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info@iatl.com

Preliminary Results



PROJECT:

105 Duane St. Levin

Project No.:

Consultant Contact:

Tel:

FAX: 845-424-3482

LABORATORY: International Asbestos Testing Laboratory

Lab Contact: Frank Ehrenfeld III
(856) 231-9449

Analysis: Analytical Transmission Electron Microscopy

Turn Around Time: 5 Day

Method: • ASTM D 5755-95: MicroVacuum Sampling and Analysis of Dust by ATEM for Asbestos

ASTM D 6480-99: Wipe Sampling and Analysis of Surface Dust by ATEM for Asbestos

Samples Delivered:		Date:		Time:
Samples Received:	JH	Date:	7/16	Time:
Sample Analysis:	CL	Date:	7/28/02	Time:
Preliminary Results Released:	CO	Date:		Time:

Sample Log / Summary Data

Client	Lab	Area (cm ²)	Volume (ml)	Comments Asbestos & other substances	Results Asbestos (%)	Results Other (%)
C758840	1538322	100	1.0	Chrysotile	76.9	37000.0
C758891	1538323	40	0.75	Chrysotile	76.9	123000.0
C75883	1538324	100	5.0	Chrysotile + Actinolite	96.2	9250.0
C739064	1538325	BLANK	50.0	None Detected	<15.4	N/A

Analysis by ASTM D 5755-95 / ASTM D 6480-99

Dust / MicroVac and Wipe sample results are dependent on several factors including sampling technique. IATL can supply information to assist the client in the interpretation of these results.

Page 1 of 2

These preliminary results are issued by IATL to expedite procedures by clients based upon the above data. IATL assumes that all of the sampling methods and data upon which these results are based, has been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificate of Analysis will follow these preliminary results. The signed COA is to be considered the official results.

International Asbestos Testing Laboratories
16000 Horizon Way, Unit 100
Mt. Laurel, New Jersey 08054

Tel 856 231-9449
Fax 856 231-9818

- Chain of Custody -

Client: OLMSTED ENVIRONMENTAL Project Name: 105 DWANE SA-LAVIN
1992 Route 9 Project No.: _____
GARRISON, New York 10524
 Phone: 845-424-4077 Contact: Ed OLMSTED
 FAX: 845-424-3482 Pager: _____
 Special Instructions: _____

Type:

Asbestos			Lead			Other		
<input type="checkbox"/>	Air	<input type="checkbox"/>	<input type="checkbox"/>	Air	<input type="checkbox"/>	<input type="checkbox"/>	Soil	_____
<input type="checkbox"/>	Bulk	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bulk	<input type="checkbox"/>	<input type="checkbox"/>	Paint	_____
<input type="checkbox"/>	Water	<input type="checkbox"/>	<input type="checkbox"/>	Water	<input type="checkbox"/>	<input type="checkbox"/>	Other	_____

Analysis Method:

<input type="checkbox"/>	PCM: NIOSH 7400	<input type="checkbox"/>	PLM: Bulk Asbestos EPA 600	<input type="checkbox"/>	TEM: AHERA
<input type="checkbox"/>	PCM: OSHA	<input type="checkbox"/>	PLM: Point Counting 198.1	<input type="checkbox"/>	TEM: NIOSH 7402
<input type="checkbox"/>	PCM: Other _____	<input type="checkbox"/>	PLM: NOB via 198.1 (PLM only)	<input type="checkbox"/>	TEM: EPA Level II
<input type="checkbox"/>	AAS: NIOSH 7082 (Air)	<input type="checkbox"/>	If <1% by PLM, to TEM via 198.4	<input checked="" type="checkbox"/>	TEM: Microvac / Wipe
<input type="checkbox"/>	AAS: Lead in Drinking Water	<input type="checkbox"/>	to meet NYSDOH requirements **	<input type="checkbox"/>	TEM: Asbestos in Water
<input type="checkbox"/>	AAS: Lead in Paint ASTM D3335-85	<input type="checkbox"/>	(**call to confirm TAT!)	<input type="checkbox"/>	TEM: Bulk Analysis
<input type="checkbox"/>	AAS: Lead Dust/Wipe	<input type="checkbox"/>		<input type="checkbox"/>	TEM: NOB 198.4
<input type="checkbox"/>	AAS: Other Metals / Soil	<input type="checkbox"/>		<input type="checkbox"/>	TEM: Other
				<input type="checkbox"/>	Total Dust: NIOSH 0500

Turnaround

FAX: _____ Verbal: _____

Time:

date / time

date / time

☐ 10 Day ☒ 5 Day ☐ 3 Day ☐ 2 Day ☐ 1 Day ☐ 6 hour ☐ RUSH

Preliminary FAX/Verbal Results Requested by: _____

Sample

Numbers:

Client # (s): C758840 100cm² C758891 40cm² C758893 100cm² C759064 field blank
 (start) (end) (start) (end)

IATL # (s): _____ Total: _____

Chain of

Custody:

Relinquished:	<u>Edward OLMSTED</u>	Date:	<u>7/13/02</u>	Time:	<u>9pm</u>
Received:	_____	Date:	_____	Time:	_____
Sample Log-in:	_____	Date:	<u>7/16/2002</u>	Time:	<u>10am</u>
Sample Prep:	_____	Date:	<u>7/23/02</u>	Time:	_____
Analyzed:	_____	Date:	_____	Time:	_____
QA/QC Review:	_____	Date:	_____	Time:	_____

Archived/Released: _____ QA/QC InterLAB Use: _____ Date: _____ Time: _____

P & K Microbiology Services, Inc.Tel: 856-489-4455
Fax: 856-489-4085The Environmental Microbiology Specialists
7 Allison Drive, Cherry Hill, New Jersey 08003

Client: Olmsted Environmental Services, Inc., Garrison, NY

Project ID: 105 Duane Apt 5A

Date sampled: July 10, 2002

Date of inoculation: July 18, 2002

Samples submitted By: Edward Olmsted

Date characterization completed: July 24, 2002

P&K Report No.: 020716-089

Fungal / Bacterial Analysis (Culture Method)**Bulk Samples**

Sample ID	Weight used (g)	Medium used	Dilution factor	Fungal / Bacterial ID	Colony counts	Conc. ** (CFU / g)	Percentage* (%)
105DSA-5	0.0462	MEA	100X	sterile fungi	1	2,165 Total: 2,165	100

* Percentage of each group of fungi / bacteria in total population.

** Concentration is (CFU/Sample) if sample amount is NA.

Media types: Cellulose agar (CA), Czapek cellulose agar (CCA), cornmeal agar (CMA), 2% malt extract agar (MEA), 2% malt extract agar plus 20% sucrose (MEA+S), inhibitory mold agar (IMA), Pseudomonas isolation agar (PIA), rose bengal agar (RBA), sabouraud dextrose agar (SDA), tryptic soy agar (TSA), nutrient agar (NTA), Blood agar (BA), Staphylococcus Medium 110 (Staphy).

The detection limit of fungal and bacterial analysis using culture methods is one colony. The quantitation limits vary from analysis to analysis and from processing procedure to processing procedure. Contact us to determine your quantitation limits.

Approved by: _____

Chin S. Yang, Ph.D., Microbiologist

Quality control checked by: _____

P & K Microbiology Services, Inc.
The Environmental Microbiology Specialists
7 Allison Drive, Cherry Hill, New Jersey 08003

Tel: 856-489-4455
Fax: 856-489-4085

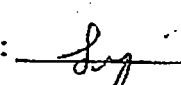
Client: Olmsted Environmental, Garrison, NY
Date sampled: July 10, 2002
Project ID: 105 Duane, Apt. 5A
Samples submitted by: Edward Olmsted
Date characterization completed: July 25, 2002
Sampling method: Bulk
Analyses performed: fungal identification, optical microscopy
P&K Report No.: 020716-089

Sample ID	Fungal ID	Fungal structures observed	Category*	Comments**
105D5A-5	Stachybotrys chartarum	Spores, hyphae, conidiophores	A few	Fungal growth

* massive> numerous>many>a few>a trace

** comments reflect entire sample

Report approved by: 
De-Wei Li, Ph.D., Mycologist

Quality control checked by: 

Sediment and *Tetramitus* Toxicity
In
New York City Drinking Water
Appendices I, II, IV

Robert L. Jaffe, Ph.D.

Environmental Toxicology Laboratory LLC
<http://www.envirolab.com>



Appendix I

Description of the *Tetramitus* Assay and Data Management for Obtaining Toxicity Values

The *Tetramitus* Assay for Determination of Particle Toxicity

Tetramitus Assay Introduction:

A simple test for measuring cytotoxic agents using the flagellate phenotype of *Tetramitus rostratus* has been developed. The test measures dose-dependent inhibition of cell division by DNA-damaging agents and other toxicants. The *Tetramitus* Assay requires no animals or animal by-products. An additional attribute of the assay, which is useful for exposure monitoring and risk assessment, is the ability to measure whole particle toxicity without the need for prior solvent extraction and solvent-substitution procedures.

The assay is five to ten times more sensitive than standard Whole Effluent Toxicity tests (WET Tests such as *Ceriodaphnia* and fat head minnow) and can be performed on non-sterile environmental samples.¹ A detailed protocol with standard operating procedures is described. Evaluation of growing cell populations in seed flasks prior to the actual performance of the test is predictive of test performance and, therefore, avoids the loss of valuable samples. The *Tetramitus* Assay will allow for frequent testing thus permitting development of more accurate hazard assessments and comprehensive exposure models.

Tetramitus rostratus is a unicellular organism, which can exist as three distinct phenotypes: flagellate, ameba, or cyst. *Tetramitus* is estimated to have originated 1.0 to 1.2 billion years ago⁽²⁾. Single flagellates can be isolated and grown in liquid culture with bacteria as the only food source. Flagellates are quite stable (no amebae have been observed in more than 15,000 subcultures of flagellate populations reaching densities of up to 2×10^7 cells/mL). Because the *Tetramitus* flagellate is a particle feeder, the organism is useful for assessing whole particle cytotoxicity. The flagellate has a rigid cytoskeleton, four flagellae, and a gullet, which starts from the ventral depression and extends into the body of the cell (Fig. 1).

The assay measures dose-dependent inhibition of cell division by DNA-damaging agents. Recent studies have demonstrated the existence in *Tetramitus* of a 21.4 kb extrachromosomal DNA plasmid (r-DNA) which codes for the ribosomal RNA⁽³⁾. Minor sequence differences have been shown to cause drastic changes in the growth rate of *E. coli* cells harboring mutant rDNA plasmids⁽⁴⁾. Walsh has estimated the existence of 4,000 copies of rDNA amounting to 17% of the total cell DNA in single *Tetramitus* amebae⁽⁵⁾. The action of DNA-damaging agents on flagellates causes both decreased rates of cell division and a decrease in cell size.

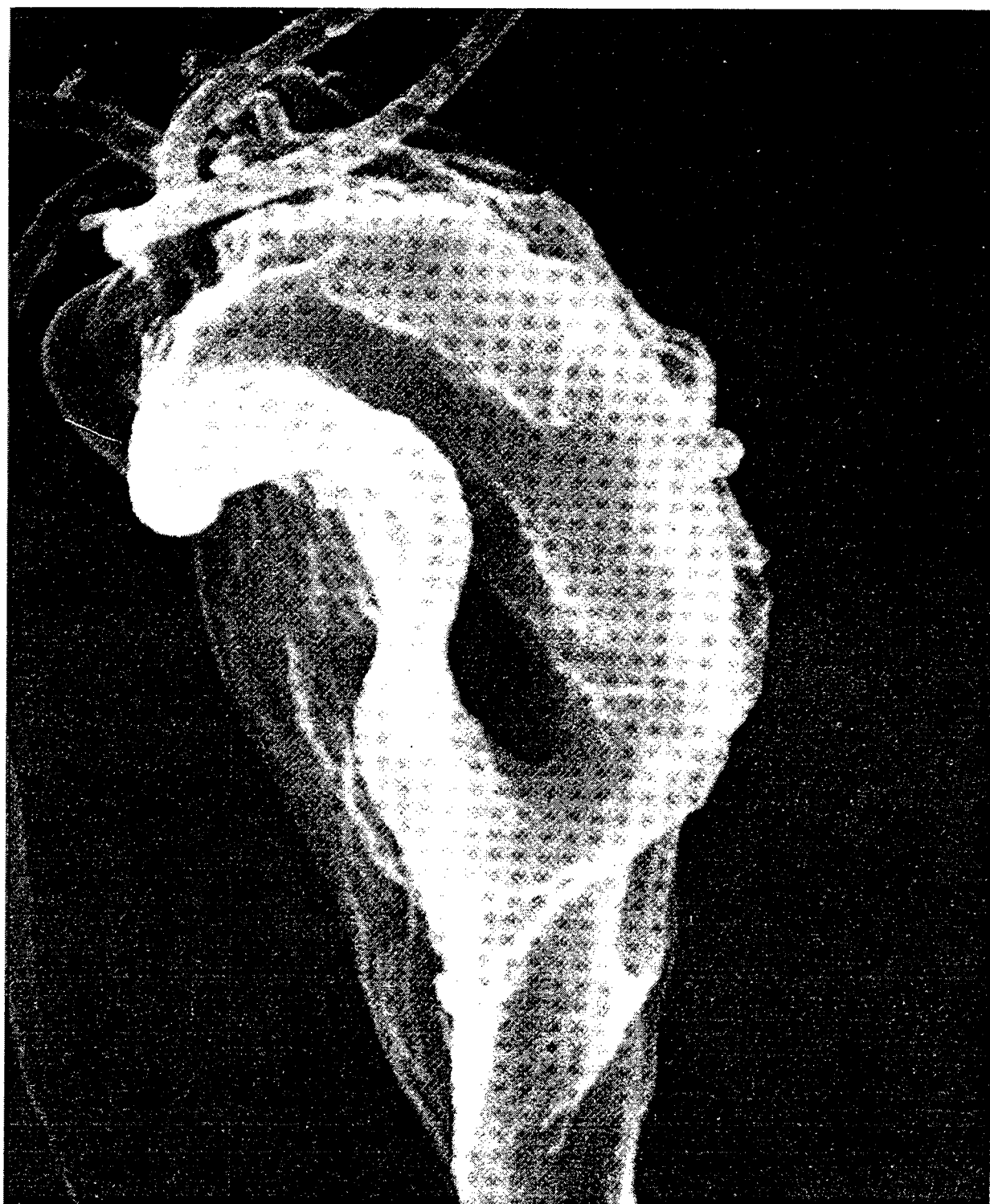


Figure 1. Scanning Electron micrograph of *Tetramitus* Flagellate

The original description of methods for culturing flagellates and suggested test protocols has been published⁽⁶⁾. The following text describes the latest methods revisions.

Original Stock Cultures

Tetramitus flagellates are maintained in association with *Klebsiella pneumoniae* in YPP medium (0.05% Difco yeast extract and 0.05% Difco proteose peptone in distilled water) and grown in Corning 16 x 125 mm sterile polystyrene tissue culture tubes (25200). Flagellates inoculated from YPP medium into bacteria-buffer cultures usually took 5-6 subcultures before optimal growth conditions were observed (mean division time of 3.5 hours at 30°C). Cultures of *Tetramitus* flagellates can be obtained from the American Type Culture Collection (ATCC) located in Rockville, Md.

Standard Bacteria-Buffer Maintenance Cultures

Tetramitus flagellates are grown in MS-1 buffer containing a dense suspension of *Klebsiella pneumoniae*(Kp). MS-1 contains 0.1 mM KCl, 0.3 mM CaCl₂, 0.3mM NaH₂PO₄, 0.0008% phenol red (pH indicator),and 1.4 mM NaHCO₃. The bicarbonate is added separately after autoclaving⁽⁷⁾. The original formulation of MS-1 called for inclusion of EDTA, which is now omitted in order not to interfere with toxicity testing of heavy metals.

Cultures of *Klebsiella* are grown overnight in a shaking water-bath at 35°C in 2.5% Oxoid #2 nutrient Broth (Unipath-CM67); 95 mL per 500 mL Nephlo flask (Bellco Glass 2581-14135). Teflon lined screw caps are used instead of the non-toxic rubber caps. Kp growth is monitored by determining the turbidity of the cultures in a Klett-Somerson nephelometer, using a red filter. The Kp are harvested by centrifugation at 2500 RCF for 10 minutes in Corning 50 mL sterile polypropylene tubes (25330-50). The Oxoid #2 supernatant is decanted, and the pellets are re-suspended in 40 mL of MS-1 by vigorous mixing with a Vortex Genie mixer. The Kp suspensions are re-centrifuged as above, the MS-1 supernatants are decanted and the pellets are re-suspended in fresh MS-1 (32 mL for each original 95 mL of Kp culture). The final suspension is referred to as Kp "soup" and 90 mL volumes (Kp suspension from 3 centrifuge tubes) are incubated in 350 mL baffled DeLong® flasks (Bellco 2510-00500) in a shaking water bath at 24°C @ 180 revolutions per minute. The New Brunswick Innova 3000 model has been found to be very reliable; all ETL's units are in use continuously without interruption. Our first unit has been in operation 24 hours a day for eleven years without a single malfunction.

Standard flagellate cultures were incubated in 125 mL baffled DeLong® flasks (Bellco 2510-00125) in 10 mL of Kp "soup" at 30°C @180rpm. Specially designed 125mL flasks with 38 mm necks (Bellco Glass, special order as described in ETL/Bellco draft-specifications) are used for seed cultures in order to facilitate rapid pipetting of 50 µl aliquots into individual tubes (see below). Seed cultures, which are in log phase for at least three division cycles are optimal for toxicity testing. Cultures, which are about to enter into early stationary phase should not be used for testing; the dose-growth curves can exhibit regression data with r^2 values under 0.97. As the population enters stationary phase, the mean cell diameter decreases and any subculture derived from stationary phase cultures will exhibit an increase in cell diameter corresponding to the increase of its slope at that time point, thereby reflecting the growth status of the culture as it re-enters log phase (Figure 2). The mean cell diameter of any culture can be used to ascertain if that culture is in log phase, thus, serving as an objective quality control indicator for a given seed flask. Stock cultures of *Tetramitus* flagellates growing in Kp suspensions are routinely maintained. Thus, cultures are available for toxicity testing at desired temperatures within a 2-day advance time. Laboratories, which do not have the availability of a ZM

by manual recording of cell counts at specified size windows. Beckman Coulter Multisizer or Z2, for size pattern determination, can use the oscilloscope patterns of the ZM as a means to evaluate size distributions. Precise size distributions can be obtained with the

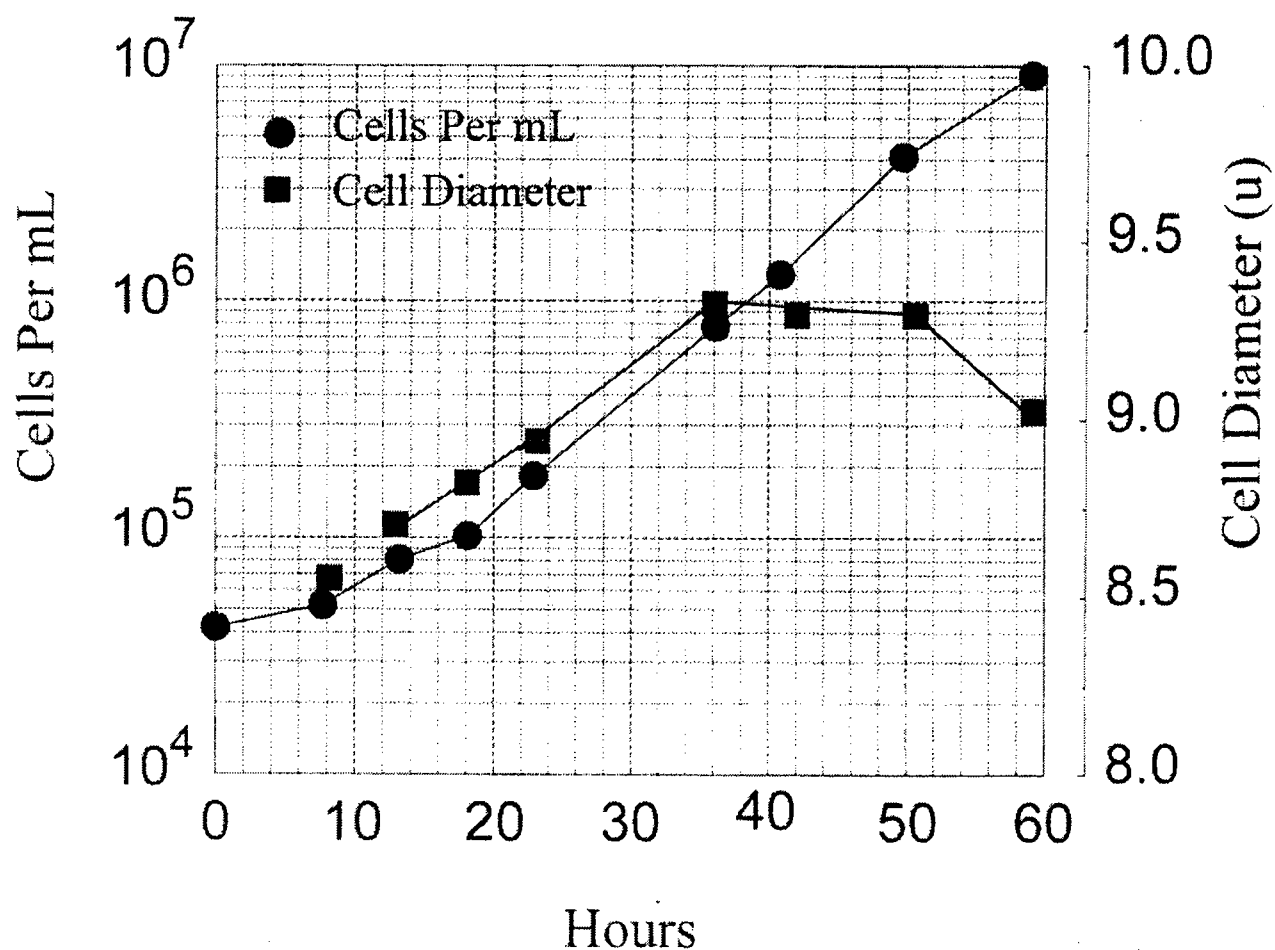


Figure 2. Growth of *Tetramitus* Flagellates at 30°C. The ■ symbols indicate the mean cell diameters as determined by the statistics program of the Multisizer IIE. When the cells are in log phase, the mean cell diameter values display a constant value.

A study was undertaken to determine the population heterogeneity of *Tetramitus* flagellates routinely grown in Kp suspension. 16 separate clones were isolated by dilution into individual tubes and were followed for a series of 20 subcultures in separate 1 mL Kp cultures. Table 1 summarizes the analysis of variance of the slopes of the 16 clones for series 5-8 subcultures growing at 30°C,

Table 1. Summary of Growth Rates of Tetramitus Flagellate Clones (Culture Series 5-8)

Slopes for each clone are measured from cell counts obtained at 3 time points. Statistical analysis include the mean slopes, coefficients of variance (CV), and the 95% and 99% confidence interval for the slopes of series 5-8 cultures. Flagellate cultures were maintained at 30°C.

Clone	Series 5	Series 6	Series 7	Series 8
TC-2	.0795	.0921	.0779	.0864
TC-3	.0901	.0781	.0735	.0907
TC-4	.0860	.0870	.0822	.0884
TC-5	.0778	.0909	.0764	.0939
TC-6	.0888	.0876	.0792	.0817
TC-7	.0759	.0936	.0760	.0806
TC-8	.0817	.0833	.0861	.0800
TC-9	.0738	.0761	.0783	.0792
TC-10	.0902	.0835	.0786	.0832
TC-11	.0796	.0722	.0721	.0803
TC-12	.0853	.0866	.0890	.0832
TC-13	.0776	.0904	.0848	.0845
TC-14	.0854	.0891	.0667	.0825
TC-15	.0829	.0863	.0812	.0844
TC-16	.0992	.0769	.0898	.0770
TC-17	.0919	.0807	.0948	.0751
MEAN SLOPE	.0841	.0847	.0804	.0832
Coefficient of Variance	8.09	7.46	8.97	5.88
95% Confidence	.0805 - .0877	.0813 - .0880	.0766 - .0843	.0806 - .0858
99% Confidence	.0791 - .0893	.0800 - .0893	.0751 - .0858	.0796 - .0868

Further observation of the population stability and homogeneity of the clones was demonstrated by measuring the mean cell diameters (MCDs) of the 16 clones during serial transfers of the series 18-20 cultures (Table 2). The mean cell diameter values differ from those shown in Figure 2, because of differences in the calibration between the Model Z2 and the Multisizer IIE and ZM. Our current calibration with the ZM indicates that the MCD value to be 9.4 - 9.6. Note that as the cell population enters stationary phase growth, the MCD decreases and the coefficient of variance increases

Table 2. MCDs of Tetramitus Clones during serial transfer at 27°C.
MCDs were determined with a Beckman Coulter Z2 Counter.

<i>Clone</i>	Mean Cell Diameter (Log Phase) Series 18	Mean Cell Diameter (Late Log-SP) Series 18	Mean Cell Diameter (Log Phase) Series 19	Mean Cell Diameter (Log Phase) Series 20	Mean Cell Diameter (Log Phase) Series LT2 (20°C)
TC-2	11.07	10.06	10.49	10.66	10.81
TC-3	11.21	9.75	10.87	10.72	10.88
TC-4	10.84	9.51	10.80	10.86	11.16
TC-5	10.85	9.46	10.82	10.75	11.09
TC-6	10.68	9.47	10.82	10.48	10.89
TC-7	10.78	10.73	10.71	10.74	10.94
TC-8	10.59	10.09	10.28	10.72	10.81
TC-9	10.84	10.88	10.92	11.03	11.02
TC-10	11.22	9.34	10.83	10.81	10.88
TC-11	10.83	10.78	10.69	10.48	10.81
TC-12	10.53	9.12	10.44	10.40	10.62
TC-13	10.64	9.69	10.68	10.61	10.79
TC-14	10.79	10.73	10.68	10.53	11.00
TC-15	10.71	9.82	10.36	10.59	NA
TC-16	10.77	9.05	10.64	10.69	10.81
TC-17	10.43	10.51	10.68	10.54	10.70
MEAN	10.80	9.94	10.67	10.66	10.88
Coefficient of Variance	2.04	6.24	1.76	1.52	1.32

These data demonstrate the stability and reproducibility of *Tetramitus* flagellate growth in serial laboratory cultures.

Counting

Cell concentrations were determined with the use of either a model ZM Coulter Counter or a Multisizer IIe (Beckman-Coulter Electronics, Miami, Florida) using a 100 μ aperture tube. 0.2 mL aliquots were transferred to Folin-Wu tubes containing 30 mL of electrolyte (0.4% NaCl [w/v] in distilled water). The volume was adjusted to 35.0 mL by adding saline from a plastic wash bottle to the etched 35 mL volume line of the Folin-Wu tubes. The contents of each tube were agitated using a Vortex-Genie mixer, aliquots were transferred to Coulter disposable counting cuvettes and 2 counts were determined at threshold settings of 10-99.9; current, 400 mA; attenuation, 4; preset gain, 1; and manometer selection, 500ul for the ZM. The narrow channel option with lower channel = 6.03 μ and upper channel = 15.03 μ settings are used for the Multisizer. This method of counting has been found to be extremely reliable; the correlation coefficients of the growth curves are usually 0.998 or higher. One correlation coefficient of a four-point growth curve was 0.999999.

The precision of the Coulter Counters, both the Multisizer IIe and the ZM, over the course of 10 years of research experience has been a constant ingredient in the production of a data base containing control and dose growth regression curves with high correlation coefficients.

Standard hemacytometer counting methods can be employed by pipetting 100 μ l of sample into a 12 x 75 mm polystyrene test tube (Fisher 14-961-10) containing 10 μ l of Lugol's iodine. After vortex-mixing, aliquots are transferred to a counting chamber. 4 counts of 100 + are obtained and the cell concentration is calculated by multiplying the average count by 1.1(to compensate for the 10 μ l of Lugol's iodine). The larger area of the hemacytometer chamber can be employed using an additional dilution multiplier of 1.1×10^3 . The lowest flagellate concentration, which accurately, can be measured by this method would be 1×10^5 cells/mL

Data Management

The growth of each control (MS-1) and dose culture were recorded by entering the cell counts into a LotusTM spread-sheet (Table 3), which was modified to list the time of sampling, elapsed time, 2-4 coulter counter determinations, average cell concentration, and the log of the cell concentration. The summary table lists the regression calculations. Templates for toxicity tests employing 4 – 7 doses also contained macros, which provided summary sheets listing the slope-ratio calculations for each dose.

The data from the LotusTM spreadsheets were transferred to PSI-Plot (Poly Software, Pearl River, NY) spreadsheets in order to produce growth and dose-response graphics

Table 3. Data entry into Lotus 123® Spreadsheets. Each spreadsheet contains a series of tests: Test 1 is the control culture (MS-1 or 0-dose), the cultures with increasing doses are labeled Test 2, Test 3, etc. The slopes, r^2 values and the slope ratios are automatically calculated by a series of macro commands and are listed in the summary sheet:

Test 1 Control (MS-1)
Dilution Factor : 1/350

	Initial	1	2
<u>Time of reading</u>	13:21:89	4:38:31	14:07:33
<u>Elapsed Time</u>	0.00	15.28	22.70
<u>Coulter Counts</u>			
Reading 1	43	948	10966
Reading 2		975	11360
<u>Average</u>	43	961.5	11163
<u>Log Cells/mL</u>	4.1795	5.5270	6.5918
<u>Cells/mL</u>	1.512×10^4	3.365×10^5	3.907×10^6

EFFECT OF CONCENTRATION (Summary Sheet for 3 doses)

Concentration	Slope	r^2	Slope Ratio
MS-1 (Control)	0.0869	0.9999	1
20%	0.0811	0.9931	0.933
50%	0.0749	0.9939	0.862
90%	0.0645	0.9969	0.740

Cultures for Toxicological Studies

Individual Toxicants:

Toxicological studies are carried out in 17 x 100 mm Falcon (35-2057) sterile, disposable polystyrene tubes; final volumes are 1.0 mL/tube. For organic toxicants, 10 μ L aliquots of serial dilutions of toxicant dissolved in dimethylsulfoxide (DMSO) are added to 990 μ L aliquots of flagellate cultures in order to obtain a series of dose-culture tubes. 10 μ L of DMSO is used for the 0-dose or control tube. Inorganic toxicants are dissolved and diluted in MS-1. Some organics which are not soluble in DMSO, such as benzo[a]pyrene are dissolved in cyclohexane.

Environmental Samples:

Whole Effluent and whole particle testing are conducted in 1.0 mL final volumes according to the dilution matrix described in Table 4. The protocol has been modified in order to permit allocation of 90% of the volume of the test cultures for delivery of the sample. In order to reconstitute the whole effluent or water samples in MS-1 buffer; 60 μ L of solution A, 30 μ L of 0.1M $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$, and 100 μ L of 0.1M NaHCO_3 are added to 10 mL of neat water sample. Solution A contains 10 mL of 0.1 M NaHPO_4 , 10 mL of .5% phenol red solution (Sigma P-0290), and 3 mL of 0.1M KCl.

Table 4. Schedule of components for testing either whole effluent water samples, or whole particle suspensions. The units of measurement for whole water dilutions are % Effluent; and P-MEQ/mL (particle milliliter equivalents per mL) for particle suspensions.

Whole Effluent Whole Particle	MS-1	Flagellates (Seed Flask)	Kp Suspension (20X)
0 μ L	900 μ L	50 μ L	50 μ L
100 μ L	800 μ L	50 μ L	50 μ L
200 μ L	700 μ L	50 μ L	50 μ L
500 μ L	400 μ L	50 μ L	50 μ L
900 μ L	-----	50 μ L	50 μ L

20X Kp Preparation and Seed Cultures:

The 20 X Kp (*Klebsiella pneumonia*) suspension (Table 4) is obtained by re-centrifuging the Kp suspension (see above) and re-suspending the Kp in 1/20 of the original volume (ex: re-suspend the pellet obtained from 100 mL of Kp soup in 5.0 mL of MS-1). The starting flagellate concentration in the 1.0 mL of test culture will be 1/20 of the seed culture. Aliquots of whole water samples also may be filtered through membrane filters (small volumes obtained with swinnex filters) of known pore size in order to determine the toxicity of filtrates, which are selected for exclusion of particles of specific sizes.

The sequence for the test is:

1) Set up the seed flask culture to contain 2.0×10^5 cells per mL (572 counts determined by Coulter Multisizer or ZM) at the anticipated time of delivery. 50 μ L delivered to each tube would result in a starting concentration of 1×10^4 cells per mL. The slope of the dose response curves for individual toxicants, whole effluents, and water concentrates is steeper at lower starting flagellate concentrations (Figure 3). Consequently, all tests are standardized for this starting concentration. The usual slopes of log phase cultures growing at 30°C, range between .082-.093 (log cell concentration per hour). The mean division time is about 3.7 hours and the time required to grow 1 log is 11.5 hours (ex: 1×10^4 - 1×10^5). Seed cultures can be diluted with Kp soup several hours before tests commence in order to ensure the 1×10^4 per mL starting concentration. Tests for suspected higher toxicity samples may be started at 1.0×10^5 cells per mL (2.0×10^6 cells per mL in the seed flask) and counted the same day (7.4 hours = 2 division cycles).

2) Test components are delivered into each Falcon 17 mm tube in the following sequence:

MS-1, particles or whole effluent, 20 X Kp , vortex and place in water bath.

3) Count cells in seed flask and then deliver 50 μ L aliquots as rapidly as possible. Use the recorded time of seed flask determination and designate the starting flagellate concentration as 1/20 of the recorded seed flask, count value. Delivery of 10 x 5 aliquots (10 tests with 4 dilutions + control) usually takes 12-15 minutes.

4) Set up Test 1 spreadsheet (separate file label) with recorded time and calculated, starting Coulter counts for the control culture, then copy these values to the 4, 5, or 6 dose-culture spread sheet cells; save the file. Copy this file to nine separate files, using the "Save As" Tab in the spreadsheet file menu. Assign different file labels for different tests. The spreadsheets can be formatted at any time prior to the first sampling time.

5) Count each test series at three subsequent sampling times, usually at 20-22 hours, 29-32 hour, and 40-44 hours. Enter the time of sample taking and the Coulter counts in each Lotus spreadsheet. The summary page will automatically list the calculated values of the slopes, r^2 values and the slope-ratios for each dilution. These values can be exported to a statistics program (PSI-Plot, Excel, Statmost, etc.) to produce graphics of the dose-response curves.

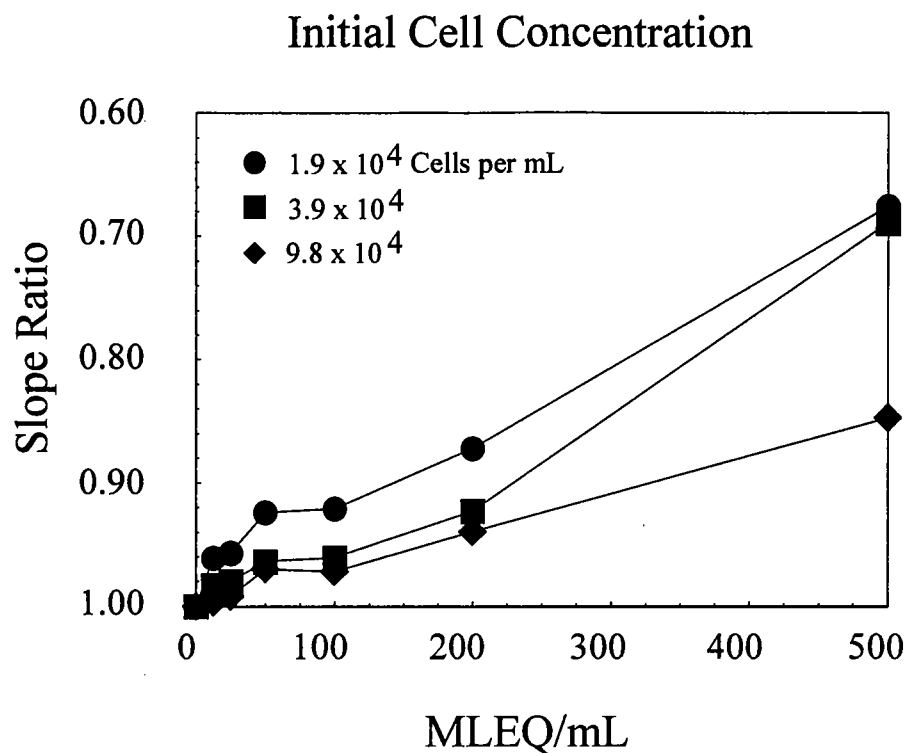


Figure 3. The effect of initial cell concentration on the dose response of a Netherlands water concentrate. The slope ratio x concentrate dose values was obtained for each of the starting flagellate concentrations. The regression curves for each starting cell concentration describe the increased sensitivity of the test at lower starting cell concentrations (decreasing slope ratios are a measure of increasing cell division inhibition and indicate increased toxicity).

Determination of the storage time stability of particles both in whole water and in suspension after filter preparation will be valuable for scheduling the elapsed times after sample collection for optimal performance of tests.

Obtaining Dose Response Curves

- Plot growth curves for each dose-culture
- Calculate the slope for each dose-growth curve
- Calculate the slope ratio for each dose:

$$\frac{\text{slope of dose culture}}{\text{slope of control culture}}$$
- Plot Dose Response Curve

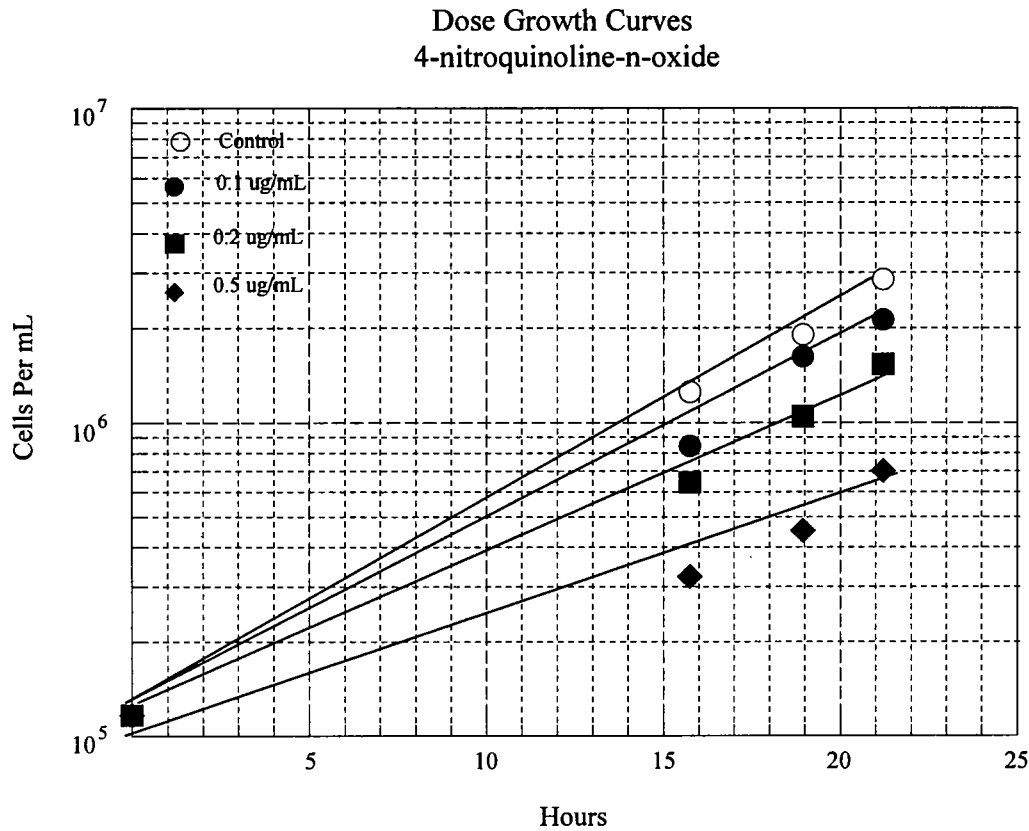


Figure 1. Growth of Tetramitus Flagellates at different concentrations of 4-nitroquinoline-n-oxide.

Table 1. Regression Data for 4-nitroquinoline-n-oxide dose-Growth Cultures

Dose	Slope ⁽¹⁾ Growth Curves	r ² ^(*) Growth curves	Slope Ratio (Relative Growth)
0 µg/mL	.0653	.9997	1.0
0.1 µg/mL	.0591	.9942	.906
0.2 µg/mL	.0512	.9929	.784
0.5 µg/mL	.0338	.9591	.517

(1) Log of cell number /hour

(*) correlation coefficient . Perfect correlation (all points on a straight line) is 1.0

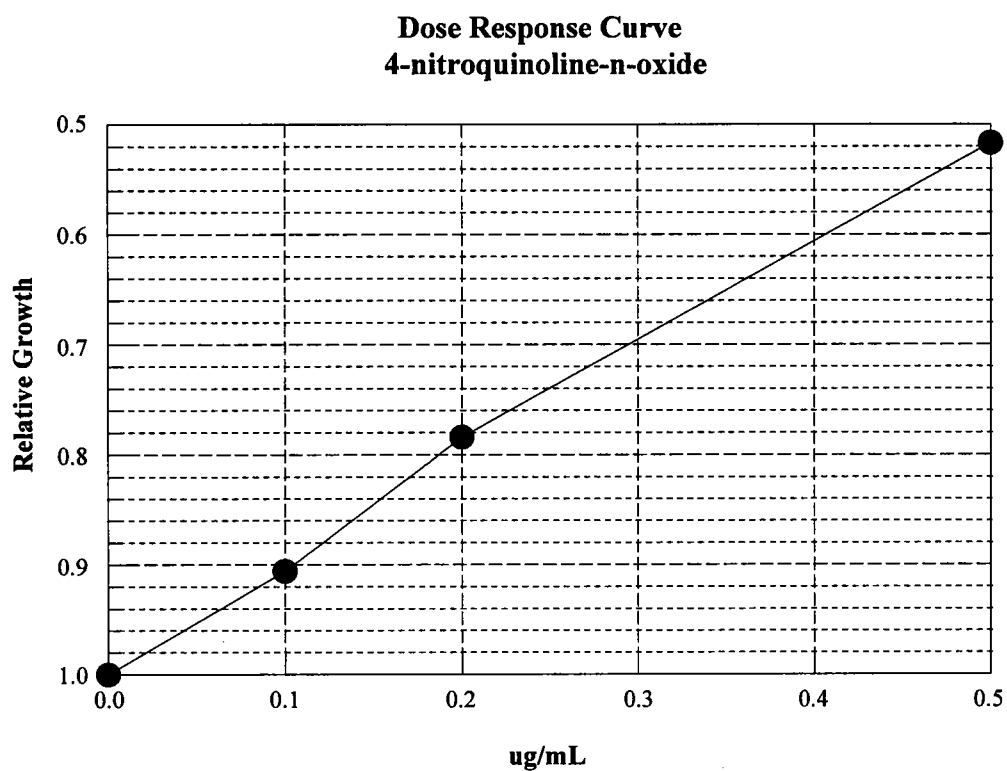


Figure 2. Dose response curve for 4-nitroquinoline-n-oxide.
Lower Relative Growth (Slope Ratio) indicates increased toxicity.

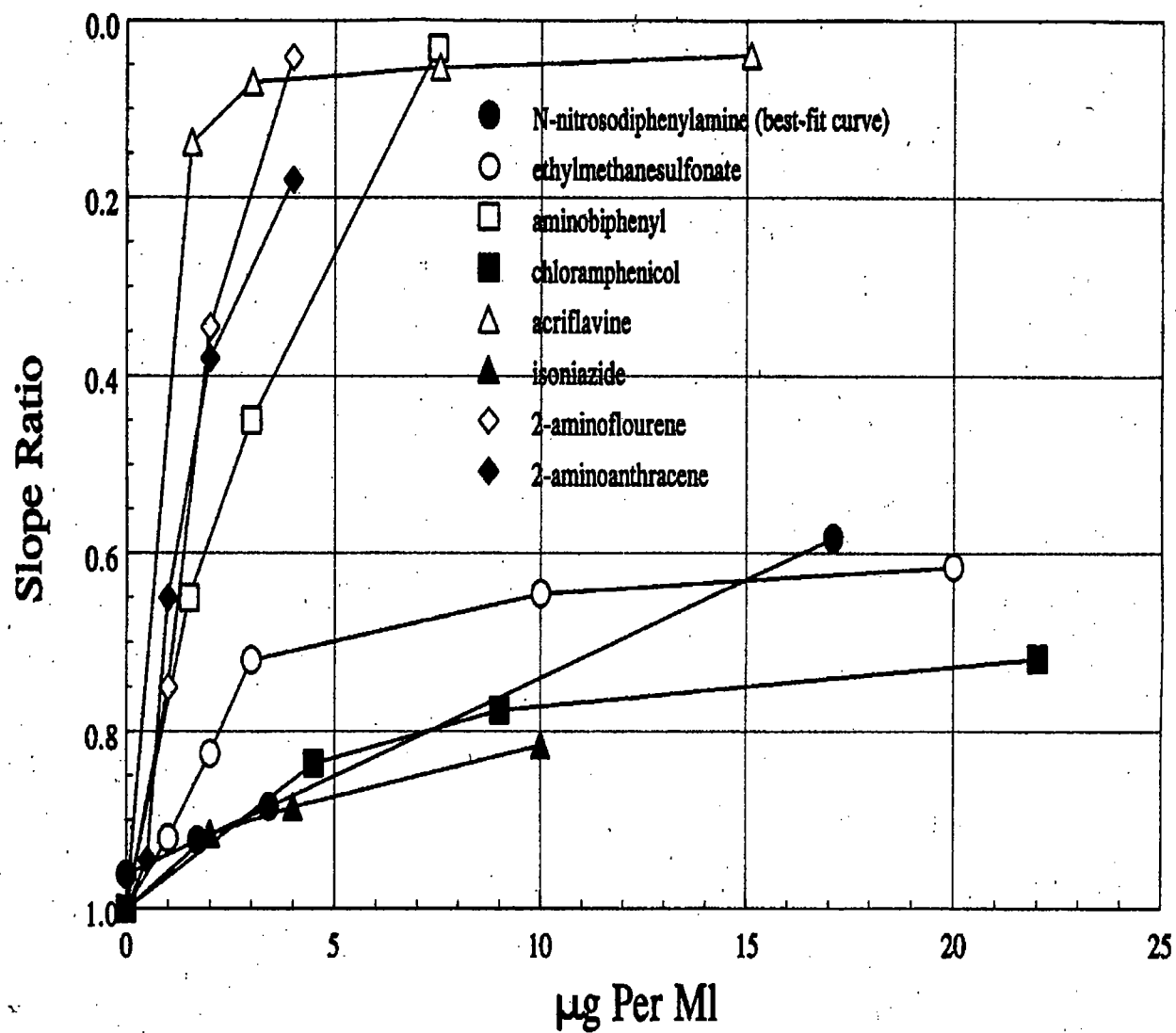
Appendix II Reference Toxicants in the Tetramitus Assay

- A. Dose Response to 8 Reference Toxicants**
- B. Comparison of 5 Reference Toxicants to other Genotoxicity Tests**
- C. Range of Flagellate Growth Inhibition Response**
- D. Tetramitus Dose Response to MX**
(Major disinfection byproduct of drinking water chlorination)

Office of Environmental Health Hazards Summary on MX Research
- E. National Institute of Standards (NIST) Standard Reference Materials (SRM)**

Coal Fly Ash NIST SRM # 2689

Diesel Particle Matter SRM # 2975



Toxicant Concentration

Figure A. Dose Response of Tetramitus Flagellates to eight reference toxicants. Lower Slope Ratios (**Relative Growth**) indicates increased toxicity.

B. Comparison of 5 Reference Toxicants to other Genotoxicity Tests

TABLE 3. Comparison of *Tetramitus* Test to Ames/*Salmonella* and Other Genotoxicity Tests (Waters et al., 1994)

Mutagen	<i>Tetramitus</i> test dose ($\mu\text{g/ml}$) slope ratio = 0.8	Ames/ <i>Salmonella</i> test LED* ($\mu\text{g/ml}$)	Other tests LED* ($\mu\text{g/ml}$)
Cadmium chloride	0.45	8 (TA 102)	0.01-1.1 CIC
		56-1120 (TA 100)	0.66-3.66 AVA
		56-610 (TA 1535)	0.37-9.0 SPM
		150-610 (TA 98)	1.0-4.3 DLM
Aminobiphenyl	1.2	2-62 (TA 98)	5 G5T
		1-62 (TA 1538)	6.3 GIH
		5-125 (TA 1535)	10 G9H
		0.1-1250 (TA 100)	
Methyl glyoxal	3.5	1.25 (TA 104)	7 SIC
		2-5 (TA 100)	30 GCL
		2-30 (TA 102)	36 G9H
Methyl yellow	7.5	2-50 (TA 98)	6.25 G5T
		5-2500 (TA 1538)	16 GIA
			22.5 SIC
2-Nitrofluorene	22	0.15-50 (TA 1538)	2-4 G5T
		0.3-50 (TA 98)	2.1 SIC
		0.5-17 (TA 1537)	5-167 ECW
		1.7-1250 (TA 100)	20 TCS
		5-167 (TA 1535)	

*LED, lowest effective dose (ranges include values reported from multiple citations).

Other test codes: AVA, aneuploidy, animal cells *in vitro*; CIC, chromosomal aberrations, Chinese hamster cells *in vitro*; DLM, dominant lethal test, mice; ECW, *E. coli*, WP2 *uvrA*, reverse mutation; GIA, gene mutation, animal cells *in vitro*; GIH, gene mutation, human cells *in vitro*; G5T, mouse lymphoma cells, TK locus; G9H, gene mutation, Chinese hamster lung V-79 cells; GCL, Chinese hamster lung cells exclusive of V79; SIC, sister chromatid exchange, Chinese hamster cells *in vitro*; SPM, sperm morphology, mouse; TCS, cell transformation, Syrian hamster embryo cells, clonal assay.

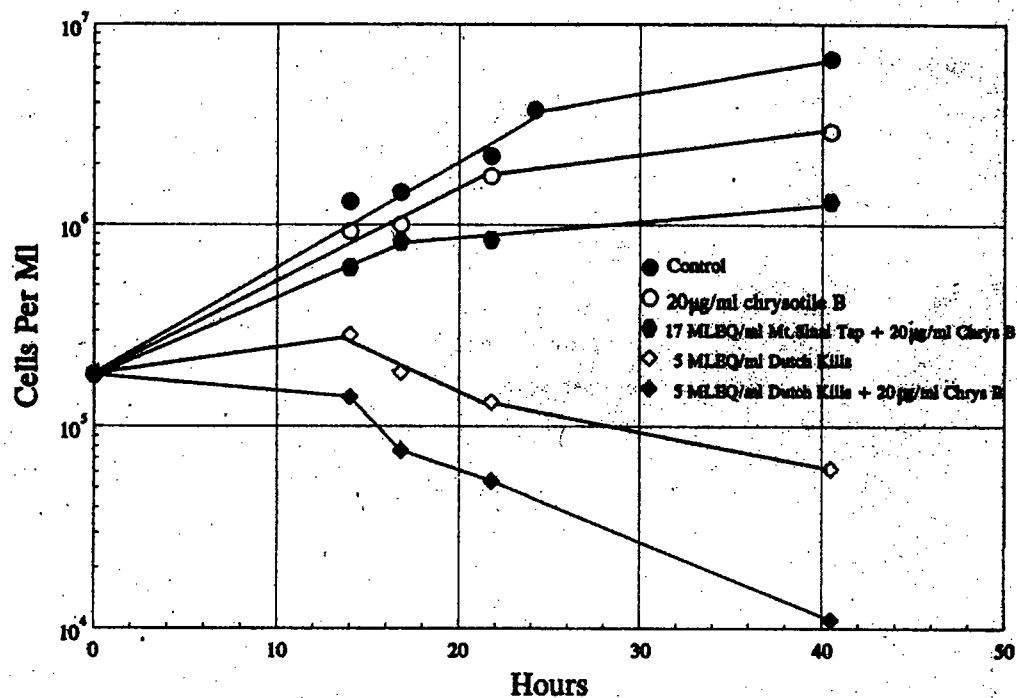


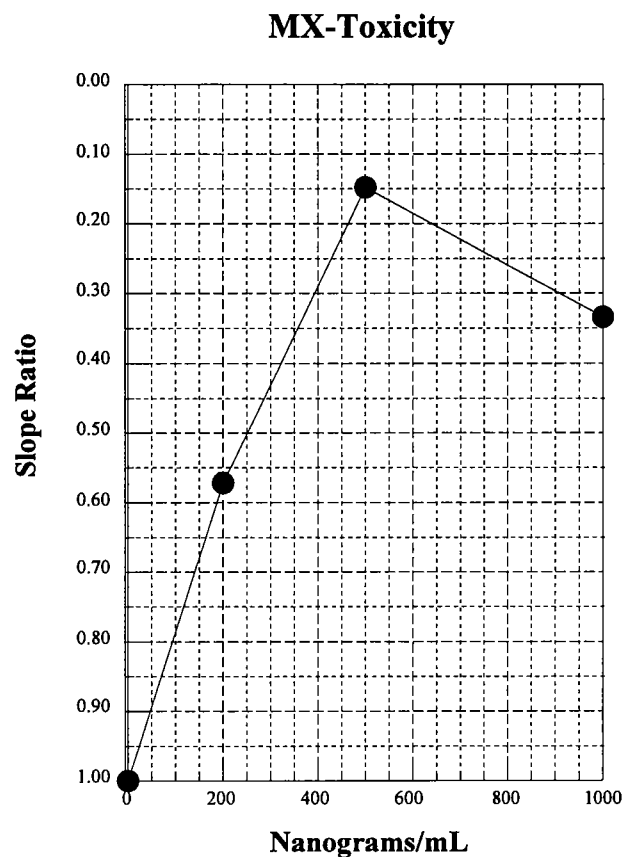
Figure C. Growth of Tetramitus Flagellates in Mt. Sinai Tap Water and Dutch Kills water concentrates. Note the synergistic effect of water concentrate + chrysotile asbestos. Flagellate growth only in Mt. Sinai Water Concentrate is similar to the growth of the control culture.

The range of Growth Responses can exhibit:

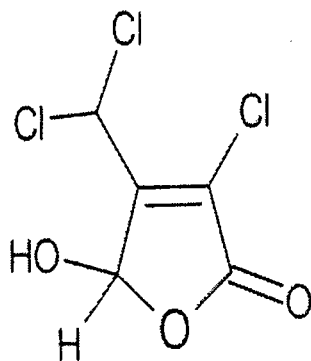
- no toxicity (same growth rate as control cultures; slope ratio = 1)
- Decrease in relative growth rate (Slope ratio values decrease from value of 1.0; a Slope Ratio of 0.9 indicates that the cells are growing at 90% of the controls).
- Complete Growth Inhibition
- Decrease in cell number (cell death)

Figure D

Tetramitus MX Toxicity



3-chloro-4-(dichloromethyl)-5-hydroxy-2(5*H*)-furanone
(MX, Mutagen X)



Molecular Weight: 217.4 CAS Reg. No.: 77439-76-0



MX: Summary

- **Animal evidence of carcinogenicity:**
 - Induction of tumors at multiple sites in both male and female rats following treatment via drinking water for 2 years
- **Other relevant evidence:**
 - Extensive genotoxicity evidence both *in vitro* and *in vivo*
 - Suggestive evidence that MX may induce cellular proliferation or promote tumors in some tissues



E. National Institute of Standards (NIST) Standard Reference Materials (SRM)

Reference Particle Toxicants:

Tests was performed on 2 standard reference materials obtained from the National Institute of Standards, in order to demonstrate that the *Tetramitus* Assay produced positive responses to known environmental particulate matter. Both Coal Fly Ash (SRM#2689) and Diesel Particulate Matter (SRM# 2975) produced positive responses (Figure 9).

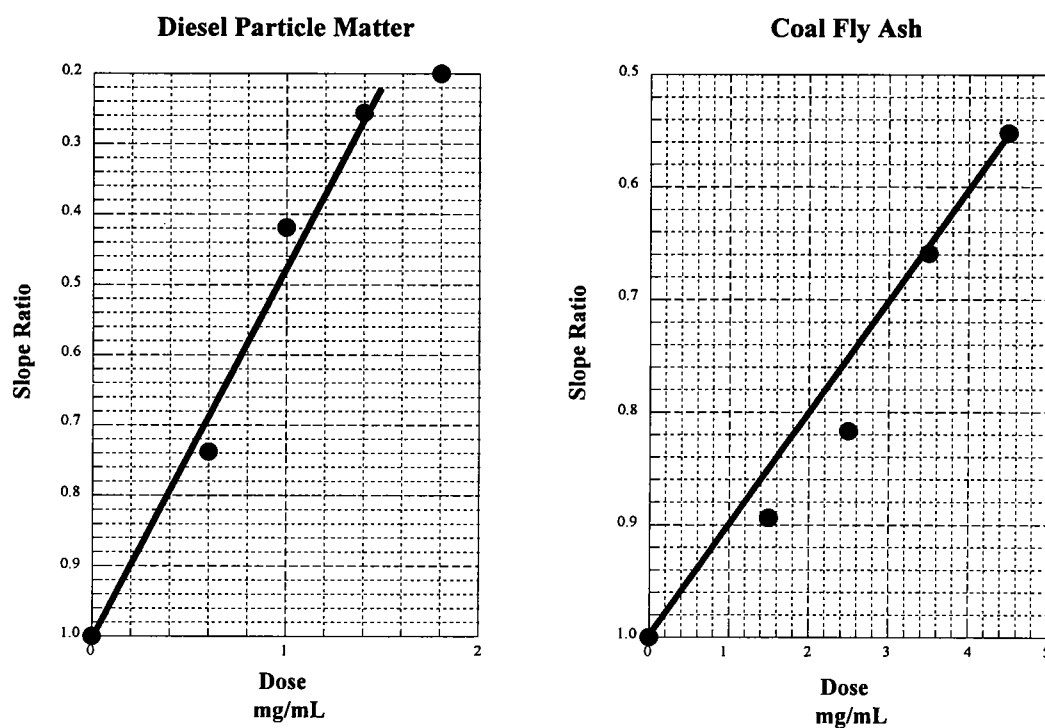


Figure 9. Dose response of *Tetramitus* flagellates exposed to National Institute of Standards Coal Fly Ash and Diesel Particle Matter .

Appendix IV. Comparison of EPA WET Tests to Tetramitus Assay

A subsequent study comparing the *Tetramitus* Assay to standard EPA whole effluent assays (WET tests) using the micro crustacean *Ceriodaphnia* and the fat head minnow were conducted on 2⁰ sewage, pharmaceutical plant, and automobile plant effluents (Jaffe,RL, Sweet,LI, and Meier,PG - manuscript in preparation). Table 5 illustrates that the *Tetramitus* Assay was at least five times more sensitive than the standard WET test. Only the pharmaceutical plant produced a NOEC (no observable effect concentration) of 60% effluent using standard WET testing; both the 2⁰ sewage and auto manufacturing plant effluents had NOEC's of 100%. The NOEC's for the *Tetramitus* assays were 20 - 40%. All the assays were conducted with starting flagellate concentrations of 1.0×10^5 cells per mL. Figure 8 is a graphic comparing WET Tests performed on different effluents. One series using a starting cell concentration of 1×10^4 produced a dose response curve which was 2.5 x more sensitive (based on comparison of the slope-ratio intercept of 0.90). Similar increased sensitivity also was observed on water concentrates (Figure 9). Whole effluent samples also may be filtered through 0.45 μ pore size membrane filters. The filtered whole effluents can be tested in order to observe the effect of particle contribution (greater than 0.45 μ) on the unfiltered whole effluent dose response curves. In addition, particle toxicity can be directly measured by testing concentrated particle suspensions (obtained by centrifugation)

Particle Toxicity in Effluent Samples:

Table 4. Comparison of WET Tests: *Tetramitus*, *Ceriodaphnia*, and (Fathead minnow).

Source of Effluent	WET Test Organism	NOEC ⁽¹⁾	LOEC ⁽²⁾
Pharmaceutical Plant	<i>Tetramitus</i>	20% effluent	40% effluent
	<i>Ceriodaphnia</i>	60% effluent	80% effluent
	Fathead minnow	60% effluent	80% effluent
Auto-Manufacturing Plant	<i>Tetramitus</i>	20% effluent	40% effluent
	<i>Ceriodaphnia</i>	100% effluent	NA
	Fathead minnow	100% effluent	NA
2 ⁰ Sewage Plant	<i>Tetramitus</i>	20% effluent	40% effluent
	<i>Ceriodaphnia</i>	100% effluent	NA
	Fathead minnow	100% effluent	NA

(1) NOEC - No Observable Effect Concentration.

(2) LOEC - Lowest Observable Effect Concentration.

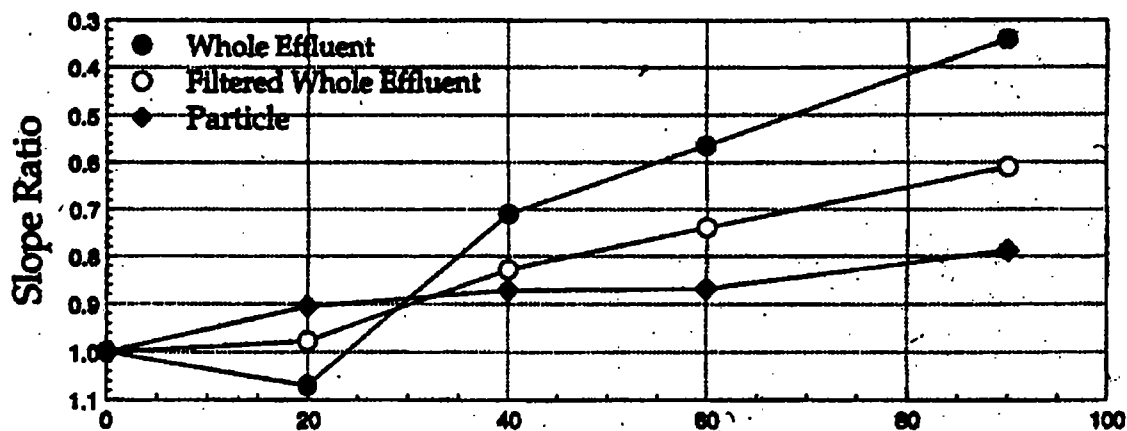


FIGURE 9. Dose response curves of components in an effluent from an auto manufacturing plant. The whole water toxicity is the sum of the filtrate + particulate toxicity.

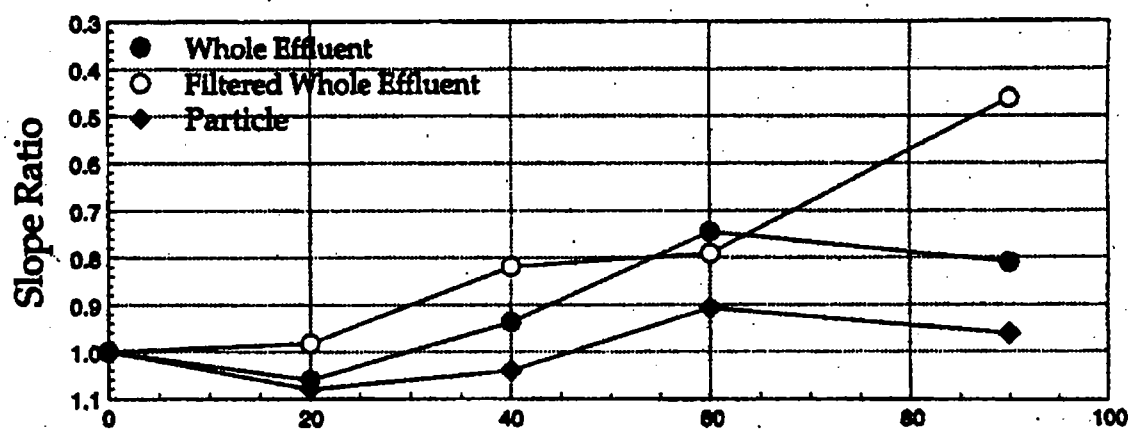


FIGURE 10. Dose response curves of components from a secondary sewage treatment plant effluent. Particle interactions above 60% effluent and 60 Part-MLEQ/mL cause flattening of both whole effluent and particle dose response curves while the filtered whole effluent curve remains linear.

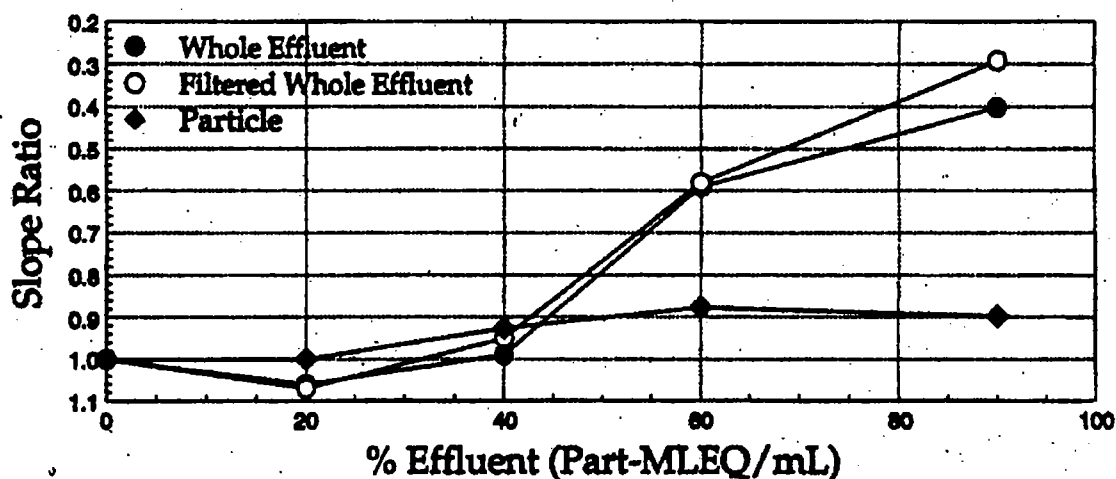


FIGURE 11. Dose response curves of components from a pharmaceutical plant effluent. Whole Effluent and Filtered Whole Effluent curves are similar.

Reference Broad Agency Announcement: BAA#02-Q-4655
Combating Terrorism Technology Support Office/Technical Support Working Group

Phase II White Paper

Flagellate Swimming Patterns as an early Warning Signal for Terrorist Poisoning of Air
and Drinking Water

Wade McGillis, Scott M. Gallager
Woods Hole Oceanographic Institution
Woods Hole, MA
and
Robert L. Jaffe
Environmental Toxicology Laboratory

Description of the problem and proposed solution

The problem addressed in this white paper is terrorist poisoning of air and drinking water. The need to monitor air and drinking water, on a real time basis, for introduction of known and newly developed toxicants is critical for protection of personnel, both military and civilian. Our solution is the development of a biomonitoring system contained in a swimming behavior spectrometer (SBS). The SBS will measure the swimming behavior response of free-swimming, single cell protist organisms exposed to toxic agents and provide real time identification of hostile introduction of toxic agents into air or drinking water at military bases, reservoirs and tap water sources. An SBS system includes the instrument, software that enables any laptop or desktop computer to function as the user interface and control station, and a Protist Nursery (PN) containing growing flagellates. The SBS will be able to be operated by high school graduates and will be provided with manuals and computer-based (embedded) training.

The SBS system may be used at fixed sites, although these sites may be regularly moved. It will be suitable for ships, brigade and battalion headquarters and support operations, hospitals, bunkers, etc. as well as more established military bases. It also will be suitable for continuous, unattended (one-week intervals) monitoring at commercial sites such as reservoirs, drinking water facilities, and wastewater plants or as a shunt-line monitor for pipes.

Our laboratories have shown that swimming behavior in protist organisms is extremely sensitive to low levels of biologically-active compounds (<http://envirolab.com> and <http://science.whoi.edu/users/sgallager/bioassay/flagbioassay.html>).

The SBS will measure, in real-time, dose-dependent swimming behavioral changes (e.g., velocity, direction, displacement and size) of protist populations exposed to ppm levels of water and air borne toxins. Swimming behavior parameters are spectrally analyzed and the results presented as the proportion of cell populations normal and abnormal. Time-dependent changes (order seconds) in behavior are related to toxicant type and concentration.

Some of this work has been funded by internal funds at ETL through venture capital start-up funds. The project builds upon hardware and software developed by Dr. S. Gallager funded through the US GLOBEC Program, a consortium program between the National Science Foundation and the National Oceanic and Atmospheric Administration.

Indicators, with alarm capability, will provide the user with results of spectrally analyzed behavior of the protests in response to unknown toxic agents. The user display will present the proportion of cell populations normal and abnormal and will indicate whether a threat is likely to exist. "Red-flagged" water supplies will then be quarantined until further toxicity testing and chemical analysis are performed. The SBS unit can be automated and networked for remote detection capability.

Description of the proposed tasks and associated deliverables

Task 1: Protist Culture Protocols

- a.. To optimize protocols for flagellate culture and prepare manuals describing the protist nursery
- b.. To optimize the flagellate-toxin reaction using the SBS to evaluate the effect of 10-15 toxicants (DoD tospecify) on the behavior of a minimum of three protist species.

Task 2: Swimming Behavior Analysis

- a. To design and construct optical and electronic equipment for imaging swimming protests under defined environmental conditions
- b. To design software and statistical procedures for swimming behavior analysis under controlled conditions
- c. To prepare manuals for the operation and interpretation of data from the SBS

Task 3: Validation

- a. To experimentally test the SBS at a DoD laboratory for accuracy and functionality using realistic toxins.
- b. To prepare user manuals and instruction videos

Task Details

Task 1: Protist Culture Protocols

a. To optimize protocols for flagellate culture and prepare manuals describing the protist nursery. Environmental Toxicology Labotatory (ETL) will maintain and provide all cultures of protists (flagellates and ciliates) for use in the development of the SBS spectrometer. ETL will examine the utility of various protist species both for sensitivity to a specified list of toxicants and ease of laboratory culture and maintenance. Examination of growth parameters at lower temperatures and the transition to higher temperature conditions for use in SBA toxicity assessment will be examined. Use of frozen stock cultures as initial source material is impractical because of the time required to bring the cultures to optimal growth conditions (3-10 days, depending on the species). In order to minimize labor efforts, low temperature growth parameters will be evaluated in order to determine optimal stock maintenance protocols. Preliminary data describing growth parameters for several protist species are listed in Table 1.

Table 1. Growth Parameters for Protist Species.

Species	Growth Temperature	Mean Division Time	Effective Population Range	Time for 1 Log Growth ⁽¹⁾	Estimated Transfer Time ⁽²⁾
<i>Bodo caudatus</i>	25°C	2.4 Hours	1 x 10 ³ –5 x 10 ⁷ cells/mL	7.6 Hours	36 Hours
<i>Bodo caudatus</i>	18°C	5 Hours	1 x 10 ³ –5 x 10 ⁷ cells/mL	17 Hours	78 Hours
<i>Tetramitus Rostratus</i>	25°C	5.2 Hours	1 x 10 ³ –1 x 10 ⁷ cells/mL	17 Hours	68 Hours
<i>Tetramitus rostratus</i>	18°C	12 Hours	1 x 10 ³ –1x 10 ⁷ cells/mL	30 Hours	120 Hours (5 days)
<i>Claucoma chattoni</i>	25°C	4.4 Hours	5 x 10 ² –3 x 10 ⁵ cells/mL	14 Hours	24 Hours
<i>Claucoma chattoni</i>	18°C	6.8 Hours	5 x 10 ² –3 x 10 ⁵ cells/mL	22 Hours	60 Hours
<i>Tetrahymena malaccensis</i>	25°C	5 Hours	5 x 10 ² –5 x 10 ⁵ cells/mL	18 Hours	36 Hours
<i>Tetrahymena malaccensis</i>	18°C	9 Hours	5 x 10 ² –5 x 10 ⁵ cells/mL	29 Hours	87 Hours

(1) Time required for population to grow 1 log; example, 1 x 10⁴ to 1 x 10⁵ cells per mL.

(2) Time estimated for periodic transfer of cultures at indicated maintenance temperature.

Both stock and tester strains are grown in the presence of *Klebsiella pneumonia* (Kp) / MS-1 buffer⁽¹⁾. The Kp have been previously grown in nutrient broth and are harvested by centrifugation and MS-1 washes. Thus a suspension of Kp in MS-1 buffer (Kp soup) serves as the growth medium for the flagellates and ciliates. The Kp soup affords the optimal growth medium and reduction of toxicants found in usual nutrient growth media. ETL will provide standardized, freeze-dried preparations of Kp and sterilized MS-1 in 500 mL bottles to those laboratories which use the SBS. These components will be the only reagents necessary for the continued culture of the selected protist species, thereby, affording a simple protocol for maintaining a protist nursery for use in SBA testing. ETL will write instruction manuals and produce accompanying videos describing all culture procedures.

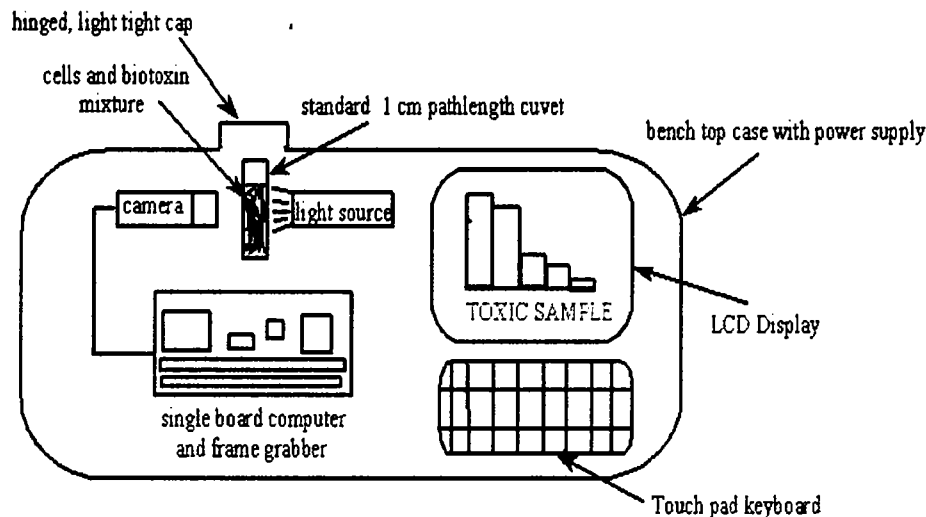
b. To optimize the flagellate-toxin reaction using the SBS to evaluate the effect of 10-15 toxicants on the behavior of a minimum of three protist species.

ETL will examine the growth parameters of 10 strains of flagellates/ciliates in order to select three candidates for final use with the SBS. Each of the 10 strains will be examined for swimming behavior parameters after exposure to a graded concentration series of MMS (methane methyl sulfonate), cadmium chloride, 4NQO (4 nitroquinoline-n-oxide), MX (the main disinfection byproduct of water chlorination), aminobiphenyl, aflatoxin B, H₂O₂, methyl-nitrosamine, and potassium cyanide at ETL. The above list of toxicants may be modified upon request by the DoD. Subsequent to the initial screening, quantitative measurements will be made using a prototype SBS at WHOI. ETL will be equipped with a similar prototype SBS to generate video sequences of swimming protests in AVI format. These files will be sent to WHOI for analysis of swimming parameters in order to select which combination of protist species and toxicants will be subsequently evaluated at WHOI for final selection.

Task 2: Swimming Behavior Analysis

- a. To design and construct optical and electronic equipment for imaging swimming protests under defined environmental conditions.

We have developed a prototype optical instrument based on microscope hardware, a custom built high-speed strobe light, and a CCD imaging camera which images swimming protist cells with a spatial resolution of 3 μm and a temporal resolution of 1 μs . The result is a darkfield image of white cells on a black background (see <http://science.whoi.edu/users/sgallager/bioassay/flagbioassay.html> to view example AVI files). Custom software has been developed under funding from NSF to track each cell in the field of view and produce paths linked in time. Parameters such as displacement, speed, velocity, and direction are calculated from the path data.



The Swimming Behavior Spectrometer (SBS) (pictured above) will be based on this prototype instrument and include the capabilities for producing high resolution images of cell cultures, real-time tracking of cell swim paths, and real-time analysis motion parameters to establish the physiological quality of the cell population. Briefly, the SBS will consist of a high output bank of LEDs as an illumination source synchronized with the trigger for a digital CCD camera. Imaging rate will depend on requirements for motion analysis but will nominally be 60 frames per second. Images will be streamed via a high speed firewire or USB2 interface into an onboard single board computer. The image stream is compressed using a run time wavelet codec (ADV601 chip; Analog Devices) and the coefficients recorded on hard drive. A parallel process operates on the image stream in wavelet space to track individual cells and calculate motion parameters. All software will be written in C++. The user interface will consist of a touch pad keyboard for entry of menu items such as I for image, P for process, O for output, etc. data are transmitted to a printer for immediate hardcopy and the system networked via standard Ethernet. The entire system can be remotely controlled and activated via the network and CDPD packet modem cell phone technology. Satellite telemetry could also be added at an additional cost. This allows the unit to be placed in remote areas where continuous monitoring of an air or water supply is desirable but impracticable by conventional means.

- b. To design software and statistical procedures for swimming behavior analysis under controlled conditions.

Statistical procedures for motion analysis will be developed based on our NSF funded project on swimming behavior in marine ciliate populations. Motion parameters such as displacement, speed, velocity, direction, net to gross displacement ratio are characterized for each cell population and placed

into a database for subsequent access. A spectral analysis of displacement and speed shows the degree of autocorrelation of the swimming path which is an indicator of cell health. Principle Component Analysis of the motion parameters allows correlation of path parameters between control populations and those populations exposed to various types and concentrations of toxins. the PCA describes which parameters best describe the population under consideration and how its behavior has been affected by adverse environmental conditions. The result will be a library of PCA coefficients which describe each protist-culture condition tested. As unknown toxins are introduced into the system, PCA coefficients are used as features in a neural network to identify what type of behavior is associated with a particular toxin. We do not anticipate actually identifying the specific toxins in this way, but the approach can identify the class of toxin based on its influence on cell behavior. For example, neurotoxins which influence trans-membrane Ca^{++} transport will cause the recovery stroke of cilia and flagella to become elongated in time (Gallager, 1988). The resultant swimming speed is greatly depressed while the swimming pattern changes from a uniform helix to a spiral. Such changes in behavior are easily detected using the spectral approach discussed above.

c. To prepare manuals for the operation and interpretation of data from the SBS

Gallager's lab will prepare operation manuals and instructional videos for the hardware and software related to the SBS.

Task 3: Validation

a. To experimentally test the SBS at a DoD laboratory for accuracy and functionality using realistic toxins.

After completion of the selection of protist species and the production of the SBS prototype, ETL will test the SBS at a DoD laboratory for accuracy and functionality using realistic toxins such as botulism toxin, hydrogen cyanide, nerve gas (sarin), and other DoD requested agents. In addition, a private laboratory, Southwest Institute, San Antonio TX, has agreed to test 10 toxic agents including nerve gas, blister and blood agents, and noxious industrial chemicals using the SBS (see budget justification for details). Endotoxins may also be produced from a variety of bacterial strains.

b. To prepare user manuals, instruction videos, and provide deliverables

ETL will write instruction manuals and produce accompanying videos describing all culture procedures and operation of the SBA spectrometer. Deliverables include two prototype SBS units, a complete protist culture package or nursery, instructional manuals, and written reports on toxicity tests conducted with various protests and air and water samples with and without added toxins.

Description of the planned methodology to transition to production and field support methodology

Both Woods Hole and ETL conduct research and consulting. Thus we have elected to commercialize this technology through licensing. ETL will act as the commercialization agent for this technology under a partnership with Wood's Hole in which net revenues will be equally shared. Commercialization will be pursued simultaneously with development of the technology under an award. ETL has retained Foresight Science & Technology, a firm specializing in commercialization of technology to assist in this effort. Foresight is Commercialization Support Contractor for the EPA, DoE, and USDA SBIR programs and also is currently supporting dual-use commercialization of technology for the Naval Surface Warfare Center and the Army Research Lab. The company has extensive experience in commercializing sensor technologies related to air and water quality and it and its staff have licensed many technologies.

A preliminary market analysis by Foresight established the commercial viability of the technology for drinking water monitoring, where suppliers are looking for ways to assure the safety of water supplies and

are interested in an early nonspecific warning. (A second market niche to be exploited is storm water, assuming regulatory pressure.) Current products do not meet end-user needs for low complexity and cost. Current products are based on a variety of techniques for detection of specific pathogens and toxins. The most common are Culture, Enzyme Linked Immunosorbent Assay, Fluorescence In Situ Hybridization/Confocal Laser Scanning Microscopy, UV-Vis Spectroscopy, and Polymerase Chain Reaction. It appears Microtox™ is the major competitor, but the high cost of maintenance is a major problem. Thus our goal is to introduce SBS with both a lower purchase price and life cycle cost than Microtox™.

(Because ETL is a small company, we shall submit SBIR proposals to EPA and other agencies with appropriate topics to seek additional funds to adapt the technology for the identified markets, and depending on the outcome of market research, other potential markets, such as the food industry, pools and spas, and aquaculture.)

During the development of this instrument for anti-terrorism use, we shall simultaneously establish its utility for toxins of interest in drinking water. An initial list of toxins of interest has been identified by examining material from the US Geological Survey Office of Water Quality and the EPA Office of Ground Water and Drinking Water. We also have consulted with the EPA Office of Wastewater Management concerning toxins of interest for storm water discharge monitoring. We shall confirm this list and conduct testing sufficient for EPA approval and certification by the Association of Official Analytical Chemists, both important for market entry.

Product development will use a concurrent engineering process under which a manufacturing engineer and representatives of potential military, other federal and state agency, and commercial customers will be invited to suggest design criteria and features and to comment on the product specification. For example, we already have discovered that high mean-time-between-failure, easy maintenance, and ability to be operated by semi-skilled labor (high school graduates) are all features that will ease market entry. Concurrent engineering expands what we need to know to ensure manufacturability, reliability, and customer acceptance. It also helps with marketing licenses. Foresight has found in work for the EPA SBIR program and others that once an award has been made, it is possible to get potential licensees to participate in concurrent engineering, under confidentiality agreements, at no cost as part of pre-licensing negotiations. This approach will be used here.

As initial test results are obtained, we shall begin our licensing campaign, focusing on companies already selling environmental monitoring equipment. On-site beta testing with likely lead customers (both involved in concurrent engineering and not involved in it) will be used to establish credibility, obtain pilot sales, and demonstrate there is a market for the licensee. Initial discussions with end-users, such as the Chicago, New York City, and Los Angeles municipal water districts, found they are willing to participate in testing and, assuming positive results, likely would procure a reasonably priced SBS system.

Once testing is completed, we shall use trade press articles, trade shows, and leverage support from government programs to market the device. For example, the USGS Office of Water Quality has stated that they will release a notice describing the technology at that time.

To prepare for negotiations, as well as to have a contingency plan in case a licensee is not obtained, ETL shall develop a manufacturing/sales/support program. During concurrent engineering, potential manufacturing contractors will be asked to participate and to give proposals for making the SBS and software and/or the Protist Nursery. Since the SBS System is an integration of COTs equipment, WHOI software, and ETL manuals and training material we do not anticipate any problem in outsourcing

manufacturing. ETL and sales representatives would handle marketing and sales, with ETL providing customer support and maintenance.

Description of the WHOI and ETL experience in doing this type of work

ETL has extensive experience with toxicity testing of reference toxicants⁽¹⁾, testing of drinking water samples⁽²⁾, testing of ambient water samples during base flow conditions⁽³⁾ and during storm water events⁽⁴⁾, and industrial effluents⁽⁵⁾ using the *Tetramitus* Assay. As part of the initial selection of suitable protist strains for SBS development, ETL has isolated 16 clones of *Tetramitus* for evaluation. For example, mean cell diameter (MCD) of each *Tetramitus* clone is quite similar during logarithmic growth (Table 2). As the cells from each clone enter into stationary phase the MCD,s decrease. We shall examine the swimming behavior parameters during different times in the growth cycle, in order to minimize the variation in the control values. Sensitivity to toxicants may also vary dependent upon the growth status of the cells. Variations in the MCD's for *Claucoma* and *Tetrahymena* also were observed .

Table 2. MCDs of Tetramitus Clones during serial transfer.

Clone	Mean Cell Diameter (μ) (Log Phase) Series 18	Mean Cell Diameter (μ) (Late Log-SP) Series 18	Mean Cell Diameter (μ) (Log Phase) Series 19	Mean Cell Diameter (μ) (Log Phase) Series 20	Mean Cell Diameter (μ) (Log Phase) Series LT2 (20°C)
TC-2	11.07	10.06	10.49	10.66	10.81
TC-3	11.21	9.75	10.87	10.72	10.88
TC-4	10.84	9.51	10.80	10.86	11.16
TC-5	10.85	9.46	10.82	10.75	11.09
TC-6	10.68	9.47	10.82	10.48	10.89
TC-7	10.78	10.73	10.71	10.74	10.94
TC-8	10.59	10.09	10.28	10.72	10.81
TC-9	10.84	10.88	10.92	11.03	11.02
TC-10	11.22	9.34	10.83	10.81	10.88
TC-11	10.83	10.78	10.69	10.48	10.81
TC-12	10.53	9.12	10.44	10.40	10.62
TC-13	10.64	9.69	10.68	10.61	10.79
TC-14	10.79	10.73	10.68	10.53	11.00
TC-15	10.71	9.82	10.36	10.59	NA
TC-16	10.77	9.05	10.64	10.69	10.81
TC-17	10.43	10.51	10.68	10.54	10.70
MEAN	10.80	9.94	10.67	10.66	10.88
CV*	2.04	6.24	1.76	1.52	1.32

* CV = Coefficient of Variance

A patent for the *Tetramitus* cell division assay has been awarded to Dr. Jaffe⁽⁶⁾ and an additional patent is pending for swimming behavior analysis. ETL is a small business which has been funded by stockholder

investment. Small grants have been obtained from the Agency for Toxic Substances and Disease Registry, the Beverly B. Perry Foundation, West Islip Breast Cancer Coalition, Croton Watershed Clean Water Coalition, and the Croton Branch of Trout Unlimited.

Results of recent toxicity tests conducted at WHOI

Experiments using *Tetrahymena* exposed to Cadmium.

Objectives:

The objective of this experiment was to determine the time dependent change in swimming behavior of the heterotrophic ciliate *Tetrahymena* following exposure to a relatively low concentration of Cadmium.

Methods:

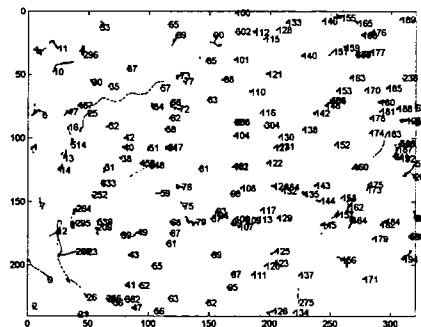
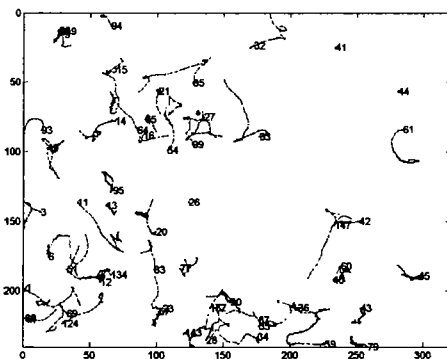
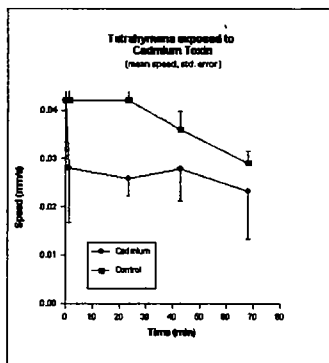
Toxicant: Cadmium dissolved in distilled water

Concentrations: control (0), 10, 20, 50, 100, 200 ug/L

Time points: 2, 20, 40, 60, 80 min

Parameters measured: cell size distribution, swimming speed, net to gross displacement ratio along swimming path

Results: At all concentrations with the exception of 10 ug/L Cd, there was a 52% decrease in swimming speed and 43% decrease in NGDR. within the first two minutes of the exposure.



Swimming paths of control cells (left) and cells exposed to 50 ug/L Cd (right) for less than 2 min.

For results of experiments with a variety of cells and toxins, please see WHOI website at:
<http://science.whoi.edu/users/sgallager/bioassay/flagbioassay.html>.

Conclusions:

- * Speed and Net to Gross Displacement ratio (NGDR) is very sensitive to changes in flagellate swimming pattern and appears to be a good measure of cytotoxicity
- * Control populations typically exhibited NGDR above 80%
- * Cell populations exposed to toxins showed a rapid shift in the frequency distribution towards zero
- * Time scale for measurable changes in behavior were on order seconds for the 100 ug/mL dose and minutes for the 10 ug/mL dose.

Planned activities and those in progress:

With appropriate funding, we plan to complete the following objectives over the next few months:

- * Optimize protocols for flagellate culture and evaluate several flagellate species for their sensitivity
- * Optimize the flagellate-toxin reaction system by testing at least 10 standard toxicants.
- * Design and construct a bench-top Swimming Behavior Spectrometer as a rapid, accurate, and simple assay for cytotoxicity. To date we have developed a rather large and complex optics based machine vision system for characterizing swimming patterns. The hardware needs to be reduced in size and the software optimized for user-friendly operation.
- * Verification of the SBS and the chosen flagellates within a DoD laboratory using toxins relevant to US security.

References:

1. 1995, Jaffe, R.L., Rapid Assay of Cytotoxicity Using *Tetramitus* Flagellates. Toxicology and Industrial Health **11**: 543-558.
2. 2000 Jaffe, R.L, The *Tetramitus* Assay, in Biomonitoring and Biomarkers as Indicators of Environmental Change, ed: Butterworth, F.M., A.Gunatilaka, and M.E. Gonssebatt pp.391- 425. Kluwer Academic/Plenum Publishers (New York)

2000 Jaffe, R.L. Drinking Water Toxicity in New York City Reservoir and Tap Water Samples. January 14, 2000 Report to the New York City Council (<http://envirolab.com>)

1999 Utility and Reliability of the *Tetramitus* Assay as a Monitoring Instrument for Toxicity Reduction and Risk Assessment. April 16, 1999, Report to the Agency for Toxic Substances and Disease Registry.
- 3.. 2000 Jaffe, R.L., C.M. Ginn, and V.L. Keane. *Tetramitus* Toxicity Survey of Water Bodies in the Croton Watershed. Report to Governor George Pataki, July, 2000 (<http://envirolab.com>)
4. 2002, Jaffe, R.L. Stormwater Monitoring in the Kisco River. (manuscript in preparation)
5. 1998 Jaffe, R.L., L.I. Sweet and P.G. Meier. Whole Effluent Toxicity Testing using *Tetramitus* Flagellates. Abstract, 4th Annual NAC SETAC Meeting, Saratoga Springs, N.Y.
6. 1995 Jaffe, Robert L. Detection of Cytotoxic Agents Using *Tetramitus* Rostratus. Patent Number: 5,387,508 Date of Patent: Feb.7, 1995. (<http://envirolab.com>)

Who We Are

Woods Hole Oceanographic Institution is a private, non-profit research facility conducting research in six major fields of oceanography. WHOI offers a cooperative academic program with the Massachusetts Institute of Technology leading to graduate degrees in oceanography and oceanographic engineering. Postdoctoral scholarships and formal fellowship programs are also available to qualified candidates

Master Project Schedule in Gantt chart format

ATL-411-WOODSHOLE-001-WH		Year 1											
Task	Duration	Who	Mo.1	Mo.2	Mo.3	Mo.4	Mo.5	Mo.6	Mo.7	Mo.8	Mo.9	Mo.10	Mo.11
Task 1: Protist Culture Protocols													
Optimize Culture Conditions/Protocol	12	RJ											
Optimize Protozoa-Toxin reaction with SBS	7	SG, RJ, PA											
Task 2: Swimming Behavior Analysis													
Design/construct electro-optic equipment for imaging protists under defined conditions	8	SG, WM, KP, PA											
Design software and statistical procedures for swimming behavior analysis	8	SG, JD, CS, WM											
Prepare manuals for operation of SBS	1	PA, RJ, SG, KP											
Task 3: Validation													
Field test the SBS at a DOD facility	1	RJ											
Prepare user manuals and instruction videos	2	RJ, SH											

Task-phased budgetary estimate

Task 1:

ETL: Salary for 1.8 months is requested for R. Jaffe to culture protozoans and develop preliminary toxicity data on 10 toxins. A Z2 Coulter Counter is needed for the work in order to monitor changes in cell sizes during the growth of protozoan populations in order to determine optimal growth-phase selection for the SB Assay. Previous work using the Coulter ZM was labor intensive; after December, 2002, Beckman Coulter will no longer service the ZM. A computer and associated software will allow for video capture of swimming behavior. Travel from ETL to WHOI is requested as most of the preliminary optical and video capture protocols will be developed at WHOI.

Task 2:

WHOI: Salary is requested for senior and junior personnel to design and construct the SBS, write and test software, and conduct testing along with ETL personnel.

ETL: Salary is requested for R. Jaffe for 2.6 months to establish final protocols and manuals for the use of equipment in the field. Travel is requested for collaboration with WHOI as well field testing at selected New York (Croton) watershed waterbodies and reservoirs.

Task 3:

ETL: Salary (2.6 mo.) and travel are requested for R. Jaffe to supervise beta-testing at Southwest Research Labs (San Antonio, Tex.), to recommend final improvements, and to develop electronic training manuals for use by military and commercial unskilled labor. The budget includes a subcontract to ETL in the amount of \$181,524.

Budget 9/1/2002 - 9/31/03

	<u>Approx. Labor Months</u>	
A. SENIOR PERSONNEL		
1. W. McGillis, Principal Investigator	1.0	
2. S. Gallager, Co-Principal Investigator	3.0	
B. OTHER PERSONNEL		
2. P. Alatalo, Research Associate II	6.0	
C. Sellers, Research Associate III	2.0	
J. Doult, Research Associate III	6.0	
K. Peal, Sr. Engineer	3.0	
5. S. Hurst, Staff Assistant	1.0	VC
TOTAL SALARIES, WAGES AND FRINGE BENEFITS	\$	150,780
E. TRAVEL		
1. Domestic	2,000	
G. OTHER DIRECT COSTS		
1. Materials and Supplies		
4 computers	8,000	
2 frame grabbers	8,000	
2 CCD cameras	3,000	
LED arrays	4,000	
2 LCD displays	4,000	
laboratory and computer supplies	5,000	
optical hardware	12,000	
Total Materials & Supplies	44,000	
6. Other		
shoptime 160hrs \$37/hr	5,920	
subcontract to ETL	181,524	
Total Other	187,444	
TOTAL OTHER DIRECT COSTS	231,444	
H. TOTAL DIRECT COSTS	382,224	
I. INDIRECT COSTS		
a. Laboratory Costs	69,313	
b. General and Administrative Costs	52,004	
TOTAL INDIRECT COSTS	121,317	
J. TOTAL DIRECT AND INDIRECT COSTS	\$	503,541

submitted by:
Catherine McVay Hughes
NYU

Outreach Projects
Health Effects
Research
Monitoring Projects
Toxicology
Research
University Research
Rescue Dogs

FAQ
Links
Home



Environmental Health Effects of WTC

University Research

The National Institute of Environmental Health Sciences (NIEHS), through the Health (NIH), set aside supplemental funding to assist scientists and educate outreach and education, exposure assessment research, epidemiological studies training activities. All of these programs aim to increase awareness of the potential health effects resulting from the WTC tragedy.

FORUM REGISTRATION FOR 12/10/2002

The Caspary Research Institute of The Animal Medical Center

Assessment of Injuries and Illness in Search and Rescue Dogs As World Trade Center Relief Efforts

This study will evaluate acute and chronic injuries in NYPD dogs that were Zero and in New York City during relief efforts associated with the September 11 terrorist attacks. Data, once compiled, will be submitted to a peer review journal for publication.

(Principal Investigator: Philip R. Fox)

Environmental and Occupational Health Sciences Institute (EOHSI)
WTC Supplement, awarded to the NIEHS Center at EOHSI (ES05022)
Principal Investigator: Michael A. Gallo

Community outreach and education program

A needs assessment of environmental health capacity is being conducted through individual interviews and focus groups with local and state public health officials.

- Three Community Forums for "NJ to NYC" Commuters are being conducted (Robert Wood Johnson University Hospital in New Brunswick, New Jersey; Jersey City Museum in Jersey City, New Jersey) and 2/4/03 (Bergen County, New Jersey). The forums target residents of New Jersey who commute to New York City and/or tourism, focusing on WTC environmental health research and concerns. Includes panel sessions with scientists.

LINK: <http://eohsi.rutgers.edu/wtc/ehnetwork/forums.shtml>

- A new case study is being developed for students based on the WTC "cough." The new hands-on activities will be used in conjunction with the EOHSI/UMDNJ-SPH ToxRAP™ curriculum for middle school students.
- This website will be regularly updated with new information and research on the environmental health effects of the World Trade Center collapse.

(Principal Investigator: Audrey R. Gotsch)

Studying exposure patterns of contaminants released from the WTC collapse

The WTC fires burned for about three months. Scientists are conducting studies focusing on residents and commuters associated with this area to determine patterns of exposure over a period of time.

(Principal Investigator: Panos Georgopoulos, in collaboration with the U.S. Environmental Protection Agency)

Analysis of indoor settled dust and smoke

(Principal Investigator: Paul J. Liou)

The dust and smoke plume emitted by the collapse of the WTC contains a mixture of many irritating agents and other pollutants. Scientists are examining indoor samples gathered from one school and several apartment buildings immediately downwind of the plume to outdoor samples to determine if potential health concerns were similar or greater for indoor and outdoor environments.

[Link to WTC presentation](#)

Psychological consequences following WTC

Investigators will incorporate the information from the plume study (Studying exposure patterns of contaminants released from the WTC fire and collapse) with a New York Academy of Medicine survey to compare psychological distress and symptoms of those individuals directly exposed to the plume of WTC air contaminants with those not in the plume.

(Principal Investigator: Howard M. Kipen)

Reproductive effects of WTC

This study focuses on the effects of stress on New Jersey and New York residents in relation to pregnancies and births. Scientists will compare birth certificates from the three years prior to 9/11 to the births after 9/11, focusing on such areas as babies' gender, birth weight and abnormalities. Investigators will also look at the plume emitted from the WTC site for agents that may cause birth defects.

(Principal Investigator: George H. Lambert, in collaboration with the New Jersey Department of Health and Senior Services and the New York Department of Health)

Assessing fears and concerns

A questionnaire will be distributed randomly to New Jersey residents to determine what concerns and fears exist related to September 11, and to assess what habits have changed following the attacks, especially for commuters.

(Principal Investigator: Michael A. Gallo)

Johns Hopkins Bloomberg School of Public Health**Long-term effects of clean-up at the WTC disaster site**

Principal Investigator: John D. Groopman

Registry, Health Assessment and Monitoring

Personal exposure to and area sampling for airborne contaminants was conducted at the disaster site during October 2001 and April 2002. Contaminants measured included asbestos, particulate matter, and volatile organic compounds. Personal exposure was assessed for a group of truck drivers involved in the clean up operation. Area monitoring was conducted at 5 locations directly at Ground Zero.

A registry of truck drivers, heavy equipment operators, and laborers who worked at Ground Zero is being created. A questionnaire has been developed that will assess respiratory health, mental health, and quality of life. The questionnaire will be sent to all workers identified by their unions as having been involved in the clean up operation at some point between September 2001 and June 2002. A comparison group of "non-exposed" truck drivers, heavy equipment operators, and laborers identified by their union will also be asked to fill out a questionnaire. The version of the questionnaire for the "non-exposed" workers will not contain exposure questions but is otherwise identical to the questionnaire that will be given to the workers who were at Ground Zero.

The responses to this questionnaire will establish a baseline of health for each worker as well as provide a better understanding of the prevalence rates of health symptoms that resulted from the clean-up of the disaster. Workers will indicate on their questionnaires whether they would be willing to be contacted in the future so additional studies can track health issues in this population.

(Principal Investigator: Alison Geyh)

Outreach

Open meetings will be held at local union halls to discuss summary results from the questionnaires related to air quality and the health assessment of truck drivers, heavy equipment operators, and laborers. These meetings will also provide a forum for workers to ask about any particular health or exposure related concerns that may have as a result of their work at Ground Zero.

All workers who receive a questionnaire from Johns Hopkins will also be provided with brochures describing health care facilities that have agreed to be Johns Hopkins' referral services. Workers can call these facilities and make appointments if they are having any physical or mental health concerns. Included in the questionnaire packet is a toll free number that workers can use to contact Johns Hopkins with any questions regarding the Johns Hopkins' program.

(Principal Investigator: Alison Geyh)

Mailman School of Public Health, Columbia University**World Trade Center Supplement**

Principal Investigator: Regina M. Santella

Exposure assessment: Chemical-based assessments of WTC emissions, air and sediments.

In the aftermath of 9/11, the Exposure Assessment Core began work on collecting air and dust samples and an extensive collaboration with Dr. Alison Geyh of the Hopkins NIEHS Center on their study of teamsters transporting debris. This involved support in the field as well as analyses of a limited number of particulate samples for a suite of 28 elements and metals measured by High Resolution ICP-MS and for polyaromatic hydrocarbons and chlorinated and brominated organic compounds by High Resolution Gas Chromatography Mass Spectrometry. The goals of this study include measuring areas samples and personal exposure of individuals working in and around ground zero; providing exposure information to these workers; and developing a database of personal exposures and area concentrations for use in future health assessment studies.

A central theme to our WTC exposure work is to help put exposures into perspective by putting contaminant compositions and levels into context, including from a historical perspective. Recent work by some of our Center members generated a wide array of air pollutant data (outdoors, indoors, and personal) for NYC that can be used to provide estimates for background levels of volatile organic compounds, aldehydes and particle-associated elements that could be measured in NYC prior to September 11, 2001. Very little to no data prior to September 11 exists for certain WTC related contaminants such as brominated diphenyl ethers and brominated dioxins/furans. Consequently, as another method to place WTC related contaminant levels into perspective, we proposed to collect sediment cores that would both integrate and archive atmospheric depositional inputs of WTC contaminants into NY Harbor, central Brooklyn (Prospect Park Lake) and mid-Manhattan (Central Park Lake). We will put these fluxes into perspective by comparing them to current and historical fluxes based on measurements in the dated sediment cores that were not related to the WTC disaster. Detailed multi-contaminant compositional data at the congener or individual compound level should enable us to partition that fraction of the post-September 11 contaminant loadings to our sites that was derived from WTC emissions as distinct from the fraction that came from other non-WTC related sources to NYC. Effects of 9/11 Exposures on Pregnant Women

(Principal Investigator: Steven Chillrud, located at Lamont-Doherty Earth Observatory of Columbia University)

Health effects

This study has enrolled a cohort of pregnant women who were exposed to airborne pollutants as a result of being in the vicinity of the World Trade Center on 9/11. The study, headed by Dr. Frederica Perera, DrPh, and directed by Sally Ann Lederman, PhD, will assess the effects of these toxins on the women's health and that of their babies. Four downtown Manhattan hospitals are participating. Samples of umbilical cord blood and the mothers blood and urine will be analyzed for traces of substances such as pcbs, dioxins, furans, polycyclic aromatic hydrocarbons, lead, cadmium, and mercury, all of which are believed to have been in the air or dust following the collapse of the buildings and the resulting fires. Additional funding has been awarded to follow the babies to age two to determine the effects of these exposures on the growth and development of young children. A similar group of women who do not work or live in the area will serve as controls.

(Principal Investigator: Frederica Perera)

WTC-ITEA database

The major goal of this work is to create a relational database containing pre and post 9/11 ambient air quality data generated from governmental agencies and allow access to the data via an easy to use web-based interface.

(Principal Investigator: Steven Chillrud, located at Lamont-Doherty Earth Observatory of Columbia University)

Public dissemination of database: COEP

(Principal Investigator: Peggy Shepard)

Mount Sinai School of Medicine

The Mount Sinai Superfund Basic Research Program

Principal Investigator: Philip J. Landrigan

Exposure assessment of WTC emissions using imaging spectroscopy and spatial analysis

This project will primarily use NASA's Airborne Visible Infrared Imaging Spectrometer (AVIRIS) images available for lower Manhattan on the 16th, 18th and 23rd of September 2001 to explore whether the high-resolution, multi-date AVIRIS imagery can be used to measure the spatial extent and structure of the plume. Measuring backscattered solar irradiance at specific wavelengths potentially allows the abundance of atmospheric gasses and particulates to be quantified. Ordinarily, the objective of radiative transfer modeling is to estimate and remove the effects of atmospheric scattering and absorption from the ground surface radiance measurements. Here we propose to use AVIRIS imagery and radiative transfer models to map spatial variations in atmospheric particulate matter and water vapor. By combining ground level measurements with detailed images of the spatial extent and internal structure of the plume under different weather conditions, we hope to provide two valuable pieces of information. First, the high resolution snapshots of plume extent and internal structure should be able to provide a spatially detailed image of the plume circulation against which numerical micro-circulation models can be tested for validity. Second, the spatial variations in plume density throughout lower Manhattan might also be able to be calibrated with point measurements of contaminant levels obtained simultaneously to provide spatially detailed estimates of potential contaminant exposure over a much larger area than could be monitored with point measurements alone. We emphasize that the research that was proposed here is exploratory, basic science. We are not aware of any similar study to date. We feel that the proposed research is likely to yield beneficial results because 1) the plume is clearly resolved by the AVIRIS imagery and because 2) a well-established body of physical theory exists to explain the interactions between solar irradiance and atmospheric constituents. AVIRIS is the most sophisticated and well-calibrated imaging spectrometer available to the civilian research community

(Principal Investigators: Steven Chillrud and Christopher Small, both at Lamont-Doherty Earth Observatory of Columbia University)

Outreach to children and families

The Mount Sinai Pediatric Environmental Health Specialty Unit (PEHSU) is in the process of compiling an evidence-based evaluation of environmental testing results from World Trade Center related exposures. Sources of exposure data include government agencies such as the EPA, OSHA and independent evaluations conducted by the New York City Board of Education. The PEHSU has organized this data into short, easily understood, lay level fact sheets that cover the major exposures from the WTC attacks and potential health effects specifically in children. The information is organized by pollutant. Fact sheets completed and in the process of review include Lead, Asbestos, Volatile Organic Compounds, Particulate Matter, PCBs and Dioxins. Fact sheets will also be posted on the Mount Sinai PEHSU website.

(Principal Investigator: Joel Forman)

Clinical & epidemiological studies of ironworkers

(Principal Investigator: Stephen Levin)

Epidemiologic study of pregnant women & children

Two hundred pregnant women who lived or worked near the World Trade Center are the subjects of this study. Pregnancy outcomes will be studied including gestational age, birth weight, height, head circumference and fetal length. Perinatal morbidity and mortality and developmental assessments will also be analyzed.

(Principal Investigator: Gertrud Berkowitz)

New York University School of Medicine

Environmental Health Issues Related to WTC Disaster

Principal Investigator: Lung Chi Chen

Exposure assessment**Purpose:**

1. To provide a broad assessment of local population and worker exposures as a result of the release of dust and smoke from the WTC area;

2. To provide assessment of exposures of the survivors that may have caused acute or long term health effects (site workers, commuters and surrounding residents);
3. To work with NIEHS to integrate exposure assessments with overall public health assessments and outreach requested by various government agencies, workers and the general public.

Approach:

1. Analyze samples for a variety of toxicants and evaluate the results;
 2. Compare current air quality around WTC to that immediately after the collapse, and that at different downwind locations;
 3. Coordinate and collaborate with epidemiologists and other environmental health professionals for the assessment of overall impacts on the survivors, and workers.
- (Principal Investigator: Morton Lippman)

Toxicity assessment

The overall objective of this task is to determine the potential acute and longer-term respiratory and systemic toxicity of selected WTC dust fractions in young and old rats following pulmonary administration of a high dose of WTC dust, with or without a subsequent respiratory tract infection.

(Principal Investigator: Lung Chi Cheng)

Community outreach program

NYU's outreach efforts are informing the public about scientific research results and progress via media interactions, community forums, and a newsletter.

- NYU researchers made themselves available to the press in all formats, including multiple print interviews. The overarching goal of these media interactions was to convey information that would address public concerns.
 - NYU community forums, held in October of 2001 and 2002, had prominent NIEHS funded researchers as expert panelists. The forums served as a venue to address community concerns, and to inform the public about potential environmental risks, results already obtained, studies in progress, and future plans outlined for WTC research.
 - The comprehensive World Trade Center Research newsletter, a collaborative effort with the University of Rochester Environmental Health Sciences Center, was released in September of 2002. The newsletter summarized current ongoing NIEHS Center investigations, in addition to providing some practical tips for addressing WTC pollution in residences. The newsletter is available online at <http://niem.med.nyu.edu/> and has been widely distributed in lower Manhattan and at WTC meetings.
- (Principal Investigator: George Thurston)

Resident Respiratory Health Study

Residents near Ground Zero and residents outside of a 5 mile radius is defined building complexes are surveyed for presence of persistent respiratory complaints. Subgroup of these residents are contacted for follow-up respiratory studies.

(Principal Investigator: Joan Reibman, in collaboration with New York University, New York State Department of Health and Center for Urban Epidemiologic Studies)

WTC resident respiratory impact study:**Physiologic characterization of residents with respiratory complaints**

Residents near Ground Zero with new onset of asthma-like symptoms will be examined and pulmonary function will be tested. Questionnaires will also be distributed to affected residents.

(Principal Investigator: Joan Reibman)

NYC firefighters study

Some of the symptoms of the World Trade Center "Cough" are typical of RADS or Reactive Airway Dysfunction Syndrome. Bronchial wall thickening and lung parenchymal inflammation will be studied in 300 firefighters using inspiratory and expiratory CT-scans to determine the effects of exposure at Ground Zero. Bronchoalveolar lavage will be performed on select firefighters to evaluate lung cell inflammation and particle burden. Lung cells will be treated with respirable WTC dust in laboratory culture dishes to measure expression of genes involved in the inflammatory response

(Principal Investigator: William Rom)

UNC Center for Environmental Health and Susceptibility & UNC Superfund Basic Research Program

Assessment of Community Exposures Following the WTC Disaster
(Principal Investigator: Steven M. Rappaport)

University of Pennsylvania

Caring for the WTC and Pentagon Rescuers Post 9/11

Researchers at the University of Pennsylvania have begun a three-year study of the search-and-rescue mission's effects on more than 200 rescue dogs and their handlers. Comprised of veterinary researchers and psychologists, the team will focus on the physical and psychological toll, possibly sounding an early alert on ailments to watch for among those who have toiled to clear the wreckage. The study also includes researchers at Michigan State University and the Centers for Disease Control in Atlanta.

(Principal Investigators: Cindy Otto, School of Veterinary Medicine and Melissa Hunt, School of Arts and Sciences)

Michigan State University

Assessing Exposure in Search and Rescue Dogs from the World Trade Center and Pentagon Sites

For more than a year, researchers at Michigan State University (MSU) and the University of Pennsylvania have been involved in a collaborative study of search and rescue dogs deployed at the World Trade Center and Pentagon disaster sites. Researchers from the Diagnostic Center for Population and Animal Health at MSU are studying samples from approximately 200 dogs for PCBs and other organic toxins, such as mercury and lead. Dogs that have died since working at the disaster sites are examined by veterinary pathologists to determine cause of death, cancer incidence and any evidence of toxic damage to their organs. After three years, the information gathered from the specimens at both universities will be compiled into a database. If a positive correlation between toxicants exposure and deaths is found, then researchers will consider ways to protect dogs in order to reduce exposure.

(Principal Investigators: Scott Fitzgerald, DVM, PhD; Wilson Rumbeih, DVM, PhD)

The University of Rochester (collaborating with New York University)

Community Outreach

The Community Outreach and Education Program (COEP) at the University of Rochester Environmental Health Sciences Center, in collaboration with the COEP at New York University (NYU), published a newsletter entitled "World Trade Center: Environmental Impact Research Community Update." The newsletter was distributed to over 5000 citizens-mostly in Lower Manhattan-on the first anniversary of the 9/11 tragedy. The newsletter highlights NIEHS-funded research projects, and is available online at:

<http://www2.envmed.rochester.edu/envmed/ehsc/outreach/WTC-911News-Fall2002.pdf>

(Principal Investigator: Dina G. Markowitz, PhD)

Assessment of ultra-fine WTC dust.

Scientists at the University of Rochester's Environmental Health Sciences Center are analyzing World Trade Center dust samples, collected by NYU scientists, to determine the health effects of these particles on lung cells. Preliminary results of these studies show that dust particles do not have adverse effects on the lung cells, and follow-up studies will look at any long-term effects on cells.

(Principal Investigators: Jacob N. Finkelstein, PhD; Gunter Oberdoerster, DVM, PhD)



This website is made possible through the National Environmental Health Sciences Institute (NIEHS), Grant No. ES05022-15S1. It is administered by the Community Outreach and Education Program (COEP), an outreach component of the NIEHS Center of Excellence housed at the Environmental and Occupational Health Sciences Institute (EOHSI), in Piscataway, New Jersey, and the UNDNJ-School of Public Health.

For more information contact: wtcoutreach@eohsi.rutgers.edu

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Updated on Wednesday, April 02, 2003

Environmental Health Effects of WTC

Rescue Dogs

[Outreach Projects](#)
[Health Effects Research](#)
[Monitoring Projects](#)
[Toxicology Research](#)
[University Research](#)
[Rescue Dogs](#)

[FAQ](#)
[Links](#)
[Home](#)

In an effort to address possible long-term WTC health implications, researchers from academia and the government are focusing on search and rescue dogs and their handlers. This sentinel study may indicate future environmental, physical, and psychological health concerns for others who labored on the WTC and the Pentagon sites.

Other WTC-related projects are made possible with NIEHS funding, and include research focused on Community Outreach, Health Effects, Monitoring and Toxicology.

The Caspary Research Institute of The Animal Medical Center

Assessment of Injuries and Illness in Search and Rescue Dogs Associated with World Trade Center Relief Efforts
 (Principal Investigator: Philip R. Fox)

University of Pennsylvania

Caring for the WTC and Pentagon Rescuers Post 9/11
 (Principal Investigators: Cindy Otto, School of Veterinary and Melissa Hunt, School of Arts and Sciences)

Michigan State University College of Veterinary Medicine

Assessing Exposure in Search and Rescue Dogs from the World Trade Center and Pentagon Sites
 (Principal Investigators: Scott Fitzgerald, DVM, PhD; Wilson Rumbelha, DVM, PhD)



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For more information contact: wtcoutreach@eohsi.rutgers.edu

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 Piscataway, NJ 08854
 Phone: 732-445-0200

[[Map and Related Information](#)]

For more information about EOHSI, contact: info@eohsi.rutgers.edu
 Please direct web site feedback to: webmaster@eohsi.rutgers.edu



Updated on Friday, February 14, 2003

WORLD TRADE CENTER

ENVIRONMENTAL IMPACT RESEARCH

COMMUNITY UPDATE

These investigations by the various university programs are being conducted as collaborative efforts with coordination by the NIEHS are described on the following pages.

The Health and Environmental Impact of the World Trade Center Disaster

Scientists have kept their promise not to forget those impacted by the pollution from the World Trade Center disaster.

Last October, the New York Times quoted Dr. George D. Thurston, a professor of environmental medicine at the New York University School of Medicine, as stating: "We're not content with just saying that because (the pollution is) within the standard that means everything's fine, let's go back and live our lives ... We're saying this is not the end of things. This is the beginning. We're going to follow these populations."

Indeed, researchers from prestigious universities in New York, New Jersey, Maryland and North Carolina are collaboratively devoting their efforts to evaluate the health concerns of individuals living and/or working in the area of the World Trade Center, as well as those of courageous men and women who have been involved in rescue and recovery efforts.

To assess these issues, funding has been made available through the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health (NIH). These funds are designated to support research focused on exposure assessment and epidemiology studies, worker training activities related to the environmental health aftermath and to provide community outreach and education for the general public.

Research teams are focusing on

exposure assessment, epidemiology and outreach. Collaboration is very evident among the various researchers, who have designed a timeline for implementation of their projects, established shared resources and expertise and designated what each institutions' role will be (who does what, how and with whom). A database of shared research results is to be setup for: indoor and outdoor air monitoring data; dust samples; population registries and to provide information for public communication.

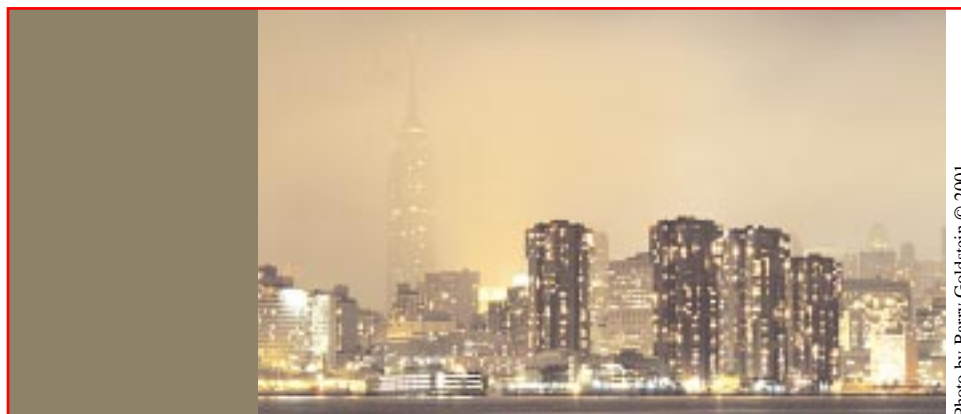


Photo by Barry Goldstein © 2001



Photo by Barry Goldstein © 2001

Update on ongoing NIEHS centers' World Trade Center research projects

WTC clean-up truck drivers study

Researchers from Johns Hopkins University, NYU and Columbia University have monitored the truck drivers who were exposed to the area during the explosion, fires and air pollutants that permeated the air around them and has followed the truckers during the cleanup effort.

Phase 1 of this study, was designed to provide information about the exposure of truck drivers involved in the clean-up effort at the disaster site. The project focused on the exposure of 55 truck drivers who hauled debris away

from the disaster site. The drivers were monitored during their work shifts at different locations around the disaster site.

Phase II of the study was to investigate the respiratory health of the clean-up workers at the disaster site. A registry of clean-up workers was compiled and the workers were interviewed and were questioned about their current and past respiratory health. Lung function tests were performed on them as well. Follow-up assessments are planned to evaluate any changes in lung function or symptoms.

Columbia Center for Children's Environmental Health study of WTC pregnant women and newborns

This study aims to assess whether babies of mothers near the World Trade Center have health problems different from babies of mothers not affected by the WTC pollution. The World Trade Center Pregnancy Study focuses on the effects of the pollutants derived from the combustion of materials during the

explosion and fires at the WTC, especially on the vulnerable populations of pregnant women and their unborn infants.

The objectives of this study are to measure the exposure to pollutants in pregnant women from lower Manhattan, to evaluate the effect of maternal exposure on pregnancy outcomes, and to conduct a planned follow-up to explore the effects of the exposure on the growth and development of the infant.

Participants in the study were enrolled when they presented for delivery at one of the four participating sites in lower Manhattan (Beth Israel Medical Center, NYU Downtown Hospital, St. Vincent's Catholic medical Center and the Elizabeth Seton Childbearing Center).

A sample of the babies' cord blood was taken at delivery and maternal blood and urine and newborn feces were collected the day after delivery. The Centers for Disease Control (CDC) will analyze the samples for pollutants thought to have been present at Ground Zero, including: PCBs, dioxins, furans, brominated fire retardant products, pesticides, lead, mercury, and cadmium.

Women who gave birth after the WTC disaster were interviewed regarding residential history, workplace history, activities during the period of



the WTC fires, level of demoralization or nonspecific distress, and lifestyle exposures that might affect birth outcomes. Information about her health during pregnancy and about the size of the newborn (weight, length, head circumference), length of gestation at the time of delivery, and other relevant biomedical data were taken from the medical records. A final sample of 300 or more women and their infants, consisting of 150 exposed and 150 unexposed pregnant women is the projected goal of this study. The researchers have enrolled 350 women and 350 babies into the prospective cohort study. These women include a wide range of ethnicities, age, parity and economic status. The study is a collaboration with the CDC which is analyzing a number of biomarkers in the collected samples. Descriptive analyses of the data on the cohort and followup are ongoing.

In a companion study being conducted by Mount Sinai, the objective was to evaluate the impact of the toxic pollutants and the psychological stress to pregnant women and their infants. Maternal blood, urine and breast milk will be analyzed for a series of toxic pollutants and a biological specimen bank will be established.

A questionnaire is being administered to the participants that contains detailed questions regarding their location on September 11, 2001 and daily for the following 4 weeks. Information is being obtained on the number of daily hours spent indoors and outdoors. Comparisons will be based on the expected amount of exposure and levels of chemicals in the bodies, as well as by pregnancy trimester of exposure. In this way, an assessment will be made as to whether exposure to WTC pollution has affected the health of newborn children in Lower Manhattan following 9/11.

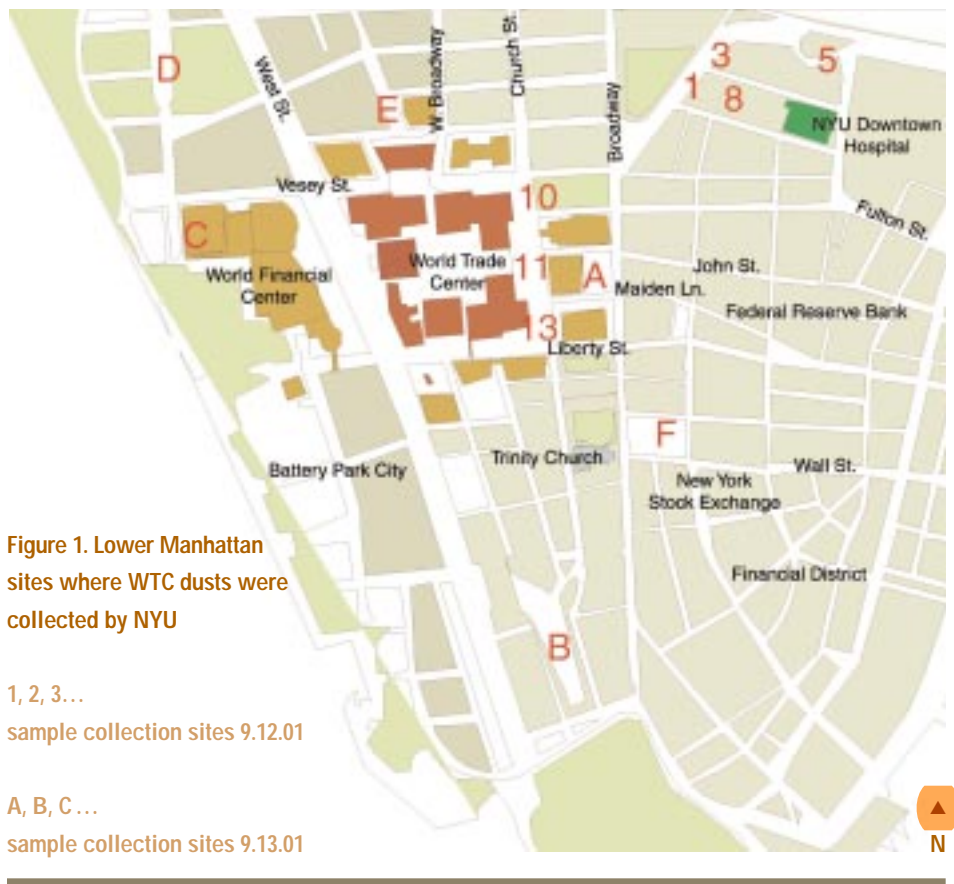


Study of WTC ironworkers

Mount Sinai School of Medicine is assessing the health of some 200 ironworkers who worked at Ground Zero helping to do the demolition and removal of debris. Their exposures were heavy and continuous because they worked 12 hour shifts, 7 days a week and were exposed to dust, smoke, soot, debris and combustion materials.

The initial health examinations were supported by grants from the New York State Department of Health and the New York Times September 11 fund. Approximately one in three of the workers that were examined had evidence of reactive airway lung disease. New cases of asthma, in previously healthy workers who were heavily exposed to airborne dust and smoke, were also found.

In this study, each worker will receive a thorough clinical examination with particular emphasis on assessing respiratory and psychological health. Chest x-rays will be taken and pulmonary function tests will be performed. One year later, these exposed workers will be re-evaluated as to whether they have long-term continuing lung health problems.



Chemical analyses of WTC dust pollution

The explosion and collapse of the World Trade Center was a catastrophic event that produced a particle pollution plume impacting many workers, residents and commuters during the first few days after 9/11/2001. Researchers from both NYU and Rutgers collected and analyzed samples of dust from the WTC plume. Samples of the total settled dust and smoke were collected at locations surrounding Ground Zero on September 12, 13, 16, and 17, and are representative of the material generated and settled immediately after the explosion and fire, and the collapse of the two buildings.

On Friday, September 14th, NYU established a continuous particle air pollution sampling site at the NYU Downtown Hospital on Beekman Street, just blocks east of Ground Zero that

provided information about community exposures to WTC pollution until the end of 2001 when the fires were finally extinguished.

The analyses conducted on each of the WTC dust samples were based upon the nature of the sources of the particles. The force of the collapse pulverized the two main WTC buildings and several adjacent low-rise buildings, so the study includes analyses to detect construction and furnishing debris, and combustible materials and products of incomplete combustion associated with the fires in each building.

Organic analysis of the dust samples were conducted to determine the chemical nature of the products of incomplete combustion produced by the fires and to identify any other organic

materials. The organic analyses included tests for the following pollutant chemicals: polycyclic aromatic hydrocarbons, polychlorinated biphenyls, polychlorinated dibenzodioxins and other hydrocarbons. Inorganic analyses of the samples were completed to obtain information on the amounts of various heavy metals and other inorganic materials present in the building materials, and in the fire. The inorganic analyses included tests for metals, ionic species, asbestos, and inorganic species. Finally, particle size analyses were conducted to provide a general description of the sizes of these dust particles, which could be breathed in and deposited in various locations within the lung.

The particle pollution that was released and then settled on surfaces downwind of the WTC complex included pulverized building debris, and products of incomplete burning produced by the explosion that ignited the thousands of liters of jet fuel. The products of incomplete burning were produced by the intense fire that consumed many combustible materials in the buildings including: furnishings, equipment, debris, wiring, metal, wood etc. The amount of material deposited was extremely high, and in many indoor locations the deposited dust was thick. In outdoor situations the settled dust and smoke was thick. The mass of the dust samples was composed primarily of construction materials, soot, and paint (leaded and unleaded), and glass fibers (mineral wool and fiberglass).

A small amount of asbestos was found in the samples. The levels of lead were similar to the levels found in typical urban soils. However, the actual levels of dust and smoke deposited in individual buildings and businesses needs to be assessed for clean up based upon the total surface area of lead and asbestos. A systematic effort will be

required to properly clean indoor locations in order to eliminate persistent levels of lead and asbestos, on surfaces, and in the air ducts servicing each residence or building, which can contain materials that can be released into the indoor air if not properly cleaned.

The caustic nature (i.e. the high pH) was likely due to the presence of cement and other alkaline materials associated with the construction debris in the deposited particles. This factor along with the presence of long and thin glass fibers (non-asbestos) and was likely the cause of lung irritations reported by residents and workers in the days and initial weeks after the collapse of the WTC buildings. The persistence of significant levels of indoor WTC dust and smoke could lead to health impacts if the toxic substances present on the indoor surfaces were not cleaned properly, and if the HVAC system of each building is not concurrently cleaned, or cleaned prior to the clean-up of the indoor surfaces and re-entry into the residence or office. The Environmental Protection Agency and other organizations repeatedly recommended Hazmat type residential clean-up prior to people going back to their residences or offices. (See “Practical Tips that You Can Use” in this newsletter).

Some types of material that were released are similar to materials that we are often exposed to during our daily lives. At a minimum, however, there were extremely high quantities of coarse and fine particles released and dispersed after the WTC collapse, and future analyses needs to be completed on the health consequences of the exposure among the commuters, workers, and residents.

Researchers hope to use the results of the dust analysis to help make assessments of short-term and long-term health effects among various



Photo by Barry Goldstein © 2001

populations. The people potentially exposed to the initially suspended dust and smoke, or subsequently settled dust and smoke, include unprotected rescue workers, residents, and workers in downtown Manhattan immediately after and in the first few weeks after the collapse. The settled dust and smoke could be re-suspended and expose unprotected residential cleanup workers, and workers and residents in poorly or inefficiently cleaned buildings weeks to months after September 11, 2001. Finally, the levels of exposure encoun-

tered will have to be placed into context with the materials that have been released from the diminishing smoldering fires that continued to burn until December 14, 2001.

WTC public information community outreach and education

The Community Outreach and Education Program (COEP) aims to provide a mechanism whereby communication between the community and scientists can occur, with the underlying objective of improving environmental health. The WTC disaster quickly moved the COEPs into uncharted territories subsequently making it an important part of the Centers' involvement in the disaster.

The general public looked to academia for answers to environmental health questions, especially after governmental regulatory agencies made proclamations that the area was "safe" before facts were gathered. Some examples of what the COEPs are doing are as follows:

Under the direction of Dr. George Thurston, the NYU Community Outreach Office has hosted a number of informational meetings to keep the public and the media informed about any health issues related to the disaster and also to provide information about research that is being conducted. NYU's first public forum is tentatively scheduled for Thursday October 17, 2002. Contact Lisa Schuetz at: 845-731-3532 or lisa@env.med.nyu.edu for additional information.

The University of Medicine and Dentistry of New Jersey-Rutgers has set up a Community Outreach and Education Initiative to increase public awareness of the potential environmental health effects resulting from the tragedy. The program has also implemented four outreach programs: 1 needs assessment of health depart-

ments' environmental public health capacity; 2 New Jersey commuter town meetings; 3 WTC dust/cough case study; and 4 an environmental health website.

The Mount Sinai School of Medicine WTC outreach and education project

Mt. Sinai's Pediatric Environmental Health Specialty Unit has compiled an evaluation of environmental testing results (e.g., from various government agencies) and have written short, easily understood fact sheets that cover the major exposures resulting from the WTC attacks. The information is organized by pollutant (e.g. lead, dioxins, fine particulates, asbestos, etc.). Based upon these pamphlets, a series of question and answer sessions are to be set up in lower Manhattan through schools, community board organizations and neighborhood organizations.

WTC resident respiratory study

The WTC Resident Respiratory Health Study is being directed by Dr. Joan Reibman of NYU and Bellevue Hospital in order to determine the extent of breathing problems in residents in communities near the disaster site. The study is a collaborative effort the New York State Department of Health and NYU/Bellevue Hospital, with funding from the Centers for Disease Control.

An initial survey has been delivered to many households in the disaster area, as well as to households outside the area (for comparison). Four residents in each household are being asked to complete the survey. Residents should complete the survey whether or not they have symptoms. Participation in the survey is completely voluntary.

The survey contains questions about past and current breathing problems, the existence of previous lung disease, and the state of the apartment after the collapse of the WTC. This study includes children as well as adults. Following the completion of the survey, a sample of residents will be asked to participate in a study of breathing function and to complete additional surveys.

The surveys started going out in June but the progress has been slow because many of the buildings are large and some have difficulty with mailings. Some of the surveys are also to be hand-delivered.

Columbia University researchers study river water sediments

A series of sediment cores were collected from New York harbor. The sediments, together with archived sediments collected from the same sites prior to September 11, 2001 will be used to assess the impact of WTC contaminant s on NY harbor sediments.

Practical Tips that You Can Use

by Catherine McVay Hughes, and AsthmaMoms

What you can do to reduce your exposure

- 1 **Use a vacuum cleaner with a HEPA (High Efficiency Particulate Air) filter.**
The filter is designed to collect very small dust particles, including asbestos.

- 2 **Use a Residential Air Cleaning Device with a HEPA filter**
 - Resist ozone “air fresheners.” According to National Institutes of Health National Institute of Environmental Health Sciences (NIEHS), “Contrary to suggestions from some sales people, no federal agency approves, much less recommends, ozone generators for use in occupied spaces.” For additional information, visit the Environmental Protection Agency (EPA) website for the long report at <http://www.epa.gov/iaq/pubs/ozonegen.html>

• Research before you buy: Check out EPA’s report “Residential Air Cleaning Devices: A Summary of Available Information”

- Compare the “clean air delivery rate” or CADR: Although there is no universally accepted method for comparing air-cleaning devices, the CADR can be used to compare removal rates between different air purifying devices and to estimate the removal rate of materials, see <http://www.cadr.org/consumer/certified.html>

- 3 **Maintain your air conditioner and/or HVAC system**
 - Make sure your air conditioner is clean and free of dust
 - Check filters and change frequently, if necessary
 - Use an additional Air Filter for A/C system or cover vent of HVAC system

3M’s Filtrete, an electrostatic micro particle room air conditioner filter, attracts airborne micro particles including: dust, pollen, mold, pet dander, and smoke. This white thin material may be cut to size with scissors to fit your air conditioner. You can also tape the Filtrete over your central air vents with blue painters tape to minimize paint damage. The most affordable World Trade Center area hardware stores that carry this product is the Weinstein & Holtzman, 29 Park Row at 212–233–4651 for \$4.99 (+ tax) per packet. The American Lung Association endorses this product.

- 4 **Keep dust from entering your home and continue to remove dust that has settled**
 - Take shoes off at the door
 - Damp mop and wet dust
 - Open windows on good air days and keep windows closed on ozone alert days
 - Open windows in the morning when the air quality tends to be better
 - Open windows after a rain storm which has “cleaned out” the air

- 5 **Maintain Indoor Plants**
Common houseplants are able to clean the air and increase the oxygen supply. According to the New York Botanical Garden web site, “Studies conducted by NASA have shown that certain common houseplants have the ability to clean the air in their vicinity. Small openings in the leaves of plants take in air; plant cells absorb carbon dioxide and other substances from the air. Carbon dioxide is used by plants to make food and pure oxygen and water vapor are released back into the air as a by-product of this process.” Their web site has information on the types of houseplants to grow in your indoor garden for different light exposures: eastern (direct morning sun), northern (bright light — no direct sun), southern (direct afternoon sun) and western (direct late afternoon sun).

However, if you are allergic to mold and pollen, please check with your doctor before starting to grow an indoor garden.

<http://www.nybg.org/plants/factsheets/cleanair.html>

- 6 **Minimize Your Exposure to Smoke**
The health effect of asbestos is influenced by how much asbestos you are exposed to (dose) and how long you are exposed (duration) and whether you smoke. If you smoke, the first two factors are multiplied according to the EPA.

Practical Tips continued

Indoor air quality

The Environmental Protection Agency (EPA) is Assisting with the Testing of Indoor Air Quality

If you live in lower Manhattan in the area south of Canal Street and west of Allen and Pike Streets that was impacted by dust and debris from the collapse of the World Trade Center, you may request:

- To have your residence professionally cleaned and then tested for asbestos in air (If asbestos is still present, your home will be re-cleaned), or
- To have your residence tested for asbestos in air, without professional cleaning (If, and only if, asbestos is found during testing, you may then ask that your residence be professionally cleaned.)

For more information or to register your apartment to be cleaned up or to be tested. Call 1-877-796-5471 or visit <http://www.epa.gov/wtc>

EPA's "Frequently Asked Questions" section of the website is particularly helpful. For example, with the building owner/manager's permission, EPA will evaluate the HVAC (central heating and cooling) system by a contractor that specializes in cleaning the HVAC. Evaluation will involve examination of maintenance records, filters and accessible portions of the system. If this evaluation determines that there is a potential problem, the HVAC system will be cleaned.

Outdoor air quality

The New York City Department of Environmental Protection (NYCDEP) Hotline is still taking requests to clean up any residual WTC dust and debris in your neighborhood. This work is to be done to prevent resuspension of WTC dust into the air. Please have ready the precise location (cross streets) and details (such as the top of a phone booth or newspaper stand or roof top or building ledge) when you call: 1-718-DEP-HELP or 1-718-337-4357.

Acronyms and Abbreviations used

A/C	air conditioning
CADR	clean air delivery rate
cm	centimeters
COEP	Community Outreach and Education Program
EPA	Environmental Protection Agency
GIS	geographic information systems
Haz-Mat	Hazardous materials
HEPA	High efficiency particulate air (filter)
HVAC	heating and cooling system
NIEHS	National Institute of Environmental Health Sciences
NIH	National Institutes of Health
NYU	New York University
Pb	lead
PCB's	polychlorinated biphenyls — toxic substances that are hazardous to human health
pH	a measure of acidity and alkalinity of a solution
PM	particulate matter
WTC	World Trade Center

NIEHS funded research centers involved and their projects

Columbia University

- Chemical assessment of WTC emissions — air and sediments
- Pollution database development
- Prospective study of pregnant women and infants exposed in utero to WTC air pollution
- Public dissemination of information

Mount Sinai School of Medicine

- Studies of WTC ironworkers for respiratory abnormalities
- Study of pregnant women and children near WTC
- Remote sensing imagery of the dust plume combined with ground measurements
- Outreach to children and families
- Analysis of organochlorines in NY and Hudson River.

Johns Hopkins University

- Health assessment and monitoring of truckers, heavy equipment operators and laborers
- Long-term effects of clean-up at the WTC site

New York University (NYU)

- Assessment of heat and lung effects on NYC firefighters
- Checking of Lower Manhattan residents' respiratory (lung) health
- Collection and analysis of indoor and outdoor settled dust samples
- Analyses of the characteristics of particle air pollution in Lower Manhattan during September thru December 2001
- Toxicity tests of WTC dust
- Conducting community forums to inform the public of the latest scientific progress and plans

University of Medicine & Dentistry

of New Jersey (Rutgers)

- Comparison of perceived (expected) vs. actual risks
- Study of possible psychological effects (e.g. stress) of WTC disaster
- Analysis of indoor settled dust/smoke samples
- Develop mathematical tools for assessing contaminant release on air quality
- Study time trends for adverse reproductive outcomes
- Assessment of NJ, NY and CT department of health personnel's environmental public health capacity
- Implementation of community forums for New Jersey commuters
- Development of case study for students to study WTC dust and possibly related "WTC cough"
- Development of website featuring WTC environmental health research and information

University of North Carolina, Chapel Hill

- Community air quality exposures
- Modeling using geographical information systems (GIS)

University of Rochester

(Collaborating with NYU)

- Assessment of very small (ultrafine) WTC dust
- Community Outreach

This community update was compiled by the Community Outreach and Education Programs of the University of Rochester Environmental Health Sciences Center (www2.envmed.Rochester.edu/envmed) and the New York University Institute of Environmental Medicine. Questions or comments, please call: Joyce Morgan, 585-275-6702 (University of Rochester) or Lisa Schuetz 845-731-3532 (NYU).

Further comments by Maggie Clarke, Ph.D., QEP
mclarke@hunter.cuny.edu
on EPA document for peer review:
Exposure and Human Health Evaluation of Airborne
Pollution from the World Trade Center Disaster
July 15, 2003

I take strenuous exception to the widely publicized conclusion that EPA issued on this report prior to even having the report peer reviewed, "Persons in the community were not likely to have a short- or long-term adverse health effects caused by exposure to elevations in ambient air concentrations of the contaminants evaluated in this report. (NCEA p. 2)".

There are a few problems with this. First, this not peer-reviewed conclusion was used by EPA to silence those who wanted EPA's voluntary "cleanup" program to continue beyond December 28, 2002, as it was fed to the press on the very date that EPA closed the program to new registrants. Using scientific reports for such political purposes prior to scientific peer review calls into question the purpose of the peer review process. If the peer review finds an error in a widely publicized conclusion, will that misperception be undone by the work of the peer reviewers? It isn't likely without a great deal of clear reporting to the press to emphasize the misinformation provided before, in tandem with the new information given in language easily understood by the public. (E.g. "ambient" is a useless word to convey meaning to the average layperson; they ignore it since they don't understand it, interpreting the results to mean – no one will have long-term adverse health effects from the WTC disaster. They don't understand the nuance unless it is clearly presented that this is one report about one aspect of the exposure. Even then, when information is dribbled out over time, the public cannot be expected to keep track and integrate all the results together to come up with one comprehensive conclusion). Therefore, the suggestion that EPA should release this report which focuses on one of many aspects of exposure (again) and say (again) that there will be no short- or long-term health impacts, is flawed since it will just further reinforce misunderstanding by the press and the public. If the purpose is to inform the public with accurate information, it is necessary to provide the full story at one time.

Another problem with conclusion #3 is that the report does not support it. The peer review is approaching the evaluation of this conclusion by disaggregating the contribution of each of the contaminants to long-term health effects (e.g., by evaluating whether PM_{2.5} exposure data indicate long-term adverse health impacts plus the effects of each of the other contaminants). This ignores synergistic impacts, such as smokers' having 80 to 90 times the risk as non-smokers when exposed to WTC asbestos (see my earlier comments – Mt. Sinai research). This conclusion ignores other combinations, such as asbestos plus fibrous glass, both of which can cause lung cancer, and perhaps through similar mechanism. There are numerous other carcinogens (dioxins, PAHs, some heavy metals etc), many not even measured in air or dust by EPA. What are the effects of lung irritants such as the extremely high pH on hastening the onset of lung cancer and other long-term illnesses such as asthma? Can we ignore all those new onset cases that have been identified and continue not to look for others that have not been diagnosed yet? After just 3 hours of exposure in early October, 2001 at Chambers and Centre, my lungs were sore. I can't imagine what 100 days of that exposure would have done to me.

I believe it is irresponsible to suggest that the health effects of this very complex mixture of air pollutants can be assessed by evaluating the effect of one pollutant at a time. Therefore, I suggest that until a risk assessment of the synergistic impacts of all the pollutants that were elevated above background (not just those that exceeded standards) is presented, EPA should not continue to say there will be no short- or long-term health impacts, and that steps be made to clarify to the press that previous statements were unfounded.

Instead of invoking the precautionary principle, when it should have been clear that this disaster was a combination of enormous pollution sources (e.g., asbestos and fiberglass factories, poorly designed incinerators and crematoria) which EPA regulates by shutting down sources in violation, EPA willfully misled the press and the public to think there was no problem. So as to not confuse us with facts, EPA did not take adequate measurements of environmental conditions immediately in the aftermath of 9/11, ignoring large classes of obvious pollutants (e.g. PAH, Hg), and refused offers of assistance, including sampling equipment, from other government agencies, namely Region 8 EPA.

Quote from Cate Jenkins¹: "EPA's Region 8 in Denver called Region 2 on September 12, a day after the disaster. In EPA's Region 8 in Denver called Region 2 on September 12, a day after the disaster. In a conference call, Region 8 offered Region 2 the free use of 30 to 40 TEM and SEM (scanning electron microscope) testing capabilities for WTC dusts. Region 8 had a contract with EMSL Laboratories for the TEM's and SEM's, which were being used to evaluate soils at the Libby, Montana Superfund site. Region 8 was willing to divert its resources to Region 2 to assist after the disaster. Twelve of the TEM/SEM's were close by and could have been in Lower Manhattan in 40 minutes." Region 2 refused the offer of the equipment for testing lower Manhattan, but used it for testing their own building at 290 Broadway. What is wrong with this picture?

Richard Tropp, a research professor at the Desert Research Institute, rtropp@dri.edu told me that his institute also offered monitoring equipment and personnel after 9/11 but was refused by EPA Region 2. This lack of equipment resulted in a poorer dataset than could have been obtained, and an unnecessarily inferior risk assessment.

This refusal of offers of monitoring/sampling equipment had cascading preventable deleterious effects on exposures which I will outline. More important, if EPA had had data within a few days of 9/11 detailing the breadth and intensity contamination from the collapse and the huge amounts of products of incomplete combustion emanating from the fires (probably equivalent to dozens of uncontrolled solid/hazardous waste incinerators at ground level – something it never

¹ Comments on the EPA Office of Inspector General's 1/27/03 interim report titled: "*EPA's Response to the World Trade Center Towers Collapse*" A DOCUMENTARY BASIS FOR LITIGATION, July 4, 2003, Prepared by Cate Jenkins, Ph.D. Environmental Scientist, Waste Identification Branch, Hazardous Waste Identification Division, Mail Code 5304W, Office of Solid Waste, Office of Solid Waste and Emergency Response, US Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460
jenkins.cate@epa.gov

would have permitted), EPA might have not issued the premature statements that have formed the foundation for the press, the public and local environmental and health agencies to make subsequent bad decisions. (I saw Thomas Dunne, Associate Assistant Administrator of EPA's Office of Solid Waste and Emergency Response admit at the late June, 2003 Air and Waste Management Association conference that EPA had indeed spoken too soon – before data had been gathered to permit the assurances it mistakenly gave) But this is not widely known.

A few of the poor decisions arising from this lack of early data range from:

- EPA delegating indoor cleanup to NYCDEP without continuing oversight to realize DEP was delegating this to landlords who ignored it or left it to tenants;
- EPA delegating the extinguishing of the fires (an unprecedented pollution source in the midst of the most densely populated city in the country) to NYC, without oversight to realize that NYC was not taking the steps necessary to quickly suffocate the fire and prevent further exposures. Suffocating these fires once the rescue mission was over may not have been more complicated than extinguishing scores of Iraqi oil fires, but only a few thin streams of water were used;
- NYCDOH advising the public via its website to clean up the hazardous waste in their homes and businesses themselves, with a paper mask and a wet rag, ensuring considerable unprotected exposures to reentrained dust – by residents, janitors, day laborers, and even volunteer Southern Baptist schoolchildren bused up from the South during Thanksgiving, 2001,
- no government agency advising residents to reduce exposure to contamination (by avoiding strenuous exercise outdoors.. as is done during ozone alerts);
- EPA devising a voluntary “cleanup” of a limited number of residences using an extremely flawed, never peer-reviewed protocol (see attached critique) which ignores the dust in most HVAC systems,
- the New York City press virtually ignoring information contradicting EPA's premature pronouncements, leaving the public misinformed, while press in other cities broke stories (Andrew Schneider, St. Louis Post-Dispatch) about the extremely high pH of the dust, and the Libby connection.

All of these bad decisions add up to unnecessarily having increased the amount of exposures, and therefore, health impacts from the WTC environmental disaster. This is important to bring up now, because policies like refusing equipment, blind delegation to local authority, the practice of giving press conclusions from documents PRIOR to their peer review, and the practice of giving premature or unsupported statements to the press, have not changed in the agency, and therefore, should any environmental disaster occur again, the same kind of bad decisions will be made again. I recommend that this peer review panel make a series of recommendations on these issues to EPA to rectify these policy lapses in emergency response so that in the future exposures to toxic contaminants will be reduced or eliminated.

I'd like to dispute one statement given 7/14 by Lorber – that “EPA's entire database is available for download”. I asked Berry Shore in October, 2001 for EPA's entire database at the time, but he refused. I learned at the Air and Waste Management Association conference in Baltimore, June 2002 that EPA had by then amassed 250,000 pages of data. This is NOT available for download. EPA has always belatedly put a tiny fraction of the data at its

disposal up on its website. By what means has the data been reduced from 250,000 pages to a few?

Another point: EPA has assumed that everyone was evacuated from the “danger” area for the full length of time during which there were hazardous conditions. There is nothing to substantiate this and it is, indeed, false. For one, there was no data to establish a danger area. There was no evacuation plan on file, as there are in places like Miami to escape hurricanes. There were numerous cases from Battery Park City to Chinatown, where

residents stayed in their apartments, usually because they had nowhere else to go. The government did not offer to put people up in hotels or provide conveyance for those unable to get out on their own power. This is another case of EPA delegating to the City programs that have considerable impact on public health, assuming that it was handled perfectly, never bothering to check.

Also, showing the satellite image of the plume heading south “into the water” and representing that as the predominant plume direction is misinformation. The plume predominantly went west to east into Brooklyn, and on 9/12/01 in the afternoon, when the plume was dense, the wind shifted for many hours to bring the plume north over Manhattan, where the smell was palpable into the Bronx (I saw this as it happened and smelled it on 42nd and later on 72nd St). There are numerous photos of the plume showing this on www.911lea.org

In general, I implore the peer review panel to think proactively about how EPA can and should change its policies and procedures to do a better job next time. Don’t think narrowly just about this document, discounting decisions that were made in the past just in the case of the WTC as being behind us. This is a golden opportunity to prevent bad decisions / exposures / health impacts in the future. Please think expansively. There are numerous holes in our knowledge, our ambient, indoor, short-, mid- and long-term, synergistic standards, our evacuation plans, interagency communications, etc. You can specify these, and your recommendations could be used to make necessary improvements. Just as the government eventually established a National Hurricane Center in Miami to research, track, predict, and evacuate from natural disasters (hurricanes), recommend that an Environmental Disasters Research Center be established in lower Manhattan (Governor’s Island) to resolve all the scientific, engineering, and policy holes, to prevent needless bad decisions in the face of future disasters.

Problems with EPA's Scopes of Work for Remediation of WTC Contamination

Marjorie J. Clarke, Ph.D, QEP, CUNY faculty, mclarke@hunter.cuny.edu

Statement endorsed by:

**~~LMTC (Lower Manhattan Tenants Coalition)~~ and
9/11 Environmental Action: www.911ea.org**

October 22, 2002

(These comments are in response to the scopes of work for cleaning and monitoring contractors, which were developed by EPA as an outgrowth of the document TERA is peer reviewing.)

In addition to being a tragedy of global proportions, as an environmental disaster, the collapse of the three World Trade Center buildings and subsequent fires from all eight buildings produced uncontrolled emissions equivalent to dozens of asbestos factories, incinerators and crematoria as well as a volcano.

The collapse itself and the burning of the buildings' contents created an unprecedented quantity and combination of dozens of toxic and carcinogenic substances, including organic compounds (e.g. dioxin and furans, PCBs, benzene, PAHs), heavy metals (e.g., lead, mercury, cadmium and others), fiberglass, and asbestos. Individually, these substances have been shown to cause permanent and serious illnesses, such as mesothelioma as well as other cancers, asbestosis, brain damage, learning disabilities, asthma and other respiratory difficulties. Studies have indicated that combinations of pollutants acting synergistically can result in toxic effects many times higher. Some of these compounds were released in gaseous form, but much was released as particulate matter, some of it so fine that it eludes one's coughing mechanism and can accumulate in the lungs, exposing many to toxics and carcinogenic substances for decades.

These toxic and carcinogenic substances were dispersed over a large area for several months. At different times people could smell the plume in upper Manhattan, Brooklyn and parts of New Jersey; materials recognizable from the WTC landed in Brooklyn. US Geological Survey aerial maps in late September, 2001 show asbestos contamination in Manhattan miles from the WTC.

These substances did not just contaminate the outdoor air, as USEPA has held, but it also infiltrated buildings, even when windows were closed. There are no natural cleaning mechanisms inside buildings as there are for outside air (i.e. wind and rain), so particulate matter builds up, particularly in carpets, upholstery, clothing, and draperies. These "reservoirs" can continue to be sources of contaminants for many years. Mold is also a problem in places due to inattention to containing the buildings after they were contaminated (both to prevent spread of toxics and infiltration of water).

EPA's Scopes of Work for remediation do not take all the above facts into account. EPA's scopes and standards for abatement have not been peer reviewed by the scientific community at large. Below are some of the most substantial problems with the proposed remediation.

Where Cleaning is to take place

The boundary for EPA's remediation program is still Canal, Allen and Pike. (EPA told us it was an arbitrary boundary based on FEMA's unscientific suggestion.) EPA has taken FEMA's recommendation to limit its remediation program just to apartment buildings, assuming that all commercial buildings have insurance that will pay for proper remediation and that the building owners will actually have proper abatements done. No schools or government buildings are included in this program, though the infiltration of contamination did not discriminate. There is no scientific basis for this.

Testing vs. Remediation

1. EPA has decided to give tenants the ability to have their apartments tested, but not remediated. This presumes that tenants understand the nature of the contamination and the long-term health risks, neither of which EPA has been providing in their educational outreach. Choice of testing can preclude later cleanup, since EPA will only test for the presence of asbestos. The program is still voluntary, depending on tenants to have knowledge of the program (and its pitfalls) and expertise to know if their apartment needs remediation. EPA's outreach has been limited to a website and a few individuals making personal appearances at apartment buildings. Worse, EPA's outreach materials withhold information about the types of WTC contamination that studies have found in apartments and they do not provide any information that would motivate people to register for the cleanup (e.g., health risks, diseases resulting from decades of exposure to the contaminants residing in dust reservoirs like carpets). The deadline has been extended to December 28, 2002. But many residents are still not aware of the program or need for abatement. EPA must improve its public outreach to that people are adequately informed of the risks of the contaminants that may still be in their apartments. If this does not take place, many people may forego having their apartments cleaned in the false belief that they will be safe. The ultimate consequences to public health could be considerable.

2. "Owners and managers of residential buildings and coop boards can request to have their buildings' common areas and HVAC inspected and cleaned. If a tenant association makes this request, EPA will seek agreement by building owner or manager." (This will result in fewer buildings having HVAC inspections and abatement. HVAC systems that remain uncleaned pose the threat of recontaminating apartments that have been cleaned.)

3. "Regardless of whether a building owner or manager has requested the cleaning of all common areas, the EPA's Project Monitor will visually evaluate public common areas such as the building lobby, hallways, stairways and elevator interiors. If dust is visible, these areas will be cleaned". (What happens if dust, as in carpets, is not visible? Also, EPA is not clear about the quantity of visible dust that triggers a cleanup.)

4. Only if the building owner requests, the Project Monitor will inspect other common areas including laundry rooms, utility rooms, compactor rooms and elevator shafts. These areas will be cleaned "as needed". This term is vague. Will the criteria here, too, be visual inspection?

5. "If a tenant or tenant association asks for testing or cleaning, EPA will contact building owner to secure permission to do cleaning of common areas and HVAC."

Type of Remediation

1. Common areas are still given just visual inspection to assess need for cleanup. The problem is that significantly elevated levels of asbestos have been found in areas that have been cleaned before and where there doesn't appear to be contamination on visual inspection.
2. "Curtains, fabric window treatments, upholstery and other materials that cannot be cleaned by wet wiping shall be HEPA vacuumed two times. Fabric covered furniture will be vacuumed using a stiff brush attachment " (HEPA vacuuming can vaporize any mercury on the particulate. This method is not effective in removing asbestos, as shown in tests at Brookdale, CT schools, where ultrasonication detected large amounts of asbestos, where microvac showed none.)
3. "Window air conditioners will be vacuumed then removed from their position and vacuumed internally. Filters will be HEPA vacuumed and reinstalled."
4. "Intake/discharge registers of HVAC systems (if present) will be removed/cleaned. Only the first foot of duct work will also be vacuumed, then the register will be reinstalled and covered with plastic." This will ensure that contamination can remain in HVAC ducts.
5. Only "[t]he first foot of all exhaust duct work (including stove, dryer and bathroom vents) will be vacuumed." Again, this is not a scientifically-derived or protective protocol, but one developed for convenience. The contamination that is left in these duct systems also constitutes a long-term reservoir.
6. "Baseboard heaters will be cleaned. Protective covers on finned radiant heaters and baseboard heaters will be removed to expose heat elements. Fins are to be brushed and vacuumed to remove dust." (My suggestion: wet cleaning, then wet wipe sampling)
7. No specific mention has been made of cleaning electronics, computers etc. that have internal fans that take in outside air, and are known reservoirs for dust.
8. "Cleaning clothing and accessories (handbags, shoes, etc.) is the responsibility of the resident. The Cleaning Contractor will not open and/or clean inside drawers, cabinets, breakfronts, etageres and similar enclosed storage and display spaces.' These will remain contaminated.
- 9 'As part of the Cleaning Program, the Scheduling Contractor will contact the New York City Department of Health (NYCDoH) if mold is observed in a residence or residential building. The NYCDoH will then contact the resident to provide recommendations on how to address the affected areas." (This leaves cleanup of mold to the resident!!!)
10. "If a HVAC system requires cleaning, then the Monitoring Contractor shall prepare a scope of work for the cleaning the HVAC system or portion thereof. The scope of work shall be provided to DEP and EPA within 2 business days of the completion of the HVAC system evaluation." (This will guarantee a hodge-podge, case-by-case methodology for cleaning HVAC.)
11. HEPA vacuuming may well volatilize any mercury bound up in particulate matter in dust. No mention is made of this possibility or how to ameliorate the impact.

Type of Testing

1. Testing is just for asbestos, and precludes cleanup if asbestos is not above EPA's threshold (based on one in 10,000 cancer risk. EPA's usual health standards are based on one in one million cancer risk. (Other contaminants could be quite high, but testing would not show this, since only asbestos is measured.)

EPA says that it has chosen a one in 10,000 cancer risk over 30 years for NYC (rather than the usual lifetime one in a million risk) because excessive particulate matter in samples has clogged the filters on which they are trying to find asbestos. This finding should indicate that further cleaning is warranted with retesting based on a clearance standard equivalent to the lifetime one in one million risk, not that people should be exposed to a greater risk! If clogging of sampling filters is a problem, EPA should operate 3 samplers side-by-side for one-third the time.

2. For clearance testing, "Residents have a choice between two forms of airborne asbestos testing, modified-aggressive and aggressive" (as if they know the difference in results). EPA's fact sheet says: "Modified- aggressive testing simulates the normal air movement you would expect in a room where a fan or air conditioner was running. In aggressive testing, a one-horsepower leaf blower is used to direct a jet of air into all corners of the residence before testing is begun. (The way this is written, a lay person would choose modified testing every time, regardless of the fact that aggressive testing is the method specified for proper asbestos abatements and would be more precautionary.)

3. "Wipe samples will be collected at 10 percent of the residences where sampling only has been requested, up to a maximum of 13 residences, as instructed by EPA. This sampling will consist of the collection of 3 wipe samples each for dioxin and mercury ". Considering that thousands of buildings were contaminated, this tiny number of samples for dioxin and mercury is not scientifically valid. The locations of the wipe sampling are also not specified. Would any be inside of ductwork on horizontal surfaces? Would any be in other reservoirs for dust? Wipe samples are not suitable technique for sampling soft surfaces such as upholstery and carpets.

4. "Common spaces will be sampled without the use of forced air devices (fans, leaf blowers etc)." This ensures that common areas will have a less effective remediation than inside apartments. There is no scientific basis for this.

Transparency of Process

EPA has gone about the remediation reluctantly. It delegated collection of indoor data to NYCDEP, who delegated it to landlords, most of whom have not complied. It waited until February to even begin the process of determining which contaminants are a threat to public health. Thus far, it has crafted new standards without the usual peer review and public comment processes. Although a closed conference, under the auspices of TERA, occurred the end of October, the lack of input from interested informed scientists is also problematic. The TERA peer review does not include these protocols, which ostensibly were written subsequent to this document that justifies selection of contaminants of potential concern.

EPA has specified that all data shall be provided to EPA Indoor Air web database. Researchers need the data; methods can be devised so that the data can be shared without compromising residents' identities.)

We urge that EPA's scopes undergo careful, public review by independent scientists and that said scientists be invited to make a presentation on an alternative course of action, taking into account the Precautionary Principle, that in the face of partially quantified dangers, government must err on the side of caution in protecting the public health.

C I T Y

No Serious Health Risks for Public Near Ground Zero, E.P.A. Reports

By DIANE CARDWELL

Most people living or working in the area around ground zero are unlikely to suffer serious short- or long-term health effects from the terror attack, according to a draft report released yesterday by the Environmental Protection Agency. But the report said anyone exposed in the early hours was at risk of chronic sickness, as many firefighters have already reported.

The report, which has been released in draft form to solicit public comment, concludes that though high levels of several contaminants were found at and near ground zero in the months after Sept. 11, they were primarily in areas off limits to ordinary New Yorkers. The draft also says that those levels returned

to normal quickly enough to mitigate serious damage.

William H. Farland, a senior science administrator at the E.P.A., said that because disaster workers "got people out of the area and cordoned it off quickly," civilian exposure was limited.

"What we don't know about were people who were actually in the plume itself," Dr. Farland said, adding that there were several studies being conducted to try to assess the effect on that population.

Researchers analyzed air samples from monitors bordering ground zero and at other sites in Lower Manhattan and surrounding areas to try to determine what people in the vicinity might be inhaling and how that could affect their health. They found high levels of various danger-

ous substances, including metals, PCB's, dioxins and asbestos, which generally decreased to pre-Sept. 11 levels by early this year.

But the draft, which will be open to comment for 60 days and is available at www.epa.gov/ncea/wtc.htm, contains its own caveats. Unlike dust samples, which were collected on Sept. 11, 2001, measurements for some contaminants did not begin until Sept. 14 and for others not until Sept. 23. Because the data suggest that the toxin levels were likely to be highest in the first few days after the destruction of the World Trade Center towers, the potential health impacts cannot be evaluated with certainty, the draft concludes.

The draft report comes on the heels of a separate study by a team of environmental scientists that found that the soot in the air of Lower Manhattan in the first few days after the attack was less likely to cause long-term health problems than many experts had feared.

That report, released earlier this week, found that the dust particles collected at 14 sites Sept. 12-17, 2001, were primarily larger, and therefore more easily expelled, than small particles, which are much more dangerous because they are more likely to lodge deep in the lungs.

But these reports may do little to ease the fears of workers who spent days and weeks at the trade center site. The E.P.A. draft says that people exposed to extremely high levels of toxins during the collapse of the towers and in the hours afterward were likely to be at risk for acute, possibly chronic, respiratory and

other symptoms. Many rescue workers and residents have reported having respiratory problems in the months since the collapse and have accused officials of withholding critical information.

Just this week, representatives of the firefighters' union, which is suing the city over its decision to reduce the size of crews at dozens of engine companies, blamed insufficient protective gear for high rates of illness among its members.

The E.P.A. draft includes some information collected by such agencies as the Occupational Safety and Health Administration and the National Institute of Occupational Safety and Health that addresses the exposure faced by firefighters and rescue workers but does not explicitly evaluate it.

Status of EPA Office of Inspector General investigation of EPA's handling of WTC fallout. To contact individuals in EPA and to see organizational directories, see:

<http://oasint.rtpnc.epa.gov/natloc/locator.home>

AIR

January 27, 2003

Assignment Title and Number: EPA's Response to the World Trade Center Towers Collapse

(Code 2002-0000702)

Team Members: Jim Hatfield, Chris Dunlap, Geoff Pierce, Dana Gilmore, Sarah Fabirkiewicz, Steve Schanamann,

EPA Goal(s): Goal 1 - Clean Air
Goal 5 - Better Waste Management and Restoration of Contaminated Waste Sites, and Emergency Response
Goal 4 - Preventing Pollution and Reducing Risk in Communities, Homes, Workplaces, and Ecosystems

OIG Goal(s): Goal 1 - Contribute to improved environmental quality and human health
Goal 2 - Improve EPA's management and program operations

Assignment Objectives	Findings/Issues Being Addressed
1. Did the available monitoring data and analyses of that data support EPA's public pronouncements regarding air quality and associated health risks resulting from the collapse of the WTC towers?	<p>EPA did not have sufficient data to declare the ambient air "safe to breathe" when it did for the following reasons:</p> <ul style="list-style-type: none"> The AHERA "standard" used to conclude that asbestos levels were safe is not a health-based standard. AHERA standard based on minimum detection limit that used old filters (70 structures/cc); new filters capable of achieving lower detection limits of approx. 15 s/cc. Health standards do not exist for cumulative impact of exposure to several pollutants at once / synergistic impact of air toxics unknown and little studied. EPA's pronouncement did not address short-term health impacts. EPA did not have data on more than half (10 of 14) of the pollutants of concern (POC's) that scientists believe the public was potentially exposed to immediately after the collapse of the WTC towers. <p>EPA's conclusion that the air was safe is based on a 1 in 10,000 risk that someone will develop cancer from exposure to the WTC pollutants, and this was only for a limited set of POC's. Is this risk level a level that the public or regulators consider safe? For air toxics, EPA has traditionally used 1 in 1 million as the definition of acceptable risk (they do not use the term "safe") and 1 in 100,000 as the action level when a regulated industry must undertake immediate corrective actions to abate health risks (EPA allows cost considerations to influence controls chosen inbetween these two points). EPA used CERCLA regulations in making</p>

<p>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, and guidance?</p>	<p>EPA appears to have correctly followed the Federal Response Plan (FRP) which provides for Federal agencies to supplement a local authority's response and not take over control. However, questions remain about EPA's obligation to press for greater control over indoor air issues if it determined that NYC was not doing an adequate job in addressing indoor air issues. Also, FEMA's decision to implement FRP (ESF#10) did not preclude or prevent EPA from implementing the NCP; EPA considered implementing the NCP but choose not to, even though selected ambient air asbestos readings were above 70 s/cc and about 39 percent of bulk dust samples were above the one percent EPA-defined action level for using the NCP.</p>
<p>3. Were asbestos demolition and renovation work practice standards followed during WTC clean up and recovery operations, and if not, why not?</p>	<p>Interviews and documents suggest that the NESHAP work practices were generally followed where practical. We were told that when possible, asbestos containing material (RACM) was removed from buildings before they were demolished. Years early, told NYC Port Authority had performed asbestos assessment and removed asbestos that was accessible from these buildings. Where that was not possible, information indicates that the buildings were continuously wetted down to minimize dust emissions. However, indications are that NYC/DDC did not obtain a NESHAP waiver before demolition, and it appears no adsorbent agents were added to water sprayed on buildings; (adsorbents make water stickier), further ensuring asbestos particles do not become airborne. Also, there was a problem, particularly in the early weeks of the response, in getting trucks to stop and be wetted down before they transported asbestos-containing debris from the site.</p>
<p>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?</p>	<p><i>Did people receive enough information about air quality? Did people return to their homes without adequate information regarding health risks, or without properly cleaning their home of WTC dust? Plan to address these issues in survey of 5,000 NYC residents. Survey poses 43 questions about communications received by the public and actions taken by the public. Anecdotal evidence and first person interviews (researchers, others who observed practices first hand) indicate (a) website useless to many until too late -- no electricity, no phone, no computer, etc. (b) some missed subtleties of EPA's intended message (outdoor air only; long term only; outside ground zero only); and (c) may not have been effective in consistently getting public to take desired precautions before returning.</i></p>

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?	<i>Are EPA's current indoor air efforts sufficient?</i> Newspaper articles and some "experts" have raised questions about the adequacy of the clean-up plans, and the scope of the project. Indoor air program is voluntary, so the entire building may not be cleaned up and there is the possibility of recontamination. Also, it is limited to south of Canal Street and may not include other areas of potential contamination (e.g., Chinatown, Brooklyn). Also, tests are only cleaning and testing for asbestos.
6. Should EPA revise its preparation and contingency planning for dealing with air pollution resulting from environmental catastrophes?	Preliminary conclusions are that EPA needs to: 1) Improve risk communications to the public 2) Improve risk characterization tools and processes, and 3) Develop scenarios in anticipation of emergency situations

Current Work/Plans:

- OMB approved our survey of the public's reaction to EPA air quality pronouncements on January 24, 2003. We are moving expeditiously to have the survey printed and mailed to 5,000 residents of New York City. Once printed and mailed, it is believed that the majority of those choosing to respond will do so within 2-3 weeks. Need to discuss adv/disadvantages of issuing separate report just on the WTC survey and/or of holding up WTC report a few weeks to include the WTC survey results in the report.
- The team is drafting the report in accordance with the message agreement meeting outline agreed to in late December; Gary Sternberg will join the team in RTP next week. First draft for Director's review is planned by end of first week of February. We would like to have several color photographs in the final report.
- At our late December meeting with the (then) Chief of Staff, she acknowledged that the content of the WTC press releases was heavily influenced by the Council on Environmental Quality (CEQ). In her view, the ultimate responsibility for content of press releases resided with the former Public Information Officer (now with DOI), who denies such authority. Have asked signed copy of interview write-up with Chief of Staff.
- EPA policies and procedures governing content, approval, etc of EPA press releases are stale, dating back to early 1980's; these policies and procedures appear not to be known or followed by current press office in Washington nor in NYC.
- Working with OL, e-mails (from 9-11-01 to 12/31/01) for former EPA Public Information Officer have been pulled and will be reviewed; paper copies of selected e-mails indicate CEQ dictated the content of early press releases -- 100 percent of what CEQ added was added; 100 percent of what CEQ deleted was deleted. Once all e-mails have been analyzed, we plan to follow up one more time with the White House Counsel's Office for an interview with Sam Thernstrum (CEQ); we have had multiple calls with the White House Counsel in an attempt to interview CEQ on this issue.

Project Milestones

Pre-Research Start/End	Fieldwork End Date	Draft Report Issued Date	Comments Received	Final Report Date	Staff Days Charged
3/26-7/26/02	1/17/03	02/14/03	3/14/03	03/28/03	773

Reasons for Delays:

Although milestones have not been missed yet, draft report issue date is tight due to following:

- Getting WTC survey -- first ever for the OIG -- approved by OMB has taken longer than envisioned; no blanket Information Collection Request (ICR) exists for OIG that could be piggy-backed, and original ICR had to be developed and federally-registered along with the survey, survey post card, survey instructions, etc -- all which had to pass a 60 open public comment period before OMB would approve the survey ICR>.
- The number of groups that collected or analyzed air and bulk dust data around the WTC after 9-11-01 was more than planned and has taken longer to analyze than estimated.
- Attempts to discuss press releases with CEQ have been drawn out by discussions with the White House Counsel.
- Limited additional field work needed to be performed after the field work verification meeting was held.



Monday, February 3, 2003
Geological and Environmental Sciences Sections Present

**OCCUPATIONAL AND ENVIRONMENTAL HEALTH IMPACT
OF THE WORLD TRADE CENTER COLLAPSE**

SPEAKER:

Steven Markowitz

Director, Center for the Biology of Natural Systems and

Professor Earth and Environmental Sciences at

Queens College of the City University of New York 718 670-4180

ABSTRACT:

The events of September 11th in downtown Manhattan was the worst single occupational health disaster in the United States, far greater than the Triangle Shirtwaist Company fire of 1911, the Gaulley Bridge epidemic of the 1930's, or the West Virginia mining collapse of 1969. Accumulating studies show respiratory disease and other effects among fire fighters, day laborers, Ground Zero construction workers, and other workers and residents near Ground Zero. Environmental studies show limited exposures to specific toxins. The extent of disease observed is disproportionate to exposures, which largely reflects the limited base of knowledge that supports occupational and environmental health. The need to protect against undue exposures in unprecedented exposure scenarios is obvious, but worthy of emphasis.



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DO LOWER MANHATTAN CLEANUP RIGHT

By WILLIAM F. HENNING Jr.
Thursday, August 22nd, 2002

Next month, the Environmental Protection Agency will finally begin cleaning hundreds of apartments in lower Manhattan.

It's a shame that the agency isn't going to do it right.

The EPA's aim, of course, is to rid these apartments of the asbestos and other toxic materials thrown into the air by the collapse of the twin towers and the fires that burned for four months afterward.

When the EPA announced in June that it would do this, it was reversing the position it held ever since Sept. 11. For eight long months, the EPA insisted no cleanup was necessary. Then, when at last it agreed that, okay, maybe one was, it said the cleanup was "to reduce the safety concerns of residents."

As if the release of hundreds of tons of asbestos, fiberglass, lead, highly alkaline concrete dust and many other toxic substances wasn't a real public health hazard, just the concern of some worrywarts.

The indoor cleanup should have started right after the collapse, at the same time the outdoor cleanup began. It is now too late to prevent the exposures that have already occurred, but it is not too late to prevent future harmful exposures.

How? First off, the scope of the EPA cleanup - limited to residences below Canal St., and then only when the occupant requests it - is too narrow. The contamination is not limited to residences. It is present in workplaces and public spaces and in residences where the owner does not request a cleanup. All contaminated places should be cleaned up on a building-by-building basis.

NEW YORK'S HOMETOWN CONNECTION

WWW.NYDAILYNEWS.COM

DAILY NEWS

Then, too, the cleanup must be conducted by properly trained and protected personnel. Our previous calls for protection of all cleanup workers were ignored, with the result that more than 400 day laborers face the prospect of long-term respiratory illness.

As we learned last week, the EPA itself was guilty of a shocking oversight lapse when it permitted a cleanup contractor to spew asbestos into the air by vacuuming downtown streets with improperly equipped trucks.

The EPA should ensure that similar failures do not recur by requiring contractors to prove their workers have been properly trained and equipped. And then the EPA should take full charge of the cleanup.

Though the EPA has the sole responsibility for the cleanup, it perversely rejects its mandated role. Instead, it is calling the cleanup a "collaborative" effort of federal, state and city agencies.

Only the federal government has the resources and expertise to clean lower Manhattan. The EPA can and should call on other agencies to assist in this effort, but not to co-manage it.

However belated, it is good that the EPA has agreed to a partial cleanup of lower Manhattan. But the cleanup will only be effective if it includes all contaminated places, including, in particular, workplaces.

It is not too late to do it right.

Henning is chairman of the New York Committee for Occupational Safety and Health. www.nycosh.org

NYCOSH's World Trade Center-related safety and health work is supported by the United Church of Christ and the September 11th Fund.

A coalition of health activists, environmentalists, concerned citizens and more than 250 unions working together to promote safe and healthful workplaces

We Protect More Than the Environment...



Home is where we live our lives and feel safe with our loved ones. For some living in lower Manhattan, the possibility that dust from the collapse of the World Trade Center may linger in their homes has raised concerns.

That is why the EPA, along with FEMA, New York City, New York State and OSHA is offering residents of lower Manhattan — south of Canal, Allen and Pike Streets — the option of having their homes professionally cleaned and/or tested for airborne asbestos contamination free of charge.

While scientific data does not point to any significant long-term health risks, people should not have to live with uncertainty about the future.

Call **1-877-796-5471** or visit **www.epa.gov/wtc** to schedule an appointment to have your apartment cleaned and/or tested or for further information.

www.epa.gov/wtc
1-877-796-5471





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The Newspaper of Lower Manhattan | HOME | May 27 — June 2, 2003

NEWS

Downtown favors West St. tunnel, poll says

By Josh Rogers

Most people living in Battery Park City think building a short tunnel under West St. is at least somewhat important if not a top priority, according to a new poll of Lower Manhattan residents. One third of the B.P.C. residents surveyed by Blum and Weprin Associates said building "a short vehicular tunnel adjacent to the World Trade Center site" is either a top priority (10 percent) or very important (22 percent). One quarter said it was somewhat important, but 42 percent said it was not very important.

Julie Weprin, who conducted the poll of 800 residents in B.P.C. and the other neighborhoods south of Canal St., did say people living in Battery Park City were the most likely to say the tunnel is not very important. The issue has been an emotional one in B.P.C. and that result was perhaps less surprising than the fact that the number of people who rated the tunnel to be at least very important was about the same in B.P.C. than it was in Tribeca and the Financial District/Seaport area.

Overall, nine percent said the tunnel should be a top priority, 24 percent said very important, 30 percent somewhat important and 31 percent not very important.

The poll on a range of subjects about living in Lower Manhattan was paid for by Friends of Community Board 1, a non-profit fundraising arm of the board. The respondents were interviewed on the telephone between May 4-6.

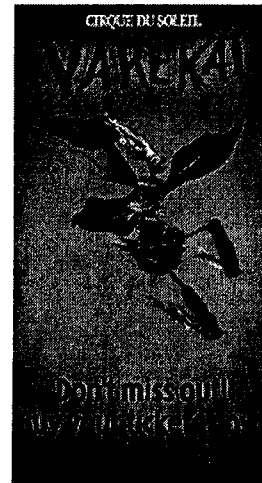
The tunnel, which is estimated to cost \$900 million, has been endorsed by Gov. George Pataki and others as a way to take most of the through traffic off the eight-lane roadway, also known as Route 9A, and ease pedestrian crossings between B.P.C. and the proposed memorial to the victims of the 1993 and 2001 terrorist attacks on the World Trade Center and Washington D.C.

Opponents of the tunnel, led by a residential group called the Save West St. Coalition, argue that the tunnel is too costly, will be disruptive to build, will cause new traffic problems at the tunnel's exit and entrance ramps, and will primarily benefit Brookfield Financial Properties, which owns the World Financial Center, which is on the opposite of the street as the W.T.C.

Madelyn Wils, chairperson of C.B. 1, which commissioned the poll, said she is confident the tunnel would be an improvement for pedestrians, but she is undecided about whether it is worth doing.

"My concern is over the costs of West St.," she said.

Similarly, after Pataki said the state was moving forward with the tunnel in



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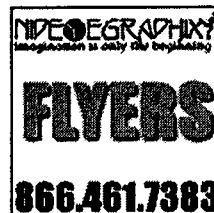
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April, Deputy Mayor Daniel Doctoroff said he was not convinced yet that the benefits justified the cost.

The money would come out of the \$21.4 billion in federal aid to help Downtown recover from the terrorist attack and Wils said there may not be enough for the tunnel if other priorities are addressed. Wils has been arguing for building a rail link from Downtown to the Long Island Rail Road and JFK Airport – which would cost at least \$2 billion.

That idea rated significantly higher than the tunnel in the poll. Almost 60 percent of the respondents said an airport/L.I.R.R. link is either a top priority or very important and only 13 percent said it was not very important.

The margin of error for the poll was plus or minus three points. Weprin said 243 people in B.P.C. were surveyed. On questions dealing with the smaller sample of residents from B.P.C. the margin of error was larger, plus or minus about seven points, Weprin said.



Other poll results

There were other significant findings in the poll. Forty-two percent of the people living Downtown before 9/11 rated it as an excellent place to live, but only 14 percent say it is excellent now. Even so, 79 percent of the people who were living Downtown before the attack said they were not thinking of moving away.

“It seems the ones that are still here now, they are here to stay,” said Weprin.

Of the people who are considering moving away, the most common reason was for personal reasons unrelated to 9/11.

Most of the apartments of people who permanently moved out of Lower Manhattan after the attack were filled by new residents taking advantage of a federally-funded residential grant program administered by the Lower Manhattan Development Corp. The poll confirmed the anecdotal evidence that the residential turnover was most pronounced in B.P.C., where 43 percent of those polled had moved Downtown after 9/11.

Fifty-six percent of the people who lived in Tribeca and Battery Park City rated it excellent before 9/11, whereas only 27 percent on the East Side rated it that way. After 9/11, 29 percent of B.P.C. residents said it was excellent, compared to 26 percent in Tribeca and 10 percent on the East Side.

Thirty percent of the respondents who lived Downtown before 9/11 said someone in their household suffers from coughing, respiratory problems, or some other ailment which they believe to have been caused by the W.T.C. debris. As for new residents, 25 percent answered yes to this question.

Thirty-one percent of the pre-9/11 residents said they were still suffering from emotional difficulties, depression, sleeplessness, anxiety or nightmares as a result of the attack. Forty-one percent said they had these difficulties after the attack, but do not have them now.

Seventy-five percent said they would like to see a temporary, open-air public market at the east side of the W.T.C. site during the transitional years when no buildings are expected to be constructed there.

When asked what should be the “number one priority for Downtown construction,” 35 percent said street level local retail services, followed by schools (21 percent) and east and west waterfront park improvements (17 percent).

This question had more fluctuation depending on where people live. Since all of the public elementary and middle schools in the C.B. 1 area are west of Hudson St., it was perhaps not surprising that 26 percent of Downtown East Siders said schools were the number one priority, while in B.P.C. and Tribeca, the numbers were 16 and 19 respectively. In B.P.C., 44 percent said better retail was the highest priority, whereas on the East Side, it was 26 percent.

The first two parts of the poll were released last week. The final part on residents' feelings on the memorial and the rest of the W.T.C. site will be released May 27, the day before a public hearing to discuss the memorial competition.

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PREDICTING HEALTH IMPACTS OF THE WORLD TRADE CENTER DISASTER

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January 16, 2002

Abstract

The recent attack on the World Trade Center, in addition to direct injury and psychological trauma, has exposed a vast population to dioxins, dibenzofurans, related endocrine disruptors, and a multitude of other physiologically active chemicals arising from the decomposition of the massive quantities of halogenated hydrocarbons and other plastics within the affected buildings. The impacts of these chemical species have been compounded by exposure to asbestos, fiberglass, crushed glass, concrete, plastic, pulverized human remains, and other irritating dusts.

To address the manifold complexities of this incident we combine recent theoretical perspectives on immune, CNS, and sociocultural cognition with empirical studies on survivors of past large toxic fires, other community-scale chemical exposure incidents, and the aftereffects of war. Our analysis suggests the appearance of complex, but

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distinct and characteristic, spectra of synergistically linked social, psychosocial, psychological and physical symptoms among the 100,000 or so persons most directly affected by the WTC attack. The different 'eigenpatterns' should become increasingly comorbid as a function of exposure.

The expected outcome greatly transcends a simple 'Post Traumatic Stress Disorder' model, and may resemble a particularly acute form of Gulf War Syndrome. We explore the role of external social factors in subsequent exacerbation of the syndrome – secondary victimization – and study the path-dependent influence of individual and community-level historical patterns of stress. We suggest that workplace and other organizations can act as ameliorating intermediaries. Those without access to such buffering structures appear to face a particularly bleak future.

Key Words: chemical disaster, ecological resilience, Gulf War Syndrome, immune cognition, racism, secondary victimization, terrorism, traumatic perturbation, World Trade Center

Introduction

The fiery collapse of New York City's World Trade Center has, at this writing, killed thousands and driven thousands more to seek medical attention. It appears to have directly and profoundly affected several hundred thousand people. Impacts range from expected extremities of psychological and psychosocial stress, to physical trauma, burns, and exposure to irritating dusts containing concrete, fiberglass, asbestos, ground plastics, and crushed human remains. Less well understood is the potential for significant inhalation and skin-dose exposure to the highly toxic and carcinogenic combustion and other decomposition products of the thousand or so tons of halogenated and Nitrogenated plastics and plastics additives in the affected buildings. Great quantities of these highly unstable and acutely combustion-toxic materials continued to smolder and burst into flame as long as three months after the event, covering lower Manhattan with a persistent, eye-burning cloud of stinking, choking, smoke.

Combinations of smoke inhalation, burns and trauma are reported to be the most common factors in the immediate hospitalizations. Very significantly, in our view, large numbers of persons with allergic skin and anaphylactic reactions were seen during the initial stages of the incident (Larkin,

2001). If recent case histories of multi-fatal and other toxic plastics fires and chemical releases provide guidance, psychological and psychosocial trauma, burns and other physical injuries, and toxic exposure, will interact synergistically to produce complex but characteristic patterns of symptoms on several timescales in a path-dependent manner at the individual and group levels – what has already come to be called ‘World Trade Center Syndrome’ by the popular press (NY Post, 2001; Newsweek, 2001). The long-term path of this syndrome will be profoundly affected by the response of larger, embedding social structures, in likely synergism with individual and community-level historical burdens carried by those exposed. Community response is most likely to occur as a virulent secondary victimization (e.g. Tarrier et al., 1999; Campbell and Raja, 1999), but can, in a best case scenario, serve as an ameliorating influence.

We begin with a review of recent theoretical developments which cross link processes of central nervous system (CNS), immune, and sociocultural cognition. This allows analysis of the effects of a sudden, traumatic, perturbation – characteristic combinations of physical, social and chemical assault – on ‘condensed’ cognitive systems at different timescales, and in the context of individual and community experiences of historical burden.

Next, we introduce the ‘new’ combustion toxicology, and summarize observed effects of large toxic fire and other chemical release events on injured survivors from this perspective. We then reinterpret studies of Gulf War Syndrome, and ultimately combine the analyses to try and predict the developing spectra of symptoms to be expected from the WTC disaster at different ecosystem levels, in the context of couplings across them.

We are particularly concerned with the likely interaction of larger, embedding crosssectional and longitudinal social structures and historical experiences with symptom patterns.

The problems are subtle and complex, and we are driven to employ cutting-edge methods. These require some initial development. The resulting mathematical model, upon which much of our analysis will be based, has been posted as a mathematical appendix on the Cogprints server (R Wallace and D Wallace, 2001).

Genes, cognition, and culture

Recently, interactions between the central nervous system (CNS) and the immune system, and between the genetic heritage and the immune system

have been recognized and even codified through journals such as *Neuroimmunology* and *Immunogenetics*. We argue that a cognitive socioculture – a social network embodying culture – in which individuals are embedded, and through which they are both acculturated and function to meet collective challenges of threat and opportunity, may interact strongly with individual immune function to produce a composite entity which might well be labeled an *Immunocultural Condensation* (ICC). We propose that ultimately CNS, immune system, and embedding socioculture become jointly convoluted to form a composite entity which will respond coherently, but in a complex manner, to sudden ‘delta function’ external perturbation. Elsewhere we have explored the response of such systems to long-term ‘structured’ systems of embedding external perturbation (R Wallace, 2001a, b). We will apply that work to understand how embedding social structures may either exacerbate or ameliorate the long-term effects of a sudden perturbation.

Increasingly, biologists are roundly excoriating simple genetic reductionism which neglects the role of environment. Lewontin (2000), for example, explains that genomes are not ‘blueprints,’ as genes do not ‘encode’ for phenotypes. Organisms are instead outgrowths of fluid, conditional interactions between genes and their environments, as well as developmental ‘noise.’ Organisms, in turn, shape their environments, generating what Lewontin terms a triple helix of cause and effect. Such interpenetration of causal factors may be embodied by an array of organismal phenomena, including, as we shall discuss, culture’s relationships with the brain and the immune system.

The current vision of human biology among evolutionary anthropologists is consistent with Lewontin’s analysis. That work is summarized by Durham (1991) to the effect that genes and culture constitute two distinct but interacting systems of inheritance within human populations and information of both kinds has influence, actual or potential, over behaviors which creates a real and unambiguous symmetry between genes and phenotypes on the one hand, and culture and phenotypes on the other.

Genes and culture are best represented as two parallel lines or ‘tracks’ of hereditary influence on phenotypes.

Regarding the interaction of these tracks, evolutionary anthropologists have concluded that, over hominid evolution, genes came to encode for increasing hypersociality, learning, and language skills, so the complex cultural structures which better aid in buffering the local environment became widespread in successful populations (Bonner, 1980).

Every successful human population seems to have a core of tool usage,

sophisticated language, oral tradition, mythology and music, focused on relatively small family/extended family groupings of various forms. More complex social structures are built on the periphery of this basic genetic/cultural object (Richerson and Boyd, 1995, 1998).

At the level of the individual human, the genetic-cultural object appears to be mediated by what evolutionary psychologists postulate are cognitive modules within the human mind. Each module was shaped by natural selection in response to specific environmental and social conundrums Pleistocene hunter-gatherers faced. One set of such domain-specific cognitive adaptations addresses problems of social interchange (Barkow et al., 1992; Cosmides and Tooby, 1992). The human species' very identity may rest, in part, on its unique evolved capacities for social mediation and cultural transmission. Anthropologist Robert Boyd has remarked that culture is as much a part of human biology as the enamel on our teeth.

Indeed, a brain-and-culture condensation has been adopted as a kind of new orthodoxy in recent studies of human cognition. For example Nisbett et al. (2001) review an extensive literature on empirical studies of basic cognitive differences between individuals raised in what they call 'East Asian' and 'Western' cultural heritages. They view Western-based pattern cognition as 'analytic' and East-Asian as 'holistic.' Nisbett et al. (2001) find that

1. Social organization directs attention to some aspects of the perceptual field at the expense of others.
2. What is attended to influences metaphysics.
3. Metaphysics guides tacit epistemology, that is, beliefs about the nature of the world and causality.
4. Epistemology dictates the development and application of some cognitive processes at the expense of others.
5. Social organization can directly affect the plausibility of metaphysical assumptions, such as whether causality should be regarded as residing in the field vs. in the object.
6. Social organization and social practices can directly influence the development and use of cognitive processes such as dialectical vs. logical ones.

Nisbett et al. conclude that tools of thought embody a culture's intellectual history, that tools have theories built into them, and that users accept these theories, albeit unknowingly, when they use these tools.

We may assume, then, the existence of both gene-culture and brain-culture condensations.

Immune cognition

Atlan and Cohen (1998) have proposed an information-theoretic adaptation of IR Cohen's (1992) 'cognitive principle' model of immune function and process, a paradigm incorporating pattern recognition behaviors analogous to those of the central nervous system.

We paraphrase Atlan and Cohen's description of immune system cognitive pattern recognition-and-response behavior as follows:

The meaning of an antigen can be reduced to the type of response the antigen generates. That is, the meaning of an antigen is functionally defined by the response of the immune system. The meaning of an antigen to the system is discernible in the type of immune response produced, not merely whether or not the antigen is perceived by the receptor repertoire. Because the meaning is defined by the type of response there is indeed a response repertoire and not only a receptor repertoire.

To account for immune interpretation IR Cohen has proposed a cognitive paradigm for the immune system. The immune system can respond to a given antigen in various ways, it has 'options.' Thus the particular response we observe is the outcome of internal processes of weighing and integrating information about the antigen.

In contrast to Burnet's view of the immune response as a simple reflex, it is seen to exercise cognition by the interpolation of a level of information processing between the antigen stimulus and the immune response. A cognitive immune system organizes the information borne by the antigen stimulus within a given context and creates a format suitable for internal processing; the antigen and its context are transcribed internally into the 'chemical language' of the immune system.

IR Cohen's (2000) cognitive paradigm suggests a language metaphor to describe immune communication by a string of chemical signals. This metaphor is apt because the human and immune languages can be seen to manifest several similarities such as syntax and abstraction. Syntax, for example, enhances both linguistic and immune meaning.

Although individual words and even letters can have their own meanings, an unconnected subject or an unconnected predicate will tend to mean less than does the sentence generated by their connection.

The immune system, in Atlan and Cohen's view, creates a 'language' by linking two ontogenetically different classes of molecules in a syntactical fashion. One class of molecules are the T and B cell receptors for antigens.

These molecules are not inherited, but are somatically generated in each individual. The other class of molecules responsible for internal information processing is encoded in the individual's germline.

Meaning, the chosen type of immune response, is the outcome of the concrete connection between the antigen subject and the germline predicate signals.

The transcription of the antigens into processed peptides embedded in a context of germline ancillary signals constitutes the functional 'language' of the immune system. Despite the logic of clonal selection, the immune system does not respond to antigens as they are, but to abstractions of antigens-in-context.

Immune and sociocultural cognition

As we show at length in the Mathematical Appendix (R Wallace and D Wallace, 2001), it is possible to give Atlan and Cohen's language metaphor of meaning-from-response a precise information-theoretic characterization, and to place that characterization within a context of recent developments which propose the 'coevolutionary' mutual entrainment – in a large sense – of different information sources to create larger metalanguages containing the original as subdialects. This work, a highly natural extension of formalism based on the Large Deviations Program of applied probability, also permits treating gene-culture and brain-culture condensations using a similar, unified, conceptual framework of information source 'coevolutionary condensation'.

Cohen's immune cognition model suggests the possibility that culture, in the sense of a local cognitive sociocultural network by which individuals are acculturated and within which they participate in collective response to patterns of threat and opportunity, and the individual immune system may be jointly convoluted. That is, there would appear to be, in precisely the sense of the gene-culture and brain-culture condensations of *immunogenetics* and *neuroimmunology*, an 'immunoculture condensation' as well.

Ultimately, however, these arguments suggest that CNS, immune and sociocultural cognition are strongly linked into a single composite entity by various kinds of 'crosstalk' – hormones and cytokines are neurologically active, while neurotransmitters are well known to have impact on the immune system. Contact with our fellows affects both.

Sudden perturbation

The WTC disaster constitutes significant and extremely broad perturbation of individual and collective life for a very large population, including both commuters and local residents of lower Manhattan. The modeling exercise of the Mathematical Appendix (R Wallace and D Wallace, 2001) suggests that the response to perturbation of an 'information source' made up of the convolution of CNS, immune and sociocultural cognition will be in terms of characteristic but 'nonorthogonal' eigenmodes of mixed patterns of pathology, so that a variable degree of mixing of different identifiable patterns of pathology – comorbidity of syndromes – will occur in proportion to the magnitude of the imposed perturbation. Equation (42) of the Mathematical Appendix (R Wallace and D Wallace, 2001) in particular suggests that, depending on the 'time constants' and 'lag times' of the elements of the syndrome, different aspects of pathology will 'kick in' at different times following the disaster. That is, although the 'incident' occurred at a single discrete time and place, the social, physiological, and psychological sequelae will not all appear simultaneously, but rather will develop according to their own internal 'time clocks' after delays which may themselves be highly, if systematically, variable. The perturbation itself will, further, interact with individual and group histories so that different individuals or groups may embark on different 'paths' of response.

The response may be multiply comorbid: At low levels of applied stress, be it physical, psychosocial or chemical trauma or their mix, a relatively small number of distinct syndromes of behavioral, psychological, social, or immune pathology should be observed, according to the model of the Appendix. As the 'magnitude' of perturbation experienced increases, however, these syndromes should become mixed, i.e. increasingly comorbid. Again, this effect should be complicated, as the 'time of integration' increases after perturbation, by the sequential appearance of symptoms and symptom patterns with differing time constants or lag times, in a broad sense.

Equation (43) of the Appendix suggests that 'eigenpatterns' of mixed pathology appear as synergistically amplified internal representations of external perturbation. If $\sigma(y)$ represents the standard deviation of pathology, and $\sigma(w)$ that of perturbation, then they will be related as

$$\sigma(y) \propto \frac{\sigma(w)}{|1 - \lambda|},$$

where λ is a kind of multiple correlation coefficient, so that, for 'tightly coupled' systems, $|\lambda| \rightarrow 1$, and this expression implies that applied per-

turbations will be greatly amplified by mixed pathologies of physiological, psychological and social response. Ives (1995) has characterized natural systems for which $\lambda \rightarrow 0$ as 'resilient' in the sense that applied perturbations will not be amplified by internal system structures. See the Appendix for details.

Note particularly that, in this formulation, symptom patterns may express themselves within embedding social networks and associated social cognition as well as simply within individuals, that is, collective, as well as individual, 'eigenpatterns' of pathology. Thus patterns of pathology will be functions of ecosystem scale as well as of applied stress. Individual and collective ecologies are separate, but linked.

Further consideration, leading to equations (47-49) in the Appendix (R Wallace and D Wallace, 2001), suggests that the multiple correlation coefficient λ *may itself be a function of the maximum applied stress*, again depending on ecosystem scale. If $|w|_M$ represents that maximum applied perturbation, then

$$\lambda \rightarrow \lambda(|w|_M)$$

and the equation above becomes somewhat complicated. For example, if $\lambda(|w|_M)$ has a typical S-shaped dose-response to the maximum applied perturbation – rising toward 1 – then the 'filter' of the transformation $\lambda \rightarrow 1/|1 - \lambda|$ produces a sharply rising J-shaped effect.

Similarly, if $\lambda(|w|_M)$ displays an inverted-U 'generalized signal transduction', then that transformation produces a much sharper peak on the same scale. Signal transduction effects are to be expected where the applied perturbation carries physiological or social information, be it chemical, sensory, or whatever. Beyond a certain maximum amplitude, in a large sense, the signal ceases to be meaningful, and becomes only noise. The question of which pattern might predominate at individual and group levels of scale is an important empirical one.

Generalized signal transduction, as we have characterized it, is consistent with what Lifton terms 'psychic numbing,' a condition resulting from extreme or prolonged stress in which a person or group is so battered as to become more-or-less permanently unable to respond appropriately to further stress (e.g. Lifton and Markusen, 1990). Such social signal transduction, which perhaps might better be termed 'pathological resilience', has been observed in the South Bronx section of New York City, which, after suffering

an official policy of 'planned shrinkage', saw vast areas lose between 50 and 80 % of their housing and population to contagious urban decay in a period of a few years (D Wallace and R Wallace, 1998, 2000). Patterns of relation among low-weight birth, homicide rate, unemployment rate, percentage foreign-born, and percent on welfare were similar for Upper Manhattan and the South Bronx – the same 'eigenmodes' of excitation – but the amplification factor for the former was 5.3 times as large for the latter, 12.5 vs. 2.4. We interpreted this to mean that the internal social structures of the Bronx had been permanently changed, i.e. 'selected' by the extreme experiences of forced population displacement and massive urban decay, so as to limit the magnitude of response to perturbation. Recognizably analogous effects, we propose, may be seen at the individual level, where a person is driven beyond the ability to respond.

Social factors can exacerbate or ameliorate symptom eigenmodes

Those exposed to the 'perturbation' of the WTC collapse will, according to our model, have a raised probability of developing a characteristic system of symptoms, a 'World Trade Center Syndrome', to quote the popular press. That syndrome will, in all likelihood, involve serious exacerbation of preexisting low level multifactorial 'eigenpatterns' already present within the affected population. This will be complicated, according to our model, by the emergence of a stratified 'comorbidity' driven by increasing exposure to the disaster itself.

Once such a syndrome – or mixture of them – emerges, it or they will be affected by embedding social structures. According to the arguments of the later sections of the Appendix, the pattern of larger social response will, itself, likely be highly coherent, and indeed may constitute a kind of 'higher language' interacting with the perturbed 'condensed information source' of those within the affected group. The arguments of the Mathematical Appendix (R Wallace and D Wallace, 2001) suggest that the 'language' of that social response is very powerful indeed and can, as an externally-imposed 'selection pressure', literally write itself upon developing symptom patterns of embedded individuals suffering exposure to the WTC disaster.

Typical collective social responses might range from public displays of expressed emotion repeatedly triggered by public officials for political reasons of 'national solidarity', to grossly unrealistic expectations of 'closure' or 'getting back to normal'. These may be compounded by continued exposure to the

effects of the WTC disaster, repeated alarms, false or otherwise, for example relatively small 'bioterrorist' outbreaks have already been exaggerated for political or other purposes, or simply from induced hypersensitivity. Indeed, other large multifatal attacks are highly likely, in the context of economic downturn, job-loss, and other stressors.

The latter part of the Mathematical Appendix (R Wallace and D Wallace, 2001) suggests that the onset of these effects – the 'writing' of systematic external stressors on symptom patterns – may itself be highly punctuated. That is, beyond a critical point, 'collective expressed emotion' will suddenly begin to exacerbate symptom patterns of those suffering 'WTC syndrome'.

An alternative model suggests that intervening social structures – community groups, church groups, labor unions, artificial 'created therapeutic communities', or even workplace initiatives – might serve to buffer affected individuals from the larger embedding social pathology. That is, having one's employer, union, or church take appropriate measures might well serve to dampen down patterns of symptoms rather than amplify them.

These speculations can be made quite formal by invoking the 'higher order' pattern recognition argument of the Appendix, assuming that the 'WTC syndrome' response constitutes, in fact, a phenotypic 'choice' made by the condensation of local cognitive sociocultural, CNS, and immune systems. That cognitive 'choice' of response might be expected to involve four possible outcomes:

- (1) no exacerbation of preexisting patterns,
- (2) short-term exacerbation,
- (3) persistent 'sensitization' to periodic re-excitation of pathological eigenmodes, i.e. generalized 'flashbacks' given appropriately conditioned triggers, or
- (4) permanently elevated pathological eigenpatterns.

The external selection pressures of the larger society will then, through the usual rate distortion arguments, 'write themselves' on the 'language' associated with and defined by this 'decision oscillator.' Thus the outputs of that oscillator will reflect those selection pressures. Supportive embedding social environments would be expected to produce outcomes (1) or (2), while 'secondary victimization' would induce the latter two.

Path dependence and symptom patterns: the burdens of history

The effects of both sudden perturbation and subsequent secondary victimization will be greatly affected by individual and community-level histories

of stress, if recent studies can be generalized. Geronimus (1992, 1996) has, for example, invoked individual-level 'weathering' in the context of social deprivation to account for differences in US Black/White birth outcomes. As described above, D Wallace and R Wallace (2000) found a draconian policy-driven 'selection pressure' acting on social network structures accounted for differences in ecosystem resilience between Upper Manhattan and the South Bronx. More recently Fischer et al. (2001) have applied a recognizably similar analysis to argue that ecological history is essential in predicting community responses to environmental perturbation. They conclude that if historical conditions strongly influence community and ecosystem responses to sudden change, then explicit consideration of ecological history may improve forecasting of ecological responses to environmental change and guide identification of highly sensitive systems. Fischer et al. (2001) find that past stressful environmental conditions can indeed increase sensitivity to subsequent perturbation, but that natural selection caused by perturbations may, on the other hand, alter responses to a repeated perturbation by increasing the tolerance of populations that succeed in persisting, a conclusion which seems consistent with the community-scale Bronx/Manhattan results of D Wallace and R Wallace (2000).

These considerations suggest, for the World Trade Center disaster, a scale-determined path dependence in the effects of both the initial perturbation and secondary victimization. Individuals with histories of chemical, income, psychosocial, or other stress would be expected to have exacerbated responses to perturbation and secondary victimization, unless they have been driven into the realm of generalized psychic numbing and pathological resilience. Similarly, communities which have traditionally borne burdens of discrimination or racism should be expected to have different, and possibly exacerbated, responses compared with those which have not.

At the individual level, we may expect stratification in symptom pattern and response to secondary victimization according to age, income, occupational history, and social status, while at the population level, we may expect significant differences according to ethnicity and 'race'. Under the highly segregated US system of de-facto Apartheid, Zip Code of residence should serve as a good surrogate for population-level histories of deprivation and racism.

After a review of combustion toxicity, we are prepared to reinterpret several case histories.

A brief introduction to the 'new' combustion toxicology

Fumes and smoke from modern office and construction materials are not like those from natural materials. Although wood, paper, natural fabrics, etc., can emit irritating fumes and soot in a fire, the intensity and irritancy is much less than most synthetic materials now commonly used as substitutes for them. Rigid polyvinyl chloride (PVC) emits 60 % of its weight as hydrogen chloride, HCl, in the early stages of a fire, which coats soot particles. These are small, smaller than those given off by, say, wood or cotton. They get into the lung and deliver a huge dose in a short time, destroying lung tissue by sheer corrosion.

Because of the flame retardant properties of chlorine, much more mass of the PVC goes off as soot and the smoke is extremely dense. People cannot see to escape. Plasticized PVC, as is used in communication cable, also produces highly acidic soot and fumes of dense smoke, but also gives off masses of phthalate anhydride, very irritating and explosive. Both forms of PVC produce large quantities of benzene, xylene, and toluene which are narcotic, and may give rise to secondary explosions.

A variety of halogenated species are present both as gases and in the soot. Large quantities of dioxins and dibenzofurans – notoriously powerful endocrine disruptors – form during the cooling phase, as they do in incinerators or burning landfills. PVC fumes and soot may contain as many as 300 species, as reported in the literature, ranging from formaldehyde to the polyaromatics, with and without chlorine. Most PVCs also contains a variety of additives which may include lead stearate as a stabilizer, phthalate plasticizers, and metal-based colorants.

The brominated fire retardants can be present in other plastics and in fabrics at more than 10 % by weight and form similar pyrolysis and combustion products. Other halogenated plastics and highly brominated-flame retarded plastics and fabrics behave analogously to PVC.

Nitrogen-based polymers such as urethane foam, acrylonitrile-butadiene-styrene (ABS) and some of the acrylics will likely have played a considerable role. Hydrogen cyanide, HCN, is emitted massively from these materials shortly before ignition. Cyanide also delivers a skin dose, besides a lung dose. Nitrogenated organics also form, of course. These should contain large quantities of flame retardants of different kinds, including brominated ethers or metal salts.

The WTC fuel load, between the two planes and the several buildings which burned, collapsed, and then smoldered copiously for weeks, would make the 1975 New York Telephone Exchange fire look like a minor event.

That fire involved over 200,000 pounds of plasticized PVC (D Wallace, 1981, 1982, 1990, 1992).

The 1975 NY Telephone firefighters, and survivors of the 1980 MGM Grand Hotel plastics fire, suffered a spectrum of subsequent symptoms which we examine in some detail below.

Two toxic fire case histories

The New York Telephone Company and MGM Grand Hotel fires, and their effects on survivors, are described at great length in D Wallace (1981, 1982, 1990, 1992). We summarize that work briefly here.

As we indicated above, the Telephone Company fire involved about 100 tons of heavily plasticized PVC cable burning over a 14 hour period. Some 700 firefighters responded to the blaze, 239 of them reporting themselves as injured. 113 of these latter subsequently participated in a 1980 survey sponsored by the Uniformed Firefighters Association, the firefighters union.

The MGM Grand Hotel fire involved a very large, mixed load of various common plastics burning at ground level – PVC, ABS, etc. Rising smoke trapped hotel patrons in their rooms, killing 85 of them at a considerable distance from the fire itself. 54 injured survivors participated in a subsequent detailed study sponsored by the Plaintiffs Legal Committee, which oversaw the resulting lawsuit.

Firefighters and civilians constitute separately socialized populations – different and quite distinct ‘sociocultures’ – in their response to the fire environment. To the former, it is the ‘normal’ working condition, for which they are rigorously trained. To the latter, it is a horror and a gross and traumatic aberration from normal life. Very large or multifatal fires, or persistent episodes of contagious urban decay which devastate communities, however, will breach even the paramilitary cultural discipline of the fire service.

Tables 1-3, below, describe the pattern of reported firefighter symptoms from the NY Telephone Company fire on short, intermediate and long time scales, respectively at the fire, two weeks to three months after, and six months or more after the fire. 64 % of the respondents complained of persistent symptoms. It is of some note that the pattern differed significantly between those with long and short work histories. Those over thirty-five years of age and those who had served more than ten years as firefighters tended to have permanent damage. Indeed, of those who had served more than 15 years, 80 % reported permanent injury.

Tables 4 and 5, by contrast, examine the respiratory and non-respiratory complaints of the sample of injured survivors of the MGM Grand Hotel fire. Reproductive, neurological, and psychological dysfunction, in contrast to the firefighter sample, dominate.

Besides the group pattern shown in Tables 4 and 5, certain individuals experienced special disabilities from the smoke, for example muscle spasms which show that certain parts of the nervous system that cause involuntary movement of the normally voluntary skeletal muscles were affected. Both Parkinsonism and epilepsy are based on these parts of the nervous system. In addition, sufferers of Parkinsonism and epilepsy have low levels of one or more catecholamines, as do depressed individuals. One injured survivor had Parkinsonism even before the fire, but required a much greater amount of medication to control his condition after the fire. A second person became epileptic after the fire and suffered grand mal seizures. These two individuals are index cases of the neurotoxic nature of the smoke.

Besides the physical injuries and individual psychological distress, social interactions appear to have been affected by the experience of the MGM fire, possibly synergistic with exposure to neurotoxins. Marriages became troubled and were dissolved. The divorce rate among the survivors was very high. This high rate of divorce is also seen in other disasters besides fires, and reflects personality changes and relational changes that often result from having risked death and knowing that others died in the same event.

In addition to divorce, another socioeconomic consequence of the MGM fire was the decline of several businesses that had sent key people to conventions or seminars that were held at the hotel. These people stayed overnight in the hotel, and several within the same office may have suffered personality changes. Individual productivity typically declined, but group interactions also suffered so that decisions could not be made, consensus could not be reached, and actions could not be taken. At least two mid-sized companies suffered greatly and became much smaller when several key managers could not perform.

The MGM Grand Hotel fire in particular shows precisely the inextricably mixed pattern of physical, neurological, psychological, and social pathology to be expected from the 'perturbation' of a traumatic toxic exposure incident.

Traumatic toxic incident of sufficient magnitude should be expected to produce a similar pattern among affected emergency services personnel, in spite of both discipline and experience. 'Post Traumatic Stress Disorder' is a grossly inadequate characterization.

These two examples appear to be fully consistent with the theoretical development we have presented as an introductory context, showing a distinct and characteristic pattern of symptoms. The next case histories explore in more detail the relation between preexisting 'eigenmodes' and exposure.

Table 1: Immediate symptoms of Firefighters

INJURY	PERCENT AFFECTED
Sore throat, irritated eyes, dizziness, aching nostrils, confusion, weakness, and exhaustion	Over 50
Chest pains, nausea, chest congestion, and headache	35-50
Irritated skin and faintness	20-30
Loss of control of arms and/or legs	10-20

Table 2: Intermediate time symptoms of Firefighters

SYMPTOMS	PERCENT AFFECTED
RESPIRATORY:	
Chest congestion	51.2
Chronic cough	22.1
Sore throat	18.5
Sore chest	9.3
Hoarseness, wheezing,	

allergy to smoke, difficulty breathing, irritated nasal membranes, shortness of breath	Less than 5

NEUROLOGICAL:	
Muscular weakness	19.8
Impaired smell/taste	16.3
Increased irritability	10.5
Headaches	10.5
Perception difficulty	7.0
Confusion, anxiety, numbness of extremities	Less than 5

MISCELLANEOUS SYMPTOMS:	
Heart trouble, irritated eyes, irritated skin	2 complaints each
Chills, sinus trouble, weight loss, bowel problem, nausea, head congestion	1 complaint each
GENERAL WELL-BEING	
Fatigue	5.8
Impaired endurance	3.5

Table 3: Long-Term Effects among Firefighters

INJURY	PERCENT AFFECTED

RESPIRATORY:	
Impaired disease resistance	37.5
Coughing	33.3
Hoarseness	23.6
Shortness of breath	9.7
'Lung function' or pain	15.8
Chest congestion	9.7
Sensitivity to smoke	11.1
Sinus or nasal drip	6.9

Repetitive bronchitis	8.3
Sore throat	8.3
Asthma	6.9
Allergy, unspecified upper respiratory problem	Less than 5%
<hr/>	
GROWTHS (epidermal or membrane lining)	13.9
<hr/>	
HEART:	
Palpitations, acute myocardial infarction, prolapsed mitral valve, enlarged heart, unspecified damage	8.3
<hr/>	
Headaches, perception difficulty	4 individual complaints
Fatigue, kidney-urinary tract	3 individual complaints
Weakness, pancreatitis/diabetes	2 individual complaints
Elevated blood count, elevated bilirubin, high pressure, gall bladder deterioration, irritation of hemorrhoid, irritated eyes, convulsive seizures	1 individual complaint
<hr/>	

Table 4: Respiratory Complaints of 58 MGM Survivors

COMPLAINT	NUMBER	PERCENT
<hr/>		
Frequent sore throat	30	51.7
Hoarseness	26	44.8
Sinusitis	23	39.7
Sensitive to dust/smoke	44	75.9
Coughs	27	46.6
Wheezing	26	44.8
Phlegm production	29	50.0
Shortness of breath	38	65.5

Bronchitis	21	36.2
Frequent upper respiratory infection	25	43.1

Table 5: Non-Respiratory Symptoms of 57 MGM Survivors

SYMPTOMS	NUMBER	PERCENT
<hr/>		
CIRCULATORY SYSTEM:		
Developed heart problem	12	21.1
Hands/feet fall asleep	39	68.4
Hands/feet easily cold	22	38.6
Mottling or blue hands/feet	8	14.0
Blood pressure change	20	35.1
<hr/>		
NEUROLOGICAL/PSYCHONEUROLOGICAL:		
Headaches	34	59.6
Change in sleep pattern	42	73.7
Memory lapses	32	56.1
Irritable	43	75.4
Difficulty learning	14	24.6
Change in perception abilities	31	54.4
Coordination decline	15	26.3
Dizziness	27	47.4
Disorientation	20	35.1
<hr/>		
KIDNEY/BLADDER:		
Frequent urination	15	26.3
Pain/burning during urination	12	21.1
Lower back pains	27	47.4
<hr/>		
SKIN CHANGES:		
Acne-like breakouts	13	22.8
Rashes	12	21.1
Burns from the smoke	4	7.0
Infections	6	10.5

Skin growths (warts, moles)	3	5.3
Skin dry, sensitive	14	24.6

REPRODUCTIVE:*		
New menstrual difficulties	11	84.6*
Miscarriage	2	15.4*
Hysterectomy	2	15.4*
Dilation and curettage	1	7.7*

PSYCHOLOGICAL:		
Nightmares	42	73.7
Depression	40	70.2
Guilt	15	26.3
Anger	17	29.8
Change in relationships	24	42.1

GENERAL WELL-BEING:		
Change in appetite	16	28.1
Less endurance	31	54.4
General weakness	24	42.1
Ceased/decreased activity	17	29.8
Lack of sexual desire	14	24.6

OTHER COMPLAINTS:		
Sensitized eyes	11	19.3
Dizziness with position change	8	14.0
Heavy sweating	7	12.3
Drink more water	3	5.3
Tremors, spasms, clenching	6	10.5

* Percentage is that of the women of reproductive age in the data base, not of all 57 people.

The following affected less than 5 percent:
liver dysfunction, nausea, neck pains, impotence,
pigmentation of skin, loss of hair, ears hurt,
swollen glands, onset of epilepsy,

exacerbation of Parkinsonism,
return of menses to elderly women,
swollen testes, prostate infections.

Other chemical disasters

Bowler et al. (1994, 1996, 1997) have examined a spectrum of toxic disasters which spanned both 'ethnicity' and chemical species, finding unexpectedly analogous population-level patterns of symptom response – headaches, respiratory, visual, gastrointestinal and dermatological. Exposure relationships were found with increasing symptoms and worsening of preexisting illnesses. The three groups were Whites exposed to metam sodium, Hispanics working in a microelectronics plant exposed to multiple organic solvents, and African-Americans exposed to sulphuric acid. Using a similar symptom instrument across exposures, Bowler et al. (1996) conclude that their results "suggest a robust symptom complex following chemical exposure regardless of the specific chemical".

Bowler et al. (1997) state that the relationship of stress and illness has been well established since Hans Selye's early work (1976) on the Stress Response Syndrome, and is further shown in the association of such reactive and serious disorders as PTSD. They cite the work of McFarlane et al. (1994), who found physical symptoms to be an 'accompaniment' of PTSD in a sample of firefighters who had higher rates of cardiovascular, respiratory, musculoskeletal, and neurological symptoms. McFarlane et al. suggest, as did Kinson and Rosser (1974), that much psychological work is needed to minimize the impact of chemical releases and disasters on subsequent physical and psychological illness.

While Bowler et al. (1997) did not conduct a multivariate analysis of their data, they found, in one case/control study of matched exposed/unexposed communities, that the same patterns were seen in both communities, with those of the exposed community much worse than in the unexposed, concluding that

"Although both towns were similar on reported illnesses prior to the [chemical] release and similar on other nonreported illnesses, it is notable that many of the exposed reported that their illnesses were worse six months after the release. Those who had

prior acute or chronic bronchitis reported worsening of their condition by 14 and 7 times more (respectively). By a magnitude of 5 times, those who had prior asthma or allergies also reported their condition to be worse."

This result, again, suggests the amplification of similar underlying community 'eigenmodes' by chemical exposure.

The next studies, however, do use multivariate methods, and, in our view, successfully isolate eigenmodes.

Gulf War Syndrome

Recently a number of researchers have begun to critically examine characteristic patterns of 'medically unexplained somatic symptoms', including multiple chemical sensitivity (MCS), chronic fatigue syndrome (CFS), fibromyalgia (FM), irritable bowel syndrome (IBS) and Gulf War Syndrome (GWS). Kipen and Fiedler (1999) find that psychiatric explanations and nomenclature have less than a perfect fit for many cases of unexplained symptoms, although there is often very great comorbidity among them, often as much as 50 % between MCS and CFS, for example. In the case of Gulf War symptoms, careful epidemiology has shown that, compared with soldiers who did not deploy to the Persian Gulf, those who deployed had two- to threefold increases in symptoms, without apparent medical explanations (Kipen and Fieldler, 1999; The Iowa Group, 1997; Fukuda et al., 1998).

Haley et al. (1997) used multivariate methods to examine symptom patterns among about 250 Gulf War veterans in a construction battalion, and found three particularly distinct and characteristic clusters, roughly characterized as 'impaired cognition', 'confusion-ataxia', and 'arthro-myoneuropathy'. Veterans with the second pattern were found to be 12.5 times more likely to be unemployed than those with no health problems. Haley et al. conclude that clusters of symptoms of many Gulf War veterans represent discrete factor-analysis derived syndromes that appear to reflect a spectrum of neurologic injury involving the central, peripheral, and autonomic nervous systems. Subsequent work by Haley et al. (2001) extends these studies.

Knoke et al. (2000) responded directly to the report of Haley et al. (1997) with their own multivariate study which compared Gulf War-era veterans who had and had not been deployed to the Persian Gulf. Closely similar clusters of syndromes were identified within both groups, although

the deployed veterans showed these clusters with greater prevalence than the non-deployed, and the strongest clusters matched fairly well with the observations of Haley et al. (1997).

Doebbeling et al. (2000) conducted a similar deployed/non-deployed veterans study, and again found similar clusters of symptoms within both groups, with the deployed again having very much greater prevalence than the non-deployed.

Doebbeling et al. (2000) conclude, however, that the markedly increased prevalence of nearly every symptom assessed from all bodily organs among the Gulf War veterans is difficult to explain pathophysiologically as a single condition. Identification of the same patterns of symptoms among the deployed veterans and the nondeployed controls suggests that the health complaints of Gulf War veterans are similar to those of the general military population and are not, in their view, consistent with the existence of a unique Gulf War syndrome.

The modeling exercise of the Appendix, leading to equation (43), however, suggests a more consistent explanation of these results. Deployed and non-deployed veterans were embedded within very similar – and highly rigid and nonresilient – sociocultural structures, and seemed to represent very similar cross-sections of the US population. This suggests that the ‘multiple correlation coefficient’ representing the linking of internal mechanisms would satisfy the condition $\lambda \rightarrow 1$, giving a very large amplification pattern for perturbations, $\sigma(w)$. Combat experience is indeed a significant perturbation at both individual and social levels, and amplified ‘eigenmodes’ of characteristic patterns of mixed pathology are, from this model, the expected result at both scales. Some degree of comorbidity is inherent, since the response ‘eigenmodes’ are nonorthogonal.

Predicting the spectrum of WTC pathologies

On the basis of our theoretical development and these case histories, it is not difficult to construct an expected pattern of symptoms for both civilians and emergency workers having significant exposures to the WTC disaster, and this is left as an exercise for the reader. The great prevalence of uterine dysfunction among women exposed in the MGM Grand Hotel fire suggests, however, particularly nasty consequences for those in the WTC disaster: the presence of massive quantities of endocrine disruptors and other physiologically active chemical species in the aftermath of the WTC attack

takes the matter far beyond either Post Traumatic Stress Disorder or Gulf War Syndrome.

To reiterate, responses will be scale-dependent, with different characteristic patterns seen the individual and group levels – the usual ‘ecosystem’ effect. These responses will also be dependent on individual and group histories of stress, deprivation, and the effects of racism. As described above, dose-response and signal transduction may be observed at both individual and group levels, for a number of systems, depending on the magnitude of perturbation. At the purely psychological level, signal transduction might well be described by Lifton’s term ‘psychic numbing’.

These patterns will be exacerbated or ameliorated by the imposed ‘selection pressure’ of influence by embedding social structures, in a manner determined in no small part by past individual and group experiences of stress, deprivation, and racism. External social pressures will drive, according to our model, much of the ‘phenotype choice’ of syndromic response to applied perturbation by affected individuals and groups. Path-dependent ‘secondary victimization’ by the larger society seems the most likely outcome, but intermediate structures such as labor unions, work-place initiatives, church groups, or artificial therapeutic communities, may serve to buffer such effects and perhaps ameliorate symptoms.

Note that this is a true ‘selection pressure’ effect, since those suffering syndrome exacerbation face shortened lifespan.

Less obvious, however, are the inevitable consequences of the couplings of cognitive process *across scale*. As one example of what are likely to be many subtle but critical cross-system impacts we examine in more detail the possible convolution of immune function into the more general pathology.

As is well known, dioxins can cause severe immunosuppression (e.g. Tonn et al., 1996), an effect possibly complicated by an inverted-U dose-response effect (e.g. Fang et al., 1996). This is to be contrasted to the standard dose-response effect on the mucociliary tract which is expected from exposure to irritants such as HF, HCl and HBr. As is increasingly understood, however, psychosocial stress may itself have an immunosuppressive effect which is indeed sufficient to interfere with vaccine efficacy.

Recent work by Kiecolt-Glaser and Glaser (1996, 1998, 2000), for example, has examined the effect of ‘chronic stress’ on the efficacy of influenza, hepatitis-B, and pneumococcal pneumonia vaccine among elderly caregivers of dementia patients, and among medical students.

They found, for influenza, that the caregivers showed a poorer antibody

response following vaccination relative to control subjects, as assessed by ELISA and hemagglutination inhibition. Caregivers also had lower levels of *in vivo* virus-specific-induced interleukin 2 levels and interleukin 1β . The data demonstrate that down-regulation of the immune response to influenza virus vaccination is associated with a chronic stressor in the elderly.

Similar effects were found among the elderly caregivers for response to pneumococcal pneumonia vaccination, leading to the conclusion that chronic stress can inhibit the stability of the IgG antibody response to a bacterial vaccine.

Medical students who reported greater social support and lower anxiety and stress demonstrated a higher antibody response to HEP-B surface antigen at the end of the study period.

Glaser et al. (2000) conclude that the differences in antibody and T-cell responses to HEP-B and influenza virus vaccinations provide a demonstration of how stress may be able to alter both the cellular and humoral immune responses to vaccines and novel pathogens in both younger and older adults.

In addition a vast body of animal model studies involving socially structured populations shows clear impacts of acute and chronic social and other stressors on immune competence (e.g. deGroot et al., 2001; Gryazeva et al., 2001). Elenkov and Chrousos (1999) in particular suggest that glucocorticoids and catecholamines, the end-products of the stress system at the individual level, might selectively suppress cellular immunity, Th1 phenotype, in favor of humoral response – again at the individual level.

We suggest, however, that the particular role of cognitive socioculture in human biology takes matters considerably beyond such individual-level stress models, and into realms for which, to paraphrase Robert Boyd's aphorism, culture is as much a part of the human immune system as are T-cells.

It seems likely that those exposed to both stress and toxic combustion products at the WTC disaster will enter the coming influenza season during the peak 3-9 month period of 'normal' grieving, and may be both markedly more susceptible to infection and markedly less responsive to the available vaccine than unexposed populations. This effect may be complicated by persisting mucociliary damage consequent on exposure to smoke irritants. Vaccine strategy for the coming season, and probably for many seasons to come, must be significantly altered in the New York metropolitan region if a large number of excess flu/pneumonia deaths are to be averted.

Analogous coupling mechanisms at both individual and larger social scales will become clear as matters unfold. A particularly important effect might

well involve carcinogenesis, since dioxins are among the most potent of cancer-inducing substances. Affected individuals or groups may, however, be damaged by pathological group processes, so that 'second victimization', by further suppressing immune function, may indirectly promote cancer induction as well.

'Post Traumatic Stress Disorder' does not seem an adequate description of the likely consequences of this attack for individuals, families, social networks, enterprises, communities, and larger organizational structures. In particular, the massive quantity of acutely combustion-toxic halogenated hydrocarbons within the affected buildings constitutes a serious, and continuing, exacerbation of the disaster.

Medical practitioners treating victims of the WTC disaster and their families over the next several years, and administrators or others dealing with larger affected groups, should expect characteristic but complex patterns of respiratory, immune, reproductive, neurological, psychological, behavioral, social and other pathology to emerge, persist, and interact for the foreseeable future. Further, this is not the first, nor is it likely the last, such incident: repeated exposures seem increasingly likely, and will be synergistic.

Given the current political climate, considerable secondary victimization – through neglect, or the result of deliberately cultivated collective expressed emotion – seems inevitable. This will likely much exacerbate symptom patterns. To reiterate, it may prove necessary to invoke labor union, workplace, religious, or artificial therapeutic communities as intermediate structures to ameliorate or even reverse these effects. Those without access to such structures face a bleak future indeed.

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**Comments on the EPA Office of Inspector General's
1/27/03 interim report titled:
"EPA's Response to the World Trade Center Towers Collapse"**

A DOCUMENTARY BASIS FOR LITIGATION



July 4, 2003

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* The conclusions and opinions are those of the author and do not necessarily reflect those of the U.S. Environmental Protection Agency.



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

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

DATE: July 4, 2003

MEMORANDUM

**SUBJECT: EPA Office of Inspector General's 1/27/03 report:
"EPA's Response to the World Trade Center Towers Collapse"
— a documentary basis for litigation**

TO: WTC Team, EPA Inspector General's Office: Jim Hatfield, Chris Dunlap,
Geoff Pierce, Dana Gilmore, Sarah Fabirkiewicz, Steve Schanamann
Nikki Tinsley, EPA Inspector General
Mary Boyer, EPA Ombudsman

FROM: Cate Jenkins, Ph.D., Environmental Scientist*
Hazardous Waste Identification Division, OSW
jenkins.cate@epa.gov

A handwritten signature in green ink, reading "C Jenkins", is enclosed in a red rectangular box.

The attached report is in response to the 1/27/03 interim report from the EPA IG titled "EPA's Response to the World Trade Center Towers Collapse." The attached report provides additional detailed documentation to support some of the conclusions of the IG WTC Team, as well as documentation of some erroneous conclusions made by the IG WTC Team.

In addition to the issues addressed by the EPA IG report of 1/27/03, the attached report addresses two additional issues that I believe should be subject to the IG investigation.

The first concerns EPA's convening of a new forum with the expressed purpose of ensuring consistency in analytical methods throughout the EPA. The problem of the disparity between test methods after the WTC and the Libby, MT Superfund site is explicitly named as a precipitating factor for the formation of this new forum. As explained in greater detail in Section M of the attached report, the formation of this new forum is inappropriate and suspect, and should instead be a matter for active investigation by the IG.

The second concerns violations by EPA of the Federal Advisory Committee Act, which has

* The conclusions and opinions in this memorandum are those of the author and do not necessarily reflect those of the U.S. Environmental Protection Agency.

resulted in a subversion of the principles of the Administrative Procedures Act upon which it was based, as well as violations of ethics regulations and presidential directives requiring federal employees to conduct the country's business in an impartial manner, preventing real or apparent conflicts of interest. As a result of the WTC collapse, EPA's Office of Solid Waste and Emergency Response initiated a re-evaluation of the Agency's risk and carcinogenicity classifications for asbestos. EPA's Office of Research and Development is currently conducting this reassessment. Insufficient notice to the public was provided for participation in the process, experts drafting the reassessment have apparent conflicts of interest, and key research appearing in peer reviewed publications have been omitted and ignored in the reassessment. See Section U of the attached report.

Please do not hesitate to contact me for any additional information or for electronic versions of any of the documents cited in the attached report.

cc: Affected parties and other responsible officials

TABLE OF CONTENTS

A:	INTRODUCTION	1
B:	EPA DENIALS OF ANY LONG vs. SHORT TERM HEALTH RISKS -- INDOORS OR OUTDOORS	3
	EPA excuse – “Public missed subtleties in its intended message”	
	Compendium of EPA statements – “No indoor/outdoor hazards, no long term effects”	
	“Health standards are overly protective” – EPA and NYC DOH disown standards	
C:	SIMULTANEOUS CLAIMS BY NYC OFFICIALS – “NO HAZARDS”	23
	NYC officials made first statements regarding safety	
	Compendium of statements by NYC officials on safety	
	“Children and pregnant women not at greater risk” – false claim by NYC DOH	
D:	ADMISSIONS OF HEALTH RISKS BY EPA, NYC, AND FEMA	33
	EPA and NYC condemn WTC-contaminated cars, claim buildings never unsafe	
	New EPA study finds hazardous levels of WTC contaminants after extraordinary cleaning procedures, requires extreme precautions during cleaning procedures	
	EPA voluntary cleanup uses maximum protective gear unless tenant has already performed a do-it-yourself cleaning WITHOUT any protective gear	
	Admissions of inadequate indoor air measurements and cleanup hazards	
	Testimony by EPA Region 2 Administrator is admission of hazard	
	Admission that indoor air testing necessary – outdoor testing irrelevant	
	Professional abatement and better testing of NYC EPA building	
	“Potential long term health risks” admissions by EPA	
	Admission that exterior dusts responsible for “recontamination”	
	After-the-fact claim of advice to use professional cleaning constitutes admission	
	FEMA grants to professionally clean apartments constitutes finding of hazard	
	FEMA IG final report – “residential cleanup programs should have begun earlier”	

Report by EPA's ORD admits hazardous exposures

"Forum" investigating inferior tests after 9/11 compared to other EPA sites

E: RE-OCCUPYING AND CLEANING – EPA and NYC DOH UNSAFE INEFFECTIVE RECOMMENDATIONS

59

False implication in IG report that EPA desired citizens to take precautions

No need for EPA IG survey on whether citizens did safe cleanup of WTC dust or were adequately informed of the hazards

Early EPA recommendations for cleanup did not even recommend HEPA vacuums

Documentation – EPA only recommended NYC DOH cleanup guidelines

"We recommended professional cleaning for heavy dust" – EPA's 1st defense

"We said to presume the dust contains asbestos" – EPA's 2nd defense

"There were hazardous material clearance certification before re-occupancy" – EPA's 3rd defense for recommending NYC DOH's do-it-yourself guidelines

Excerpts from NYC DOH cleanup guidelines and press releases

Criticisms of NYC DOH do-it-yourself cleanup guidelines

FEMA accepts EPA's after-the-fact claim it recommended professional abatement

Use of NESHAP cleanup methods, even if regulations not legally binding

F: STORIES OF CITIZENS

98

G: EPA 110 LIBERTY STUDY AND DEUTSCHE BANK DEMOLITION – PROOF DO-IT-YOURSELF ABATEMENTS INEFFECTIVE AND UNSAFE

117

EPA 110 Liberty St. study shows NYC DOH guidelines cannot remove WTC toxics

Difference between 110 Liberty abatement methods and NYC DOH guidelines

Safety precautions for 110 Liberty St. study compared to NYC DOH guidelines

110 Liberty St. proves elaborate abatement does not reduce contaminants to EPA benchmarks – 2 and 3 abatements required, even with "minimal dust"

Simultaneous abatement of HVAC system necessary, 110 Liberty St. study proves

EPA study shows WTC air will fail 10 -4 risk level, but not AHERA level

Amount asbestos/fiberglass on surfaces not related to thickness of dust layer

Asbestos not an indicator of lead – 110 Liberty St. study demonstrates fact

Failure to Warn

Ground Zero Task Force study also demonstrates “minimal WTC dust layers” responsible for high airborne asbestos

Demolition of Deutsche Bank, other buildings – abatement not always possible

Progress of EPA’s voluntary cleanup

H: “FIRST RESPONDERS FOR PUBLIC WARNING” – EPA IG QUESTIONNAIRE MUST ASK WHO MOTIVATED PUBLIC TO TAKE PRECAUTIONS (OBVIOUSLY NOT EPA) *151*

EPA IG after-the-fact questionnaire may be an attempt to obfuscate record

Questionnaire needs to ask who warned the public – otherwise it is invalid

Documented mistrust shows public unlikely to have relied on EPA for advice

The “First Responders for Public Warning” during September to October, 2001

EPA and NYC pressure on press, suppression of dissenting opinions

I: THE COVERUP – THEORIES AND MOTIVATIONS *179*

Council on Environmental Quality role

White House interference theory

Stock Market theory of coverup

Whitman’s Citicorp stock ownership theory of coverup

J: AIR TESTING AND STANDARDS FOR ASBESTOS *191*

AHERA clearance test not a safe level or benchmark – EPA IG report correct

EPA and NYC claims that AHERA 70 s/mm² level is a health standard

Earlier press coverage/documentation, AHERA 70 s/mm² level unsafe, not benchmark

EPA 110 Liberty St. study shows air fails 10 -4 risk level, but not AHERA level

AHERA 70 s/mm² is higher than background or typical levels

K:	1% ASBESTOS IN SETTLED DUST ALSO IS NOT A HEALTH STANDARD	<i>205</i>
	IG is in danger of mistaking the 1% level as a safety standard – 1% is just another detection limit, like the AHERA 70 s/mm ² level	
	EPA IG report in error that NCP was not invoked	
	1% asbestos trigger for NCP is for a prima facie case, lower levels also trigger	
	Emergency Planning & Community Right-to-Know Act triggered at 0.1% asbestos	
	EPA claims that 1% is safety standard for asbestos dust	
	EPA recants claim that 1% asbestos in WTC dust is safe in April, 2002	
	110 Liberty St. study – WTC dust with less than 1% asbestos cause hazardous levels	
	EPA vermiculite study – dust less than 0.1% causes hazardous air levels	
	EPA vermiculite study – dust less than 0.1% causes hazardous air levels	
L:	TESTING DUSTS – EPA REFUSAL TO USE ELECTRON MICROSCOPES	<i>223</i>
	Why TEM electron microscope asbestos methods are needed for WTC dust	
	EPA reverses – performs TEM tests for 110 Liberty St. study near Ground Zero	
	Criticisms and press coverage of EPA not using TEM analyses for WTC dust	
M:	WILLIAM MUSZYNSKI TO CHAIR “FORUM” TO INVESTIGATE WHY WTC TESTING DID NOT USE ELECTRON MICROSCOPES FOR DUSTS	<i>237</i>
N:	EPA BUILDING IN NYC – EARLY SECRET ASBESTOS ABATEMENT	<i>241</i>
	Press accounts and other documentation of Region 2 building special abatement	
O:	LIBBY SUPERFUND SITE – COMPARISON TO WTC TESTING AND CLEANUP	<i>251</i>
	WTC and Libby are being cleaned up under the same statutory authority, the NCP	
	EPA responses to comparisons between the WTC and Libby	
	Strong advocacy required to get action in Libby, just as after the WTC	
	Press coverage of comparison of Libby and WTC testing and remediation	
	Early criticism comparing Libby and WTC contamination levels and test methods	

P:	CARPET AND POROUS MATERIAL TESTING AND CLEANING	263
	EPA recommends dry HEPA vacuuming, unsafe and ineffective	
	EPA reverses, warning of hazards from carpets/porous materials, recommends disposal	
	EPA 110 Liberty St. study proves HEPA vacuuming and shampooing doesn't work	
	Recent EPA claims to citizens that carpeting will encapsulate asbestos	
	Early documentation that HEPA vacuuming ineffective and unsafe	
	Press coverage of carpet contamination issue	
Q:	ELIGIBILITY BOUNDARY FOR EPA VOLUNTARY CLEANUP PROGRAM	275
	Uneven distribution of asbestos around Ground Zero	
	EPA's inadequate testing to determine true contamination boundaries	
	Brooklyn	
	Chinatown	
	Tunnels and subways	
R:	VOLUNTARY CLEANUP PROGRAM - FAILURE TO CLEAN ENTIRE BUILDINGS – FAILURE TO CLEAN BUSINESSES	283
	EPA has the authority to force cleanups individual units and whole building	
	Recontamination problem with voluntary cleanup program	
	110 Liberty St. study shows need for HVAC as well as whole building cleanings	
	Offices need to be included in cleanup program	
S:	FAILURE TO TEST FOR OTHER TOXINS DURING CLEANUP	293
	List of WTC constituents that will be tested in EPA's voluntary cleanup program	
	Expert panel convened by EPA recommended testing for more toxic constituents	
	Earlier comments on need to test and account for the aggregate, synergistic carcinogenicity and toxicity of different toxic constituents	
	Lead	
	Fiberglass (man-made vitreous fiber, MMVF)	
	Mercury	
	Dioxins	
	PCB's (polychlorinated biphenyls)	

Polynuclear Aromatic Hydrocarbons (PAH's)

Caustic

Beryllium and other toxic metals

T: FAILURE TO PROTECT PUBLIC AT 1 in 1 MILLION CANCER RISK LEVEL – NEED TO FACTOR IN IMPACT OF EARLY WTC EXPOSURES *317*

Costs should not be consideration in the WTC cleanup, according to President Bush

10^{-4} risk level based on false premise that EPA could not test for 10^{-6} risk level

EPA statutes require a cleanup to the 10^{-6} risk level whenever feasible

EPA's 10^{-4} risk level for the WTC cleanup ignores past and concurrent exposures

10^{-4} risk level for asbestos alone ignores risk from other toxic WTC components – NCP regulations require considerations of aggregate risk from all toxic constituents

U: EPA INITIATIVE TO DOWNGRADE ASBESTOS RISK CLASSIFICATION *341*

ATSDR and EPA violate impartiality and conflict of interest requirements

ATSDR and EPA violations of Federal Advisory Committee Act

EPA and ATSDR expert panel reports based on biased, selective group of studies

Role of omitted studies in EPA asbestos reassessment

Potential conflicts, bias in scientist on both ATSDR and EPA expert panels

V: NATIONAL CONTINGENCY PLAN (NCP) DENIED AND VIOLATED *359*

What is the FRP and the NCP?

FRP and EPA regulations require EPA to invoke NCP for terrorism and disasters

EPA admits operating under the NCP for the WTC disaster

EPA responds to disaster under NCP by appointing "On Scene Coordinators" – EPA still using OSC's as of October, 2002

Violation of statutory authority if EPA is not operating under the NCP

EPA has obfuscated fact that its operations are under the NCP

EPA can delegate, but has preemption over local and state authorities

Under NCP, EPA has right of access to cleanup indoor air or other contamination

EPA admissions of responsibility for indoor air – disaster/terrorism/otherwise

EPA denials of authority over indoor air after the WTC collapse

REFERENCES

391

APPENDIX 1 – Chart/Plot of asbestos concentrations in bulk dust by distance and direction from Ground Zero

APPENDIX 2 – ASBESTOS STUDIES OMITTED FROM ATSDR AND EPA RE-EVALUATIONS RELEVANT TO:

- Mesothelial Tissue and Lung Tissue Asbestos Burden Studies in Human Mesothelioma Cases**
- Carcinogenicity of Chrysotile Asbestos**

APPENDIX 3 – LIST OF MEMORANDA BY CATE JENKINS ON WTC FALLOUT

A: INTRODUCTION



This report has been transmitted to the EPA Office of the Inspector General (EPA IG), responsible for assessing EPA's performance in the aftermath of the World Trade Center (WTC) disaster, as commentary on the EPA IG interim report on that subject dated 1/17/03. This report has also been transmitted to the EPA Ombudsman.

This report may also be useful as a review of the available documentation of what EPA and other officials told the citizens of New York City about the hazards of WTC fallout, and the probability of the truth of these statements. It also could serve as a primer for those in the initial steps of redressing this wrongful harm through litigation.

Press reports are included in this report for two reasons. First, they provide contemporaneous accounts from journalists who were on the scene actively investigating as trained observers. Second, in a legal proof, it is often necessary to demonstrate that the defendant knew or should have known that there was a problem. Press stories establish this by showing certain facts and issues were the matter of public notoriety. Memoranda and other writings by federal officials who documented at the time violations of law and official EPA guidance also serve this purpose, and are quoted as well.

This is not just a retrospective about what happened in the past. It is ongoing. NYC is still heavily contaminated with WTC fallout. EPA is currently conducting its limited and ineffectual cleanup of a small number of residences in lower Manhattan. Much more needs to be done.

When Governor Christine Todd Whitman, EPA Administrator, traveled to address NYC on September 13, 2001, she delivered a promise from President Bush. No expense was to be spared in the cleanup. This promise is still no less the due for the living victims of the WTC.

"We're getting in there and testing to make sure things are safe," Whitman says. "Everything will be vacuumed that needs to be, air filters (in area buildings) will be cleaned, we're not going to let anybody into a building that isn't safe. And these buildings will be safe. The president has made it clear that we are to spare no expense on this one, and get this job done." . . . [*Asbestos Alert*, 9/14/01, by David France and Erika Check, *Newsweek*, <http://msnbc.com/news/629268.asp?0sp=w12b2&cp1=1>]

"The President has said, 'Spare no expense, do everything you need to do to make sure the people of this city and down in Washington are safe as far as the environment is concerned,'" Whitman said. . . . [*EPA chief says water, air are safe*, 9/14/01; by Susan Ferraro, *New York Daily News*]

B: EPA DENIALS OF ANY LONG vs. SHORT TERM HEALTH RISKS -- INDOORS OR OUTDOORS

“Did the available monitoring data and analyses of that data support EPA’s public pronouncements regarding air quality and associated health risks resulting from the collapse of the WTC towers?

...

“Anecdotal evidence and first person interview (researchers, others who observed practices first hand) indicate (a) website useless to many until too late – no electricity, no phone, no computer, etc. (b) some missed subtleties of EPA’s intended message (outdoor air only; long term only; outside ground zero only)”
[1/27/03 EPA IG report]

This and following sections provide the written record of who said what and when. It contains extensive excerpts of governmental statements and contemporaneous press coverage.

This section documents EPA claims of the safety of both indoor and outdoor air, and no long term or short-term hazards. Section C documents similar claims by NYC officials. Section D of this report documents where both EPA and NYC admit to hazards, contradicting the claims in the first two sections of this report.

EPA excuse – “Public missed subtleties in its intended message”

The EPA IG report of 1/27/03 appears to give credence to shifting the blame to the public, saying it missed some sort of subtleties in the message EPA was trying to convey:

... some missed subtleties of EPA’s intended message (outdoor air only; long term only; outside ground zero only)” ... [1/27/03 EPA IG report]

When the public heard EPA say that there were no health risks, without any differentiation between long and short term risks, the public rightfully assumed EPA’s statements included the later development of cancer from any asbestos exposures. EPA also broadcast the explicit message that there were no long term health risks, or said that risks were “very low.” EPA cannot hide behind some revisionist claim that their message had hidden subtleties that the public missed. EPA officials only talked about the irritant effects of the dust, and quickly followed up saying there was no cancer hazard from asbestos.

Compendium of EPA statements – “No indoor/outdoor hazards, no long term effects”

The following are EPA statements about both indoor and outdoor air. There were no subtleties. EPA even said in its 9/14/01 press release that INDOOR air would be safe in downtown buildings, and made other explicit statements that measurements of outdoor air are representative of exposures indoors.

If EPA believed at any time that quotations by the press were inaccurate or misleading, it did nothing to make any corrections. EPA could have written letters to the editor. It could have enlisted the aid of Mayor Giuliani to clarify its message. Most importantly, EPA could have issued its own press releases if it believed it was necessary to set the record straight. EPA issues press releases on a wide range of subjects frequently, both from Headquarters, and also at the Regional level. EPA maintains an archive of all of these press releases as well on its web site. A review of past Headquarters and Regional press releases reveals EPA made no attempt to clarify any press stories, so it must be assumed that the information in the press was an accurate portrayal of EPA statements.

9/13/01

As rescue efforts continue and the rubble is removed, Environmental Protection Agency officials are finding a new problem in the dust: elevated levels of asbestos. Tuesday night, one sample of dust from the ground at the rescue site contained four and a half times what the EPA worries about.

...

[ABC News, What's in that Smoky Cloud? Concerns about Air Quality, Last Updated: Sep 13, 2001, http://abclocal.go.com/wabc/health/WABC_oncall_091301asbestos.html]

9/13/01

Despite fires and a pungent odor at the wreckage of the World Trade Center, most tests for contaminants in New York's air have not triggered alarm, health officials say. U.S. Environmental Protection Agency spokeswoman said Wednesday that EPA officials "really don't detect any real danger" in air and dust tests. And New York Mayor Rudolph Giuliani echoed the sentiments this morning.

...

The EPA continues to test air and dust around the attack site. Results released today on samples collected Wednesday showed little or no asbestos in dust at the site or in air downwind of the attack, an EPA official said.

...

"It's very, very important to put this into perspective," said Bonnie Bellows, an EPA spokeswoman. "We expect to find some asbestos in a building of this generation."

...

[ABC News-Fouled Air? Health Officials Stress Caution, but Say Measured Levels Safe, 9/13/01, www.abcnews.go.com/sections/living/DailyNews/wtc_healthhazards010911.html]

9/13/01

Strewn across Lower Manhattan, in shards and twisted piles and layers of ash, there is enough concrete to build a five-foot-wide sidewalk from New York City to Washington, D.C., enough steel to erect more than 20 Eiffel Towers, and the remnants of nearly 14 acres of glass.

...

The E.P.A.'s administrator, Christie Whitman, said in a telephone interview from Washington that some chemicals that were of theoretical concern in the hours after the collapse, especially lead, which was legally used in paint in the years of the building's construction, had not been detected in quantities high enough to raise alarm. And she stressed that the asbestos levels, too, were a concern only for rescue workers and work crews who will be involved day after day directly at the site, and not for residents nearby. She said her agency would monitor the area continually during the coming months."

...

[Challenges and Dangers in Disposing of Two Fallen Giants, 9/13/01, NY Times]

9/13/01

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'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.

...

[Headquarters Press Release, Washington, DC, For Release 09/13/2001, EPA INITIATES EMERGENCY RESPONSE ACTIVITIES, REASSURES PUBLIC ABOUT ENVIRONMENTAL HAZARDS, www.epa.gov]

9/14/01

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."

Air Samples taken on Sept. 13 th 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 asbestos, ranging from 2.1 to 3.3 % slightly above the 1 percent trigger for defining asbestos material. [emphasis added]

...

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."

...

[Headquarters Press Release, Washington, DC, For Release 09/14/2001, EPA, OSHA UPDATE ASBESTOS DATA, CONTINUE TO REASSURE PUBLIC ABOUT CONTAMINATION FEARS, www.epa.gov]

9/14/01

The persistent pall of smoke wafting from the remains of the World Trade Center poses a very small, and steadily diminishing, risk to the public, environmental officials and doctors said yesterday.

There could be a slight health threat, they said, to city residents with weakened immune systems, heart disease or asthma, and to rescue workers who did not wear protective gear or who smoke. Smoking greatly amplifies the effects of some kinds of pollution, scientists said. But over all, the danger was no greater than that on a smoggy day, some officials said.

Some samples of the dust that cloaked the disaster scene, victims and rescuers on Tuesday showed slightly elevated levels of lead and asbestos, the agency said. But by Wednesday, levels of the substances had dropped below the threshold of any concern, said Bonnie Bellow, a spokeswoman for the Environmental Protection Agency. Tests on samples taken yesterday would not be completed until today, she said.

Continued monitoring of fine soot particles and other kinds of air contaminants by state environmental officials also showed "nothing out of the ordinary," a state official said.

...

[THE CHEMICALS, Monitors Say Health Risk From Smoke Is Very Small, By ANDREW C. REVKIN, 9/14/01, NY Times]

9/14/01

The smoky, acrid odors emanating from the plume above ground zero became another manifestation of the surreal tragedy, a tangible presence that wafted into the city's consciousness and hung omnipresent.

Tests in parts of Brooklyn and Staten Island, which until late Wednesday's wind shift were downwind from the blast site, suggest that the plume is not hazardous except in a small area immediately around the disaster, said Bonnie Bellow, a spokeswoman for the U.S. Environmental Protection Agency. She said levels of asbestos, lead, and volatile chemicals were all at low levels, negligible or nondetectable.

"That is not to say that odors, like dust, aren't irritating to people with respiratory problems and asthma," Bellow said. "People should take precautions if there's a lot of dust in the air."

People did just that. Angela Martin, an asthmatic from Forest Hills, said she had decided not to return to work in the downtown area for a few weeks. "I, for one, am spending a lot more time indoors," she said.

The Board of Education closed three schools north of Canal Street after tests showed "questionable" air quality, spokesman Kevin Ortiz said.

...

In lower Manhattan, the few pedestrians who walked the streets wore facemasks, purchased at hardware stores and pharmacies. Traces of devastation - soot, smoke, dust - mingled in the salty air of the South Street Seaport.

Holder, the former Army officer, manages a nearby parking garage. Few cars were parked there yesterday, and those that were remained covered in gray powder. "Protection is better," Holder said about the use of facemasks. "You never know what it is."

...

[Acrid Smell in Air Reminder of City's Loss. By Errol A. Cockfield, Jr, 9/14/01, Newsday, www.nynewsday.com/templates/misc/printstory.jsp?slug=ny%2Dnysmell142365628sep14§ion=%2F]

9/14/01

EPA administrator Christine Todd Whitman, who maintains that the risks are negligible

...

Of the 24 dust samples the agency took in the first two days of the chaos, many contained asbestos, but only one registered levels above acceptable maximums, says EPA spokesperson Tina Kreisher. That sample, taken from very near the epicenter of the disaster in Manhattan's financial district, contained 4.5 percent asbestos fibers. It was taken as agents fled the collapsing buildings on Tuesday. Dust samples from Thursday, she says, also showed elevated levels of 2.1 percent to 3.3 percent. A level of 1 percent or less is considered safe.

...

In addition, the agency has taken numerous air samples, all of which were in safe ranges, says Whitman, the former governor of New Jersey. "The way the plume has

gone and the way it has dissipated, it is not a health problem," she says. "We have found particulate matter in the air, but other than being an irritant to those people who are out there breathing it deeply that's why people are wearing protective gear and masks it is not a problem for the general population."

Given these assurances, officials have said they are considering reopening the New York Stock Exchange on Monday, though it is just a few blocks from the Twin Towers.

...

[Asbestos Alert. How much of the chemical does the World Trade Center wreckage contain? By David France and Erika Check, 9/14/01, NEWSWEEK WEB EXCLUSIVE, <http://msnbc.com/news/629268.asp?0sp=w12b2&cp1=1>]

9/14/01

"The President has said, 'Spare no expense, do everything you need to do to make sure the people of this city and down in Washington are safe as far as the environment is concerned,' " Whitman said.

The dangerous toxins have dissipated to low, nonthreatening levels, she said, but probably will rise again briefly as workers move more debris. But the air is not hazardous except for people with respiratory conditions.

...

[EPA CHIEF SAYS WATER, AIR ARE SAFE , New York Daily News; 9/14/01; SUSAN FERRARO]

9/15/01

In lower Manhattan, the U.S. Environmental Protection Agency, tapping emergency cleanup funds under the federal Superfund program, has launched an elaborate air testing program that includes six new monitoring stations and a high-tech portable unit that will be parked close to the blast site. Dust samples taken at the site have shown relatively high levels of asbestos, a carcinogen.

EPA spokeswoman Bonnie Bellow said Friday that air tests Thursday in two federal buildings in lower Manhattan - 290 Broadway and 26 Federal Plaza - did find airborne asbestos, but that none of the samples exceeded one-tenth of the maximum level allowed in workplaces by the Occupational Safety and Health Administration.

"There's nothing at this point that indicates that business can't resume" in the Wall Street area on Monday as scheduled, she added.

...

[Tests: Dust Not a Danger Here, Dan Fagin, 9/15/01, Newsday, [/www.nynewsday.com/templates/misc/printstory.jsp?slug=ny%2Ddldust152367598sep15§ion=%2F](http://www.nynewsday.com/templates/misc/printstory.jsp?slug=ny%2Ddldust152367598sep15§ion=%2F)]

9/16/01

Hundreds of asbestos cleanup workers representing more than a dozen local unions and several contractors continued the massive and delicate task of removing the contaminant yesterday from buildings damaged by the collapse of the World Trade Center.

In the meantime, Christine Todd Whitman, head of the U.S. Environmental Protection Agency, said yesterday that "there is no reason for concern," saying that the latest measurements of debris and air at ground zero and in areas tested in the financial district show the amount of asbestos is at or below background levels, which she defined as 1 percent or less of the total sample.

While there is no doubt the debris from the collapse contains asbestos and that some was released into the atmosphere, Whitman said the situation is better than she had hoped.

...

[TERRORIST ATTACKS /Asbestos Targeted In Cleanup Effort, EPA's Whitman: 'No reason for concern', by Hugo Kugiyu, Newsday, 9/16/01, <http://www.newsday.com/news/printedition/newyork/ny-2368899sep16.story>]

9/17/01

Air quality in the city remains safe despite the smoke still rising from the World Trade Center rubble, officials insisted yesterday, even as asbestos removal teams combed lower Manhattan streets.

"We have found no levels of asbestos or any pollutants that raise concern," said Geoffrey Ryan, a spokesman for the city Department of Environmental Protection. Ryan said DEP employees continue to take daily air samples around the city, while the state Department of Environmental Conservation collects data from 25 fixed monitoring stations. All have shown pollutants to be within safe levels, he said . . .

...

[AIR SAFE TO BREATHE, DEP SAYS, New York Daily News, 9/17/01, SUSAN FERRARO AND CLEM RICHARDSON]

9/18/01

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.

...

"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 breathe and their water is safe to drink," she added.

...

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.

...

[EPA press release, 9/18/01, www.epa.gov]

9/18/01

"Low levels of asbestos were detected in some dust and debris close to the wreckage of the World Trade Center, the officials said, but there was no evidence of danger, except to search crews moving the rubble. . . . Tina Kreisher, a spokeswoman for the E.P.A., said that ample gear was available at the attack site but that because of the heat and stress, workers commonly refused it. 'There are small pockets of asbestos,' Ms. Kreisher said. 'The concern is there, not for the city, not for residents, but definitely for these workers.'

...

[Dust Is a Problem, but the Risk Seems Small, 9/18/01, NY Times]

9/19/01

There were initial fears that a toxic cloud of asbestos fibers had been released when the buildings collapsed, but air and dust sampling by the Environmental Protection Agency (EPA) and the Labor Department's Occupational Safety and Health Administration since Sep. 13 has revealed either no asbestos in the air, or relatively low levels -- from 2.1 to 3.3 percent, compared to a one-percent threshold.

...

[Unknown Health Dangers Presented by 'Toxic Stew', INTERPRESS SERVICE, 9/19/01]

9/21/01

U.S. Environmental Protection Agency (EPA) Administrator Christie Whitman announced today that the most detailed results to date of ongoing monitoring of drinking water in New York City provide additional reassurance that residents and people who work within the city are not being exposed to contaminants such as asbestos, radiation, mercury and other metals, pesticides, PCBs and bacteria.

"EPA has been very aggressive in monitoring for potential environmental problems in the aftermath of the World Trade Center attack, and I am very pleased by what we've discovered. New Yorkers and New Jersians need not be concerned about environmental issues as they return to their homes and workplaces," Whitman said. "Air quality monitoring data in residential areas has been consistently reassuring. More recently, we've also tested drinking water supplies and found no sign of asbestos bacterial contamination, PCBs or pesticides," she continued.

...

To date the Agency has taken 97 air samples from 11 separate fixed monitoring sites in and around the "hot zone" and elsewhere in lower Manhattan, and four fixed monitoring sites located in New Jersey downwind from the blast. Only seven samples taken at or near ground zero have had marginally higher levels of asbestos that exceed EPA's level of concern for longterm exposure.

...

Ambient air monitoring in the Financial District, where this week people have returned to work, show mostly no detectable levels of asbestos, or in a few isolated instances, levels of asbestos that are below EPA's levels of concern.

...

Whitman detailed dust sampling undertaken thus far at the World Trade Center site, and confirmed that EPA has done a total of 101 dust samples, of which 37 were slightly over the one percent asbestos (the amount above which material is considered asbestos-containing).

...

[EPA press release, 9/21/01, www.epa.gov]

10/03/01

Both agencies have taken hundreds of samples to monitor environmental conditions since September 11, and have found no evidence of any significant public health hazard to residents, visitors or workers beyond the immediate World Trade Center area.

...

EPA and OSHA, working closely with other federal, state, and local agencies, have been sampling the air, dust, water, river sediments and drinking water and analyzing them for the presence of pollutants such as asbestos, radiation, mercury and other metals, pesticides, PCBs, or bacteria that might create health hazards. They have found no evidence of any significant public health hazard to residents or visitors to the New York metropolitan area.

...

"EPA's web site now has more detailed information on environmental monitoring information in New York City that should be very reassuring to residents, tourists and workers, and we will continue to update that site with information as it becomes available," said EPA Administrator Whitman. "Our data show that contaminant levels are low or nonexistent, and are generally confined to the Trade Center site. There is no need for concern among the general public . . .

...

[OSHA] Administrator Henshaw said. "It is important for workers involved in the recovery and clean-up to wear protective equipment as potential hazards and conditions are constantly changing at the site; however, our samples indicate there is no evidence of significant levels of airborne asbestos or other contaminants beyond the disaster site itself."

...

[EPA press release, 10/3/01]

10/11/01

[EPA spokeswoman] Bellow said none of the agency's tests for the presence of

asbestos, radiation, mercury and other metals, pesticides, PCBs or bacteria have shown any evidence of any significant public health hazard.

...

[POL'S LEERY OF WTC AIR QUALITY, 10/11/01, New York Daily News, MARTIN MBUGUA]

10/19/01

But on Sept. 11, as with so many things, the EPA's world changed. Faced with a public health scare that could have sent thousands in Manhattan fleeing the city or jamming hospitals, the EPA decided to cough up the truth about asbestos. Its officials bent over backward to get out the message that asbestos was harmful only if breathed at high levels and over sustained periods of time. When reporters pointed out that some of the tests had exceeded the EPA's safety levels, the agency hurried to explain that this was a "stringent standard based on long-term exposure" and repeated that the public was not at any real risk.

...

For all these reasons, it made sense for EPA head Christie Whitman to offer her soothing words about downtown. By about three weeks after the collapse, the EPA had taken 442 air samples, only 27 of which showed levels of asbestos above its most stringent standards. Many readings were taken in the immediate WTC site, and samples outside that area were even lower. The main risks, if any, are posed to the emergency workers, although they have been warned to wear protective masks. It is a shame that the truth has emerged only in the course of a catastrophe, and that the EPA had to expend so much energy calming a public that should have known the facts long ago.

...

[The EPA Comes Clean on Asbestos, Federal officials stop chasing a phantom risk, Wall St. Journal, . BY KIMBERLEY A. STRASSEL, 10/19/01]

10/26/01

The documents obtained by The News detail the presence of many hazardous substances many of them odorless in levels above or approaching EPA or OSHA safety standards.

"Yes, they are high," said EPA spokeswoman Mary Mears, when asked to comment on the hazardous-substance readings contained in her agency's documents. "But you get a little distance from the plume and they go dramatically down."

When questioned, though, Mears conceded that shifting winds sometimes blow the plume directly at workers at the site.

...

[A Toxic Nightmare At Disaster Site Air, water, soil contaminated, by Juan Gonzales, NY Daily News, 10/26/01]

10/26/01

Air quality in Lower Manhattan has gradually improved since the early days after the

World Trade Center disaster last month, when a gritty, acrid residue of combustion and dust hung over parts of the city like a shroud. But at certain times, under certain conditions — usually for brief periods — the bad air still returns.

Most health experts are not terribly alarmed about the effect of these episodes on a generally healthy population. Although many people remain concerned about the smells and dust that can make eyes and throats burn, and anxious that conflicting information has left them at risk, health experts say that because the spikes do not last long and often occur in the middle of the night when few residents or office workers are on the streets, most people need not worry.

...

Officials at the Federal Environmental Protection Agency say the issues of particulate pollution and Lower Manhattan weather patterns are not that simple. They say that federal health standards for fine particulates have never been exceeded at any of the agency's monitors for any period averaged over 24 hours since Sept. 11, and that no health standards have been established for short-term surges because the harmful health effects of short exposures have not been proven.

...

The chief of the E.P.A.'s Air Programs Branch in New York, Raymond Werner, said that pollution generated at ground level is not the only thing that can account for elevated particulate counts. Some increases have also occurred during the recent warm days, he said, when sunlight has reacted photochemically with gases in the atmosphere to produce more particles.

...

[Safety Questions Remain About Air at Ground Zero, By KIRK JOHNSON, New York Times, 10/26/01]

10/26/01

William J. Muszynski, of the U.S. Department of Environmental Protection, said site workers "need to take precautions for themselves," but "citizens, especially citizens who are healthy, are safe."

...

[Officials: 'Ground Zero' Workers Safe, (no author listed), Newsday, 10/26/01]

10/27/01

Federal and city officials assured New Yorkers yesterday that the sometimes acrid smell emanating from the rubble of the World Trade Center does not pose a health risk for most people.

...

Testing at 19 monitoring stations to detect the presence of dangerous chemicals in and around the site "indicates people are safe," said William Muszynski, deputy regional administrator for the U.S. Environmental Protection Agency.

...

But he added: "Most of the recent days over the past couple of weeks, and even before that in some cases . . . the air data off the site was without significant risk.

...

[City, Feds Say WTC Air's OK Rule out risk to health, By MICHAEL R. BLOOD, NY

Daily News, 10/27/01]

10/27/01

Environment specialists told New York workers and residents last week that early studies of asbestos and lead levels in the dust at the site of the collapsed World Trade Center showed that they were below danger levels.

...

Dr George Thurston, professor of environmental medicine at New York University, said that so far levels of asbestos and lead were below the levels of concern set by the US Environmental Protection Agency.

...

[British Medical Journal, Vol. 323, p. 956, 10/27/01, News extra Early research says dust at World Trade Center site not dangerous, By Janice Hopkins Tanne, <http://bmj.com/cgi/content/full/323/7319/956/a>]

10/30/01

"We continue to closely monitor air quality and other environmental conditions in and around ground zero," said William J. Muszynski, EPA Acting Regional Administrator. "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. We welcome all concerned members of the public to our lower Manhattan offices to review the information we've gathered and to visit our Web site."

...

[EPA Region 2 press release, 10/30/01, www.epa.gov]

10/28/01

NEW YORK, Oct. 28 (UPI) -- Seven weeks after the terrorist attacks on the World Trade Center about 400,000 tons of rubble and steel have been removed, but the site still smolders and there is some concern about the dioxins, PCBs, benzene, sulfur dioxide and lead emitted at the 16-acre site.

...

However, New York Mayor Rudolph Giuliani said the air quality near Ground Zero "is safe." "I'm no expert on it. So I have to rely on the EPA and the state agencies and the city agencies and the private monitoring," the mayor said. "And all of that says the problems that this created are not dramatic. They're not health-threatening."

"You smell it and you feel there must be something wrong, but what I'm told is it's not dangerous to your health," he added. However, the EPA stressed that while the levels may be high directly at the site, "when you get a little distance," EPA spokeswoman Mary Mears said, "they go dramatically down."

...

[WTC's toxic exposure a worry, By Alex Cukan UNITED PRESS INTERNATIONAL, 10/28/0, <http://www.upi.com/view.cfm?StoryID=28102001-030950-8046r>]

11/1/01

[T]he vast majority of our tests find levels of these contaminants that pose no significant long-term health risks to residents, business employees and visitors beyond ground zero. And despite recent press accounts which suggest otherwise, these findings have not changed.

...

The Daily News focused on a small number of sampling results with the highest contaminant readings. The paper failed to report, however, that EPA has taken thousands of samples that do not exceed federal standards or guidelines. In addition, the sampling results highlighted in the article are snapshots of the levels of certain chemicals associated with burning such as benzene, dioxin and sulfur dioxide at a moment in time. They were taken right on the debris pile, at ground level. Some were even taken using probes placed into the pile. EPA and Occupational Safety and Health Administration standards are set many times below the level at which you would expect health impacts. Our results tell us that these chemicals are present at ground zero at levels that sometimes exceed a federal standard.

...

People living and working in the area should take comfort in the fact that EPA air samples of pollutants such as benzene, dioxin and sulfur dioxide taken at the perimeter of the work site are either very low or non-detectable.

...

[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S. Environmental Protection Agency, Before the New York City Council Environmental Protection Committee, November 1, 200,
<http://www.epa.gov/region02/news/speeches/011101k.htm>]

11/2/01

A battery of government experts testified yesterday that environmental conditions around the destroyed World Trade Center pose no long-term health risks.

...

"The vast majority of our tests find levels of these contaminants pose no significant long-term health risks to residents, business employees and visitors beyond Ground Zero," testified Kathleen Callahan, deputy regional director of the U.S. Environmental Protection Agency. While some readings at the WTC site sometimes exceeded federal regulations, they were "snapshots of the levels of certain chemicals associated with burning," and changed with the weather and other conditions, Callahan said.

She added that the standards of the EPA and the Occupational Safety and Health Administration "are set many times below the level at which you would expect health impacts." Callahan also said that workers at the site are adequately protected if they wear respirators.

...

[Pros: Safe to Breathe Near WTC, By FRANK LOMBARDI, NY Daily News, 11/2/01]

11/4/01

"We've found that, by and large, the air in Lower Manhattan is safe to breathe," said Nina Habib, an Environmental Protection Agency spokeswoman.

...

[Ailments blamed on ground zero's toxic brew, Shelley Emling, Atlanta Journal Constitution, 11/4/0]

11/4/01

"The further you get from the site, the data does not demonstrate significant risks to people," said William J. Muszynski, acting regional administrator of the Environmental Protection Agency.

...

[Officials downplay risks of pollution near Ground Zero From Brian Palmer, CNN, 11/4/01, <http://www.cnn.com/2001/US/11/04/rec.environmental.concerns/index.html>]

11/9/01

Some testified that the level of asbestos is more prevalent and harmful than what the EPA told the committee last week. David Newman, of the New York Committee for Occupational Safety and Health, said the EPA's view that asbestos levels were not high enough to pose long-term health risks left him concerned. "While diseases such as asbestosis result from exposure to asbestos over long periods of time, asbestos-related cancers, such as mesothelioma, which have a 10- to 40-year latency period, can develop from low-level exposure to this killing dust," Newman said.

EPA spokeswoman Mary Mears disagreed. "Given the levels of asbestos we don't think there is any kind of significant health risk for people working or living near the site," she said. "But there could be some risk to the workers who are actually on the site where the levels tend to be the highest."

...

[Cleanup Worries: Residents, doctors see WTC health risks, By Bryan Virasami NEWSDAY, 11/9/01, <http://www.newsday.com/news/health/ny-nyenv092455924nov09.story>]

11/26/01

We've tested for the presence of pollutants such as asbestos, fine particulate matter, lead, volatile organic compounds, dioxin, benzene, metals, PCBs and other chemicals and substances that could pose a threat to the public and workers at the site.

Fortunately, the vast majority of our tests find levels of these contaminants that pose no significant long-term health risks to residents, business employees and visitors beyond ground zero. And despite recent press accounts which suggest otherwise, these findings have not changed. In fact, environmental conditions off the site have improved in recent weeks.

...

EPA and Occupational Safety and Health Administration standards are set many times below the level at which you would expect health impacts.

...

Now I'd like to turn to some of our other findings. We have found asbestos in some of our air and dust samples at ground zero and the surrounding area. Some of the dust samples show levels above the one percent used to indicate that a material is asbestos-containing. To date, out of more than 2,000 air samples taken at about 20 fixed air monitoring stations in and around the site, only about 30 have had levels of asbestos that exceed the Asbestos Hazard Emergency Response Act of AHERA standard, we use to determine if children can re-enter a school building after asbestos has been removed or abated. It is a stringent and protective standard. With one exception on October 9, the last time we recorded a level above the school re-entry standard was September 30.

...

As you know, individual groups and organizations, including the Ground Zero Elected Official Task Force, have undertaken their own studies of environmental conditions in and around the World Trade Center site. Reports summarizing these studies, such as the October 12 report prepared for the Task Force, show results that are fundamentally consistent with EPA's findings. Furthermore, the recommendations offered to the public as a result of these independent studies are also consistent with those of EPA.

...

[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S. Environmental Protection Agency, Before the New York State Assembly, 11/26/01]

1/8/02

EPA officials offer conflicting advice at this point. They say the apartments and office towers around ground zero are safe but they advise landlords to seek professional asbestos cleaners. And they've advised all workers on the site to wear respirators.

"There is nothing we have found that is at a significant level," said Bellow of the EPA, "that would say you should not come here to live or work."

...

[In New York, Taking a Breath of Fear, by Christine Houghney, Washington Post, 1/8/02]

1/10/02

Nina Habib, an EPA spokeswoman, said the EPA's own asbestos tests -- numbering in the thousands -- have been outdoors, not indoors. And only a handful have shown concentrations above acceptable levels. "That's indicative of what's in people's apartments as well," she said. "

...

[Ground Zero asbestos like Libby's EPA chemist says New York dust as toxic as that in Montana, 1/10/02, Susan Drumheller, Idaho Spokesman, www.spokesmanreview.com]

2/7/02

"Based on our findings, and now really more than 10,000 samples of a wide range of substances, we have found no significant long-term risk posed by the outdoor air," EPA spokeswoman Bonnie Bellow said last week.

...

[U.S.A. Today, 2/7/02]

2/11/02

In addition to the monitoring conducted by our federal, state and city partners, we have tested for the presence of pollutants such as asbestos, fine particulate matter, lead and other metals, volatile organic compounds, dioxin, PCBs and other substances that could pose a threat to the public and workers at the site. These samples are taken from more than 20 fixed monitoring stations at and around ground zero and an existing New York State air quality monitoring network that was augmented for the World Trade Center response.

The Agency also uses portable sampling equipment to collect data from a range of locations in lower Manhattan. Fortunately, the vast majority of our tests continue to find levels of these contaminants below standards or guidelines set to protect public health. We have also found that environmental conditions on and off the site have improved considerably over time. While this news may be reassuring to the general public, it is important to emphasize as we have from day one that the risks are different for response workers at the World Trade Center site; they have been working long hours in dusty and what were very smokey conditions.

...

[TESTIMONY OF JANE M. KENNY REGIONAL ADMINISTRATOR EPA, BEFORE THE U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS SUBCOMMITTEE ON CLEAN AIR, WETLANDS, AND CLIMATE 2/11/02, http://www.epa.gov/ocir/hearings/testimony/2002_0211_jmk.pdf]

2/12/02

Fortunately, the results of our testing of outdoor environmental conditions to date have consistently indicated that air quality in Lower Manhattan does not pose a long-term risk to those who live, work, or visit there.

...

[letter from Administrator Whitman to Senator Clinton, 2/12/02]

5/8/02

The U.S. Environmental Protection Agency (EPA) and its federal, state and city partners today announced a comprehensive plan to ensure that apartments impacted by the collapse of the World Trade Center have been properly cleaned. . . . this unprecedented effort to provide assurances that people are not being exposed to pollutants related to the World Trade Center collapse at levels that might pose long-term health risks.

...

"We understand the concerns of Lower Manhattan residents and we know that they are looking to us for reassurance," said Jane M. Kenny, EPA Regional Administrator. "While we cannot undo the events of September 11, we can provide the assurance that people's homes have been cleaned properly. While the scientific data about any immediate health risks from indoor air is reassuring, people should not have to live with uncertainty about their futures."

"As New Yorkers rebound from 9/11, Mayor Bloomberg is committed to ensuring that the

health and safety of residents and workers is of the highest priority," said Christopher Ward, DEP Commissioner. "While earlier air testing in Downtown Manhattan reassured New Yorkers, this comprehensive, collaborative program will allow residents to have their apartments cleaned and tested free of charge if there is any concern with indoor air quality. New Yorkers deserve to know that their environment is safe from health risks."

...

JEPA AND CITY OUTLINE COMPREHENSIVE PLAN TO ADDRESS THE CONCERNS OF LOWER MANHATTAN RESIDENTS ABOUT THE IMPACTS OF THE WORLD TRADE CENTER COLLAPSE ON INDOOR AIR QUALITY, 5/8/02, <http://www.epa.gov/region02/news/2002/02038.htm>]

5/8/02

"This is to assuage concerns from residents in Lower Manhattan who continue to have concerns over air in their apartments," said Mary Mears, spokeswoman for Region II of the EPA.

...

[EPA to Clean WTC Apartments, 5/8/02, By Alex Cukan, United Press International]

5/9/02

Bowing to angry tenants and homeowners near Ground Zero, the Environmental Protection Agency said yesterday it would test and clean apartments potentially tainted with asbestos from the destruction of the World Trade Center.

...

Despite the about-face, the EPA and city environmental officials maintained yesterday that no health emergency exists. They said the sweeping new program is being carried out largely to ease fears of those who live near Ground Zero.

...

"While the scientific data about any immediate health risks from indoor air is very reassuring, people should not have to live with uncertainty about their futures," said Jane Kenny, EPA regional administrator. "There is no emergency here."

...

[EPA Vows Housing Cleanup, 5/9/02, By GREG GITTRICH, NY Daily News]

5/15/02

EPA officials say the remaining dust poses little health risk. . . . EPA officials say the program is designed mainly to reassure jittery residents that their homes are safe.

"What the scientists have been telling us is, 'Very low risk, even over a long period of time,'" EPA regional administrator Jane Kenny said. "Really what we're trying to do is to make people in lower Manhattan feel that they're living in a good place and that they're safe in their homes."

...

[EPA Rapped for NYC Cleaning Program, 5/15/02, By Michael Weissenstein, Associated Press]

5/31/02

[EPA press release]

The fires have been out for months, recovery activities are almost completed, the barge operation is shut down and our sampling generally shows that air quality in lower Manhattan is back to normal levels prior to September 11. EPA is now focused on providing local residents the assurance that their homes have been cleaned properly.

...

Since September, the Agency has monitored daily for substances such as volatile organic compounds (VOCs), dioxin, polyaromatic hydrocarbons (PAHs) and metals that would have been associated with the fires that had burned for months after the World Trade Center collapse. These readings were first taken in the smoke plumes and later in the recovery pits and at a number of stations ringing the Ground Zero site. Early on, EPA found elevated levels of some substances in the smoke itself, but these levels tailed off dramatically even a few feet from the source of the smoke. Since January, the pollutants have been at either extremely low levels well below EPA's benchmarks or at levels not detectable.

...

Analysis of the majority of samples from monitoring sites at or around Ground Zero has not shown detectable levels of asbestos or has found levels well below the standard that EPA is applying one that is normally used to determine whether children may re-enter a school building after asbestos has been removed or abated. No lower Manhattan samples have been above this level since April 2, when a sample taken from the worker wash tent at which workers remove dust from their boots and clothing slightly exceeded the standard. Since September 11, only 21 out of nearly 9500 samples taken have exceeded the school-based standard.

...

[EPA SHIFTS FOCUS TO INDOOR AIR, 5/31/02,
<http://www.epa.gov/region02/news/2002/02052.htm>]

undated, 2002

WHAT DID WE FIND?

At Ground Zero levels of particles, benzene, asbestos are elevated and are a potential health threat to workers.

...

Elsewhere - although short-term irritant health effects may persist as long as smoke and dust are present near the site, levels of contaminants in the air and dust in the neighborhoods near the site are not high enough to cause long term health effects.

...

[<http://www.epa.gov/airnow/presentations2002/werner.pdf>]

6/3/02

Starting today, lower Manhattan residents can request cleaning and/or testing of their homes from the U.S. Environmental Protection Agency (EPA) by logging on to the Agency's World Trade Center Web page at www.epa.gov/wtc or by calling the EPA

hotline at 1-877-796-5471. The launch of the hotline and Web site marks the startup of the comprehensive multi-agency program that was announced in May to ensure that apartments impacted by the collapse of the World Trade Center have been properly cleaned. EPA and its federal, state and city partners are collaborating in this unprecedented effort to provide assurances that people are not being exposed to pollutants related to the World Trade Center collapse at levels that might pose long term health risks.

...

"I encourage residents of lower Manhattan to take advantage of our cleaning and testing program," said Jane Kenny, EPA Regional Administrator. "The program will provide downtown residents with a measure of confidence that their homes have been properly cleaned."

...

*[EPA LAUNCHES LOWER MANHATTAN CLEANING HOTLINE, 6/3/02,
<http://www.epa.gov/region02/news/2002/02053.htm>]*

12/20/02

The December 28th deadline for lower Manhattan residents to sign up for EPA's cleaning and testing program is drawing near . . .

"Our cleanup program is designed to reassure residents that they have reduced the risk from exposure to dust left over from the collapse of the World Trade Center," said Jane Kenny, EPA Regional Administrator. "Now is the time to call the hotline to sign up."

...

*[EPA Region 2, DEADLINE TO SIGN UP FOR EPA LOWER MANHATTAN CLEANING AND TESTING PROGRAM DRAWS NEAR, 12/20/02,
<http://www.epa.gov/region02/news/2002/02134a.htm>]*

"Health standards are overly protective" – EPA and NYC DOH disown standards

Not only does EPA and NYC claim that its air tests were below all health standards for long term health effects, but they also claim that their own health standards are overly protective. This implies that EPA believed that even when levels of toxic contaminants from WTC fallout exceed standards, citizens should not worry:

11/1/01

EPA and Occupational Safety and Health Administration standards are set many times below the level at which you would expect health impacts. Our results tell us that these chemicals are present at ground zero at levels that sometimes exceed a federal standard.

...

*[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S. Environmental Protection Agency, Before the New York City Council Environmental Protection Committee, November 1, 2001,
<http://www.epa.gov/region02/news/speeches/011101k.htm>]*

11/1/01

The standards or tolerance levels that are being used are very conservative. For example, for asbestos, we are using the standard that is used for indoor air quality for reentry into a school after asbestos removal, which is the most stringent standard, as the tolerance level or standard for outdoor air quality in the residential areas. This is also true for other substances, such as dioxins, identified at the perimeter of the site. . . . Moreover, these standards have been designed to include many safety factors so that acceptable levels of exposure are far below the levels at which health effects are expected to occur.

. . .

[Jessica Leighton, Ph.D., Assistant Commissioner, Environmental Risk Assessment, NYC DOH, Before the NYC Committee on Environmental Protection, 11/1/01]

11/2/01

She added that the standards of the EPA and the Occupational Safety and Health Administration "are set many times below the level at which you would expect health impacts." Callahan also said that workers at the site are adequately protected if they wear respirators.

. . .

[Pros: Safe to Breathe Near WTC, By FRANK LOMBARDI, NY Daily News, 11/2/01]

11/26/01

EPA and Occupational Safety and Health Administration standards are set many times below the level at which you would expect health impacts.

. . .

[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S. Environmental Protection Agency, Before the New York State Assembly, 11/26/01]

C: SIMULTANEOUS CLAIMS BY NYC OFFICIALS – “NO HAZARDS”

The following are the statements of NYC Mayor Giuliani, the NYC Department of Health (NYC DOH), and the NYC Department of Environmental Protection (NYC DEP), along with the press coverage of their statements. Along with EPA, they also claimed that there were no hazards from indoor air as well as outdoor, and no long or short term hazards. NYC officials actually appear to precede EPA in making these claims.

NYC officials made first statements regarding safety

Research indicates that Mayor Giuliani came before EPA Administrator Whitman in making claims about the safety of the air in NYC. Mayor Giuliani and the NYC Department of Health Commissioner made public statements on 9/12/01, which were in the papers on 9/13/01.

EPA issued its first press release on the WTC on 9/13/01, which was in the print press on 9/14/01. On 9/13/01, Whitman traveled to NYC and made a speech at 5:30 PM to announce the results of testing, but not EPA testing. EPA administrator Whitman made a telephone interview with the NY Times on presumably 9/12/01, which was printed in the 9/13/01 edition. But this 9/12/01 NY Times interview was not as major a statement as the statements by Giuliani and the NYC Health Commissioner on 9/12/01.

EPA did not have any of its own air testing results until at least 9/15/01. The table below shows the first dates EPA had data for a range of specific toxic constituents. EPA only had very limited results from 4 to 6 dust samples it took on 9/11. See the following table.

DATES first tests taken by EPA	Air	Dust	Drinking or Surface Waters
asbestos	9/15 (only 5 samples)	9/11 (only 6 samples)	unknown
particulate matter	9/18 (only 7 samples)	never	never
PAH's	11/2	never	never
dioxins	9/16	never	9/14 (only 2 samples)
PCB's	9/16 (only 4 samples)	never	never
Volatile organic compounds	9/16	never	never
Benzene	9/16	never	9/15
Lead	9/16 (only 2 samples)	9/11 (only 4 samples)	9/14 (water)
Chromium	9/16 (only 2 samples)	9/11 (only 4 samples)	9/14 (water)

On the other hand, the NY State Dept. of Environmental Conservation had in-place particulate monitoring results from before and after 9/11, because particulate monitoring was always done, before and after 9/11.¹ OSHA had air monitoring samples starting from 9/13. The NYC Department of Environmental Protection first took its first asbestos air samples on 9/14, and then for only 2 air samples from Brooklyn.

The only tests for toxic materials from 9/11 were 6 dust samples taken by EPA, and 12 dust samples from Con Edison, the utility company.² Apparently, the only real data for EPA or NYC to use for their statements on 9/12/01 came from these dust samples. See Appendix 1 of this report for the results of EPA and Con Edison's dust samples on 9/11. Generally speaking, the levels of asbestos found by Con Edison in WTC dust were lower than that found by EPA in later days.

Con Edison has always had a major interest in asbestos because it supplies steam as a utility, just like electricity, to buildings in Manhattan. Their steam pipes are insulated with asbestos. Occasionally, steam pipes have exploded, resulting in asbestos releases. See the endnote describing the 1989 incident where a steam pipe exploded in Gramercy Park, NYC, and Con Edison was indicted on various charges including criminal conspiracy to conceal the release of asbestos.³

Compendium of statements by NYC officials on safety

9/13/01

Mayor Giuliani and Dr. Neal Cohen, the city's health commissioner, said yesterday the air quality is being monitored, but no cause for concern has been detected.

"The air is safe as far as we can tell, with respect to chemical and biological agents," Giuliani said.

Cohen added that city, state and federal environmental agencies are "looking at air asbestos" and that "at this point, we don't have any level of concern."

...

[SITE DUST CALLED HARMFUL, *New York Daily News*; 9/13/01, FRANK LOMBARDI]

9/13/01

U.S. Environmental Protection Agency spokeswoman [Bonnie Bellow] said Wednesday that EPA officials "really don't detect any real danger" in air and dust tests. And New York Mayor Rudolph Giuliani echoed the sentiments this morning.

"The Health Department has done tests and at this point it is not a concern," Giuliani said. "So far, all the tests we have done do not show undue amounts of asbestos or any

particular chemical agent that you have to be concerned about." Still, he said, people in lower Manhattan were feeling the effects of all the dust and debris spawned by the terrorist attack. "The accumulation of it, for people that are down there, can become very, very irritating," he added. "And there were a lot of people whose eyes have been burning, but I don't think there is any chemical agent we have to worry about at this point."

...

[ABC News, *Fouled Air? Health Officials Stress Caution, But Say Measured Levels Safe*, 9/13/01, abcnews.go.com/sections/living/DailyNews/wtc_healthhazards010911.html]

9/17/01

If you were evacuated from a residence or workplace south of Warren Street, west of Broadway, and north of Exchange Street, and have been approved to resume tenancy by your building manager, you are advised to wear a dust mask upon entering this area to decrease the possibility of dust inhalation and throat irritation. Outside these boundaries, masks are not necessary, but may be worn for your own comfort. If there is dust present indoors, it should not be necessary to wear this mask if you follow the cleaning procedures detailed below. [emphasis added]

...

Because some asbestos was used in the building of the World Trade Center, City, State, and Federal agencies have been collecting dust, debris, and air samples since the World Trade Center collapse. As expected, some asbestos was found in a few of the dust and debris samples taken from the blast site and individuals working in this area have been advised to take precautions. However, most of the air samples taken have been below levels of concern. Based on the asbestos test results received thus far, there are no significant health risks to occupants in the affected area or to the general public.

In general, asbestos-related lung disease results only from intense asbestos exposure experienced over a period of many years, primarily as a consequence of occupational exposures. The risk of developing an asbestos-related illness following an exposure of short duration, even to high levels, is extremely low.

...

[NYC DOH, 9/17/01, <http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>]

9/22/01

NYC HEALTH DEPARTMENT DISTRIBUTES HEALTH RECOMMENDATIONS FOR RESIDENTIAL AND COMMERCIAL REOCCUPATION

...

New York City Health Commissioner Neal L. Cohen, M.D., said "The Health Department is continuing to work with federal, state, and local agencies to assess the safety of neighborhoods affected by the collapse of the World Trade Center buildings. While there are no significant adverse health risks to the general public, residents and business owners who are allowed to return to their buildings should follow Health Department recommendations to minimize exposure to dust and other particulate matter that may cause throat and eye irritation

...

[NYC DOH, 9/22/01, press release,

<http://www.ci.nyc.ny.us/html/doh/html/public/press01/pr84-922.html>]

Because some asbestos was used in the building of the World Trade Center, City, State, and Federal agencies have been collecting dust, debris, and air samples since the World Trade Center collapse. As expected, some asbestos was found in a few of the dust and debris samples taken from the blast site and individuals working in this area have been advised to take precautions. However, most of the air samples taken have been below levels of concern. Based on the asbestos test results received thus far, there are no significant health risks to occupants in the affected area or to the general public.

...

[Currently posted on NYC DOH website, unknown original date,
<http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>]

What are the health effects if I am exposed to asbestos?

There are no known immediate effects at the time of exposure. Asbestos does not cause allergies, headache, burning eyes, sore throat or skin problems. In general, asbestos-related lung disease results only from intense asbestos exposure experienced over a period of many years, primarily as a consequence of occupational exposures. The risk of developing an asbestos-related illness following an exposure of short duration, even to high levels, is very low.

...

[NYC DOH fact sheet on asbestos currently posted at
<http://home.nyc.gov/html/doh/html/ei/eiasbest.html>]

What are the health effects of asbestos?

Destruction of the World Trade Center buildings released large amounts of dust and ash, some of which contained trace amounts of asbestos. Based on the asbestos test results received thus far, the general public's risk for any short or long term adverse health effects are extremely low.

...

[NYC DOH, undated, New York City Department of Health Responds to the World Trade Center Disaster, Public Health Advisory Concerning Air Quality in the Affected Area of the World Trade Center Disaster, <http://www.nyc.gov/html/doh/html/alerts/wtc1.html>]

10/5/01

New York City Health Commissioner Neal L. Cohen, M.D., today informed New Yorkers that 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.

Some individuals with underlying respiratory conditions, such as asthma, may experience exacerbation of symptoms, and other persons may also experience short-term discomfort including irritation of the eyes, nose, and throat."

[This press release does not even mention asbestos as a possible contributor to long term health effects.]

...

[Press Release, New York City Department of Health Office of Public Affairs, NYC HEALTH DEPARTMENT RESPONDS TO CONCERNS ABOUT AIR QUALITY IN LOWER MANHATTAN, 10/5/01, <http://www.ci.nyc.ny.us/html/doh/html/public/press01/pr89-1005.html>]

10/26/01

Joel A. Miele, senior commissioner of the city's Department of Environmental Protection, said they have been using monitoring standards for indoor environments, which are tougher than those for outdoor areas. "We have bent over backwards to be as conservative as possible in our testing ... and there is no significant danger" to anyone's health, he said.

Fires and wind at the big, open site can kick up smoke and an awful smell, and register different monitor readings at different times, Miele said. "People are safe, not just at the site, but at the perimeters," he added.

Dr. Neal Cohen, the City Health Commissioner, said people with health problems, especially respiratory issues, should take precautions. And although some citizens may experience irritation in their eyes, throat and nose, he insisted "we don't believe there will be long term health affects" from site emissions. Test results, he said, show an occasional uptick in some areas, but they soon return to normal levels.

"We do not see a consistent picture of problems except at 'the pile' where the workers are supposed to wear protective gear," Cohen added. The officials scoffed at a report in Friday's Daily News that said levels of poisonous chemicals and metals in the environment at and around 'ground zero' exceed federal levels.

...

[Officials: 'Ground Zero' Workers Safe, (no author listed), Newsday, 10/26/01]

10/27/01

Federal and city officials assured New Yorkers yesterday that the sometimes acrid smell emanating from the rubble of the World Trade Center does not pose a health risk for

most people.

Mayor Giuliani, whose office at City Hall is just a few blocks from the twin towers' charred, smoldering ruins, said extensive monitoring by government agencies found that "the problems this created are not dramatic, are not health-threatening." "I come down here in the morning and sometimes the odor is terrible," the mayor said. "You smell it and you feel there must be something wrong with it. But what I'm told is that it is not dangerous to your health."

...

Health officials said that although people in good health near the area generally face no realistic or significant danger, they warned people with asthma and other respiratory ailments to exercise caution.

...

"The short-term irritation of eyes, nose and throat that some people ... may feel does not translate into significant or any long-term health effects," said city Health Commissioner Neil Cohen. "The occasional uptick in elevated readings that are taken with some of these pollutants generally does return to acceptable levels very, very quickly. In the aggregate, we don't see any consistent picture that would affect anyone but the immediate rescue worker who is at The Pile," Cohen said.

[City, Feds Say WTC Air's OK Rule out risk to health, By MICHAEL R. BLOOD, NY Daily News, 10/27/01]

11/1/01

Asbestos was one of the substances of greatest concern since it was a known building component in the World Trade Center. However, except for a few transient increases found during the initial weeks, the levels of asbestos have been below levels that would cause health concern. Moreover, these levels are decreasing, and cannot be considered long-term exposures.

...

Although short-term irritant health effects may persist as long as smoke and dust are present near the site, levels of more hazardous contaminants in the air and dust in the nearby neighborhoods are not high enough or for long enough to cause long-term health effects.

...

[Jessica Leighton, Ph.D., Assistant Commissioner, Environmental Risk Assessment, NYC DOH, Before the NYC Committee on Environmental Protection, 11/1/01]

11/2/01

Environmental and health officials sought to assure a City Council committee yesterday that there were no indications of serious long-term health risks to workers or residents at or near ground zero, amid growing concerns to the contrary.

...

Robert Adams, the director of environmental health and safety services at the city's Department of Design and Construction, said that although workers at the site were still required to wear respirators and other protective gear, the data suggest that even an unprotected worker would not experience long-term health risks from the levels of

poisons that had been detected.

Jessica Leighton, an assistant commissioner at the city's Department of Health, said that while tests had recorded occasional spikes in the levels of various contaminants, including asbestos, at some locations at or near the site, long-term health risks are associated with consistent exposure over a 30-year period.

...

[Workers and Residents Are Safe, Officials Say, By DIANE CARDWELL, 11/2/01, New York Times]

11/8/01

Beyond the tragic loss of life and spirit at the site that once was the World Trade Center, lingering concerns continue to rise from the debris, specifically about what is in the air. At Stuyvesant High School, there is independent monitoring of the air quality, and parents have raised concerns about the levels of dust in the school.

City Health Commissioner Neil Cohen said Thursday that he would review the tests, but stressed that he knows of no health risk at the school. Neil Cohen, NYC Health Commissioner: "The air quality in that area has been well below the standards required for health and safety."

...

[Residents Say City Not Doing Enough To Assure Them About Health Concerns Near Ground Zero, 11/8/01, WABC News, http://abclocal.go.com/wabc/news/WABC_110801_enviroimpact.html]

11/8/01

Despite fires and a pungent odor at the wreckage of the World Trade Center, most tests for contaminants in New York's air have not triggered alarm, health officials say.

U.S. Environmental Protection Agency spokeswoman *[Bonnie Bellow]* said Wednesday that EPA officials "really don't detect any real danger" in air and dust tests. And New York Mayor Rudolph Giuliani echoed the sentiments this morning.

"The Health Department has done tests and at this point it is not a concern," Giuliani said. "So far, all the tests we have done do not show undue amounts of asbestos or any particular chemical agent that you have to be concerned about." Still, he said, people in lower Manhattan were feeling the effects of all the dust and debris spawned by the terrorist attack. "The accumulation of it, for people that are down there, can become very, very irritating," he added. "And there were a lot of people whose eyes have been burning, but I don't think there is any chemical agent we have to worry about at this point."

...

[ABC News, Fouled Air? Health Officials Stress Caution, But Say Measured Levels Safe, 9/13/01, http://abcnews.go.com/sections/living/DailyNews/wtc_healthhazards010911.html]

2/02

I live and/or work downtown. Do I need to be concerned about the air I'm breathing? For healthy people living and working in areas near the WTC site, it is believed that the contaminant levels in the environment do not pose serious long-term health risks. While exposure to smoke can cause eye, nose and throat irritation among healthy individuals, these symptoms are usually short-lived and are unlikely to lead to ongoing health problems. The fires at the site can also contribute to odors in the surrounding area. When odors are present, some people may experience short-term effects such as respiratory irritation, headaches and dizziness. These effects tend to lessen once exposure to the odors is stopped.

...

[New York City Department of Health & Mental Hygiene Responds to the World Trade Center Disaster ENVIRONMENTAL HEALTH QUESTIONS FOLLOWING THE WORLD TRADE CENTER DISASTER, 2/2002, <http://www.nyc.gov/html/doh/html/ei/eiasbest.html>

2/10/02

Some people living or working near Ground Zero may have faced serious health risks since Sept. 11, but environmental experts say they don't know enough to be certain about long-term harm.

...

"Every test that has been done says the air quality was in acceptable limits," Mayor Bloomberg said yesterday. "I think some people are just never going to want to believe that."

...

Despite EPA assurances, tests in November outside Stuyvesant High School found asbestos well above federal standards.

...

[WTC's Air of Uncertainty - Experts weigh health risks of twin towers fires & dust, 2/10/02, NY Daily News, By PAUL H.B. SHIN and RUSS BUETTNER]

2/11/02

Many individuals were exposed to large amounts of smoke, dust, and airborne substances. The potential release of contaminants during and after the collapse was a primary public health concern from the beginning, and air monitoring was established immediately, and still continues. The Health Department reviews the numerous air quality, debris sample, and personal air monitoring tests being conducted by various agencies. The data from air quality tests thus far have been, in general, reassuring. None of the testing done to date has shown results that would indicate long-term health impacts.

...

[New York City Department of Health Office of Public Affairs, Testimony Thomas R. Frieden, M.D., M.P.H. Commissioner New York City Department of Health and Joel A. Miele Sr., P.E. Commissioner New York City Department of Environmental Protection before the U. S. Senate Committee on Environment and Public Works Subcommittee on Clean Air, Wetlands, and Climate Change Monday, February 11, 2002, <http://home.nyc.gov/html/doh/html/public/testi/testiair.html>]

2/25/02

Literally before the dust had cleared, the administration of New York's then-Mayor Rudolph Giuliani assured a terrified city that the air was safe. On September 16, the city's health department issued a public statement declaring that "the general public's risk for any short or long term adverse health [effects is] extremely low." The same day, EPA Administrator Christie Todd Whitman volunteered her own bill of clean health: "There's no need for the general public to be concerned."

...

[*Toxic haste, Staten Island Advance, Alyssa Katz, 2/25/02, <http://www.americanprospect.com/print/V13/4/katz-a.html>]*

"Children and pregnant women not at greater risk" – false claim by NYC DOH

The NYC DOH claimed that pregnant women and young children did not need to take extra precautions when exposed to the air and fallout from the World Trade Center:

What are the health effects of asbestos?

Destruction of the World Trade Center buildings released large amounts of dust and ash, some of which contained trace amounts of asbestos. Based on the asbestos test results received thus far, the general public's risk for any short or long term adverse health affects are extremely low.

...

Do pregnant women and young children need to take additional precautions?

No. Pregnant women and young children do not need to take additional precautions.

...

[*NYC DOH, undated, New York City Department of Health Responds to the World Trade Center Disaster, Public Health Advisory Concerning Air Quality in the Affected Area of the World Trade Center Disaster, <http://www.nyc.gov/html/doh/html/alerts/wtc1.html>]*

The very statute which forced school systems to monitor, control, and test for asbestos states explicitly that children have an increased risk. This is because they live longer so that asbestos has more time to cause cancer.

Asbestos School Hazard Detection and Control Act

...

§ 3601. Congressional statement of findings and purposes (a) The Congress finds that-- (1) exposure to asbestos fibers has been identified over a long period of time and by reputable medical and scientific evidence as significantly increasing the incidence of cancer and other severe or fatal diseases, such as asbestosis; (2) medical evidence has suggested that children may be particularly vulnerable to environmentally induced cancers; (3) medical science has not established any minimum level of exposure to asbestos fibers which is considered to be safe to individuals exposed to the fibers;

[*June 14, 1980, P.L. 96-270, § 1, 94 Stat. 487, 20 USCS § 3601 (2001). Available at <http://www.findlaw.com/> or <http://uscode.house.gov/>]*

In addition, there is at least one study showing that asbestos fibers can cross the placenta and reach the unborn child:

Digests of lungs, liver, and placenta from five stillborn infants of 22 to 38 weeks gestational age were examined for asbestos and other fibers using light and electron microscopy, energy dispersive X-ray analysis, and selected area diffraction analysis. Uncoated chrysotile asbestos fibers were found in the digests of at least one of the three tissues examined from each stillborn infant. The asbestos fiber burdens ranged from 71,000 to 357,000 fibers/g wet tissue. Most of the fibers were small, with the mean length ranging from 0.83 to 2.53 microns. While appreciable numbers of uncoated chrysotile fibers were present, no coated asbestos fibers were found in any of the stillborns. Both coated and uncoated nonasbestos fibers were found in at least one of the tissue digests of all five stillborns. The uncoated nonasbestos fibers were characterized as aluminum silicates, diatomaceous earth fragments, or other fibers. The coated nonasbestos fibers or ferruginous bodies were consistent with being formed on diatomaceous earth fragments, black carbon cores, or sheet silicate cores. Since the placenta is the only route of communication between the fetus and the outside environment, our findings strongly suggest a transplacental transfer of asbestos and other fibers in humans.

...

[Haque AK, Mancuso MG, Williams MG, Dodson RF, Asbestos in organs and placenta of five stillborn infants suggests transplacental transfer, Environ Res 1992 Aug;58(2):163-75]

D: ADMISSIONS OF HEALTH RISKS BY EPA, NYC, AND FEMA

It is difficult to consistently claim that WTC fallout is not hazardous. There are many direct and implied admissions of hazard by EPA, NYC, and FEMA officials, in contrast to the denials compiled in Sections B and C. The following are those statements found that imply or directly state a hazard to residents and office workers.

The purpose of first documenting statements by EPA and other governmental authorities claiming that there were no hazards, and then contrasting them with their own admissions of a hazard is this: Such conflicting statements establish a willful and malevolent intent to deceive, and a failure to warn. The following sections of this report give additional instances where EPA and NYC officials deceived citizens about WTC fallout hazards.

EPA and NYC condemn WTC-contaminated cars, claim buildings never unsafe

There is a large disparity between what EPA and the NYC DOH determined for the safety of cars contaminated with WTC dust, and the safety of residences and offices contaminated by the same WTC dust. On one hand, EPA and the NYC DOH said that cars were condemned, because they could not be cleaned. On the other hand, EPA and the NYC DOH said that residences and offices were safe from the very beginning with the same WTC dust, and could be cleaned using the NYC DOH do-it-yourself cleanup guidelines.

The story of the condemned WTC cars is interesting, with several reversals and conflicting claims, explained below:

12/3/01 – Mayor and NYC Health Commissioner say WTC cars condemned

On 12/3/01, Mayor Giuliani and the NYC Health Commissioner Neal Cohen held a joint press conference, and said that vehicles that had been towed from near Ground Zero, covered with WTC dust, could not be returned because cleaning would be “too difficult” and even after cleaning, their safety would be “inconclusive.” This press conference was just a few days before the new mayor and a new health commissioner took office. As seen earlier in this report, up until this point, neither Giuliani nor Cohen ever admitted to any hazards to anyone other than rescue workers.

12/4/02

The city's health commissioner said yesterday that he was recommending that the city condemn the 900 cars that were towed from the World Trade Center site after the towers came down. Although the cars' owners have in some cases been calling for their return, the commissioner, Dr. Neal Cohen, said that because asbestos and other contaminants were prevalent throughout the cars' engines and bodies, it would be too expensive to clean them, and such a cleaning could be inconclusive, in terms of safety.

...

[Recommendation On Cars Towed On Sept. 11, 12/4/01, By Jennifer Steinhauer, NY Times]

12/27/01

"These vehicles are contaminated," Cohen said. "The cleanup of them is not practical, and I'll do whatever I can in my authority and recommend to the mayor that they be condemned."

...

[Drivers Want Their Cars Back, 12/27/01, CBS News, <http://www.cbsnews.com/stories/2001/12/27/archive/main322479.shtml>]

3/15/02

In December, New York's then-health commissioner Neal Cohen said the cars' engines and bodies were contaminated with dangerous World Trade Center debris and would not be returned.

...

[What To Do With An Auto Graveyard, At the last minute, the EPA prevents the return of cars damaged in the World Trade Center collapse, By Julie Scelfo, NEWSWEEK WEB EXCLUSIVE, 3/15/02, <http://www.msnbc.com/news/724974.asp>]

The statement that cars are unsafe with WTC dust, and that they cannot be decontaminated to assure safety, is a very important statement by a key official responsible for the WTC cleanup.

The important conclusion to draw is this: How is an automobile so very different from a washing machine, dishwasher, couch, HVAC system, carpet, computer, TV, bed, etc.?

NYC reverses itself after being sued by car owners

On 12/27/01, Mayor-elect Bloomberg appointed Thomas Frieden to be the new Health Commissioner. The NYC DOH then reversed itself on the WTC dust-contaminated car issue. This was after NYC was sued by the car owners. The new NYC administration reversed Mayor Giuliani and told owners they could retrieve their contaminated cars in March, 2002:

3/29/02

The letters went out earlier this month, informing the owners of almost 400 cars and trucks recovered from in and around the World Trade Center disaster site that the vehicles could be reclaimed at the Fresh Kills landfill. All the owners had to do was cover them "with a tarp or other impervious material" and haul them away on a flatbed.

That was the easy part. Then the owners had to have them cleaned with special equipment designed to prevent the inhalation of asbestos and other contaminants in the dust that blanketed Lower Manhattan after the Twin Towers collapsed.

...

The city advised the owners to "assess your vehicle for operational safety and have it thoroughly cleaned before operating it," recommending that it be cleaned with vacuums equipped with HEPA (high efficiency particulate air) filters to contain the asbestos-tainted dust.

...

[Cars Trapped at WTC Now Stuck in Another Mess: City Had Planned to Release Contaminated Vehicles Until Congressman Called in Federal Environmental Officials, By Rudy Larini, Newark Star-Ledger, 3/29/02]

5/14/02

But the city flip-flopped after meeting with insurance companies and being sued by owners who wanted their cars. The city sent owners letters telling them they could pick up their vehicles in March. The mailings included tip sheets explaining how to remove asbestos-tainted dust.

...

[WTC Cars Will Be Trashed, City, EPA to destroy hundreds of contaminated autos, By GREG GITTRICH, NY Daily News, 5/14/02]

The following is what the NYC DOH put up on its web site in January, 2002, advising how to clean contaminated automobiles:

1/02

How do I get asbestos off of me and my things after it has gotten on them?

To clean asbestos from:

...

Cars, vehicles, bicycles

Do this:

...

HEPA* vacuuming.

...

[New York City Department of Health & Mental Hygiene, Bureau of Environmental Investigations, Asbestos (ACM) Fact Sheet, 1/2002, <http://www.nyc.gov/html/doh/html/ei/eiasbest.html>]

The more detailed instructions on do-it-yourself car cleaning from the NYC DOH are given below:

Motorists living near the World Trade Center disaster site may face some challenges getting their cars cleaned and started if they were exposed to heavy levels of dust and soot from the collapse of the Twin Towers. Motorists are advised to clean the car's interior and exterior, as well as clean and inspect the engine, before starting their cars.

...

How can I protect myself from exposure to dust while cleaning the interior of my car? If there are high levels of dust inside the car, wear a dust mask, preferably one that is double-banded. Make sure to use clean-up techniques that do not generate dust, such as wetting down the dust with water or using a HEPA (high efficiency particle air) vacuum, which will reduce dust recirculation.

How do I clean the interior of my car?

First, vacuum the interior of the car with a HEPA vacuum. If a HEPA vacuum is not available, a conventional or shop vacuum can be used, preferably with a HEPA or allergy bag. A conventional or shop vacuum should not be used in a garage or closed area without adequate ventilation.

After vacuuming, wipe the interior of the car with soap and water using disposable rags or sponges. Pay extra attention to the dashboard and vents, particularly if the vehicle is a 1998 model or newer. New cars have many computer and electronic devices located behind the dashboard that could be damaged by heavy dust. Place wet rags or sponges in plastic bags and dispose of while still wet.

...

What do I do when starting the engine for the first time?

Only after thoroughly cleaning the car's exterior, interior, and engine should motorists start their cars.

When starting the vehicle, do not race the engine. Let it idle approximately five minutes. Observe the tailpipe to see if any strange-looking vapors or materials spew out. The engine may have ingested some dirt that will be discharged when it is first started. If strange noises are heard or smoke is seen, shut the vehicle off and call a professional mechanic to inspect it.

Drive the vehicle slowly at first to make sure it is operating correctly. If so, take the vehicle on a highway so the force of the air can help flush dust and dirt from under the hood and other areas. Only then should the ventilation system be used, first in the recirculation mode to prevent underhood dust from entering the passenger compartment. After five or ten minutes, switch the ventilation system to bring in outside air.

...

How do I clean my vacuum equipped with a disposable dust bag?

Replace the vacuum dust bag, and place the old dust bag in a plastic bag and seal. Afterwards, dispose of the dust bags with your regular garbage.

Wipe the vacuum's exterior, including hose and other exposed parts, with a damp cloth. While still wet, place the damp cloth in a plastic bag, seal and discard with your regular garbage.

How do I clean my vacuum that is not equipped with a disposable dust bag?

Go outside and carefully empty the dust out of the vacuum dust container into a plastic garbage bag and seal. Discard the garbage bag with your regular garbage.

Wipe the vacuum's exterior, including hose and other exposed parts, with a damp cloth.

While still wet, place the cloth in a plastic bag, seal and discard with your regular garbage.

Replace the prefilters on a HEPA vacuum. Check your HEPA cartridge to determine if it needs to be replaced.

What do I do with my dirty clothing and dust mask?

Place dust mask in plastic bag, seal and discard with your regular garbage. Make sure to wash dirty clothes separately from other laundry.

...

[New York City Department of Health & Mental Hygiene, Responds to the World Trade Center Disaster, Recommendations for Motorists in the Area Affected by the World Trade Center Disaster. Undated, <http://nyc.gov/html/doh/html/alerts/wtc7.html>]

EPA overrides NYC DOH decision to return cars to owners

After a direct appeal from U.S. Representative Nadler to Administrator Whitman, EPA reversed NYC's decision to return the contaminated cars to the owners:

2/18/02

New York City officials have reversed a decision made in December and announced that owners of cars and trucks recovered from the World Trade Center would be permitted to retrieve their vehicles. Earlier, the city's health commissioner said the vehicles were potentially contaminated with asbestos and therefore unsafe to return to their owners. Why the turnaround? "Since the fall, data has been presented to the health department collected by a number of agencies, including the FDNY, NYPD, FBI and EPA, and those samples indicated that there were undetectable to low levels of asbestos found in samples taken from the cars," says Greg Butler, a spokesman for the New York City Department of Health.

But insiders from at least three of those agencies say they are familiar with the tests, and that some have shown levels of asbestos at triple the EPA's standards for contamination. "We're amazed that they're returning the cars," says one official. "I think it's very disturbing," says an EPA source. "I wouldn't feel comfortable driving a vehicle removed from Ground Zero."

...

[Newsweek, FALLOUT, Driving With Dangerous WTC Dust? 2/18/02]

5/14/02

Hundreds of cars towed from the streets around the World Trade Center and pulled from the collapsed complex's garages will be destroyed because of asbestos contamination, federal officials said yesterday. The city had planned to return the vast majority of the vehicles to owners in March. But days before the giveback, the Daily News revealed that the cars were covered with dangerous levels of asbestos, prompting the federal Environmental Protection Agency to step in.

Now the city and the EPA have determined that 890 vehicles the vast majority of the

cars stored at Fresh Kills landfill on Staten Island are contaminated, based on dust samples.

"The vehicles will be destroyed," EPA spokeswoman Bonnie Bellow said yesterday. "They are being power-washed, and when possible the interiors are being vacuumed." The scrubbed cars will be hauled to a recycling center in Jersey City, where they will be shredded, Bellow said.

The News revealed March 8 that tests on vehicles conducted at the landfill showed that as much as 3% of the dust was asbestos more than three times the level that triggers federal cleanup rules.

...

But Rep. Jerrold Nadler (D-Manhattan) sent The News' findings to EPA chief Christie Whitman and urged her to issue an emergency injunction to stop the cars' release. A day later, the EPA asked to meet with the city.

...

[WTC Cars Will Be Trashed, City, EPA to destroy hundreds of contaminated autos, By GREG GITTRICH, NY Daily News, 5/14/2]

3/15/02

FOR WEEKS, local, state and federal officials have squabbled over whether the vehicles most of which are coated with fine powder of World Trade Center debris are safe. "We know the dust contains lead, zinc, mercury, asbestos, not to mention organic materials," says New York Congressman Jerrold Nadler. "To release cars to owners is highly irresponsible." On Thursday, Nadler wrote a letter to the Environmental Protection Agency's Christie Todd Whitman urging her to file an emergency injunction against the city to prevent their release. On Friday, the EPA asked the city to meet with its officials before releasing the cars.

The New York City Department of Health told Newsweek it will honor the EPA's request, but that its decision to release the autos was based on careful review of numerous environmental tests. "The data indicates that there is no significant risk to human health," says Kelly McKinney, the NYC Department of Health's Associate Commissioner for Environmental Health. "The fundamental way we work is to gather as much data as we can, to look at that data, compare it with whatever standards are available, compare it with our knowledge of the issues, and that's what we did with this issue as we have with every World Trade Center issue."

...

[What To Do With An Auto Graveyard, At the last minute, the EPA prevents the return of cars damaged in the World Trade Center collapse, By Julie Scelfo, NEWSWEEK WEB EXCLUSIVE, 3/15/02, <http://www.msnbc.com/news/724974.asp>]

(We don't know what the NYC DOH did in terms of "careful environmental tests" to conclude that the cars were safe. This might be a good subject for a Freedom of Law information.)

By intervening and telling NYC officials that the must condemn the cars, EPA made a determination that they cannot be effectively decontaminated.

The guidelines that the NYC DOH had developed for cleaning the cars, on their face, appear to be equivalent to or more rigorous than the NYC DOH do-it-yourself guidelines for cleaning residences and offices. Thus, there is no reason to believe that the NYC DOH do-it-yourself residential and office cleanup guidelines would be any more effective for air conditioners, couches, carpets, TV's, computers, and refrigerators, etc.

The timing of these events is also of interest. Giuliani and his health commissioner held a joint press conference a few days before leaving office, making such a strong statement about asbestos and the inability to decontaminate a vehicle. Perhaps they felt free from political ramifications by making such statements right before leaving office.

Also, when EPA Administrator Whitman reversed the decision of the Bloomberg administration, saying again that the cars must be destroyed, it only took her a day after being alerted to the problem by Congressman Nadler. Why did she work so quickly in this instance to override the authority of NYC, when all along EPA had been claiming to the press and in testimony that EPA lacked jurisdiction over indoor air issues? Aren't exposures to asbestos in cars the same as any other indoor air exposure?

Despite being condemned, contaminated cars sold to consumers

11/1/02

Questions are being raised about how two dozen potentially toxic cars got into Connecticut. The vehicles were recovered from around the World Trade Center following the 9/11 attacks and were resold to dealerships.

"I thought it was the deal of the century I tell ya," says Joe Santino. That deal of the century Santino says he got was a vehicle that had been in Lower Manhattan on September 11th. "It should have never been allowed to happen."

At the end of July, almost a year after the terrorist attacks, Santino traded his old car for a used 2001 Chevy Suburban. He bought it at Diamond Auto in East Haven. "I knew them all my life and I trusted them," he said. The sales agreement fully disclosed the truck had come from the vicinity of the World Trade Center and Santino says the dealer assured him the vehicle was safe.

"He told me it was a World Trade Center recovery vehicle that it had dust and dirt and was all cleaned out."

It wasn't long before the Santinos started noticing something strange. "It was just a dust that was appearing everywhere," Tracy Santino said. "The front doors; you would slam them, dust used to come up out of the corners." Santino was especially concerned about the residue because his son has cystic fibrosis.

He took pictures, collected a bag of debris and had it tested at a local lab. "To my surprise, the guy called me the next day and told me don't drive the vehicle, get out of the vehicle and he told me it was loaded with asbestos."

...

A state investigation has identified 11 dealerships in Connecticut that bought World Trade Center recovery vehicles. "We are investigating reports that some of the dealerships may have known about this contamination and that kind of knowledge without disclosure is certainly a violation of our laws," Blumenthal said.

...

A spokesperson for Nationwide Insurance told us the vehicle came with documentation that it had toxic debris and was sold as salvage. When we asked for this in writing we were told the company needed to speak with an attorney.

...

[WTNH, *Car contaminated with asbestos sparks state-wide investigation*, 11/1/02, <http://www.wtnh.com/Global/story.asp?S=996505&nav=3YeXC9Xi>]

As another matter of interest, fire trucks and other rescue vehicles were also contaminated with WTC dust. The NY Environmental Law and Justice Project has been active in testing these vehicles on behalf of firefighters, and forcing decontamination, over the objections of NYC. For more information, see the website at www.NYenviroLAW.org. These fire trucks still had large pieces of debris lodged in cracks like the gap where windows roll up and down after more than a year. In one case, a piece of stationary with a World Trade Center address was found in the ladder mechanism a year after the disaster. The trucks were stationed in fire houses far from the WTC site, and accessible to children.

New EPA study finds hazardous levels of WTC contaminants after extraordinary cleaning procedures, requires extreme precautions during cleaning procedures

The following is a quote from a study released 6/4/03 by EPA that constitutes an admission of hazard. A mixed use residential and commercial building at 110 Liberty Street was found by EPA to have hazardous levels of WTC-related contaminants, such as asbestos, lead, silica, and fiberglass. The building is on the southeast corner of the perimeter of Ground Zero.

These are EPA's conclusions, not the conclusions of somebody else interpreting the data.

The pre-cleaning analytical results for all of the data sets listed above were also evaluated to determine if the concentration of contaminants in the dust were elevated above health-based benchmarks. . . . Based on pre-cleaning data, there were ten residential units and five commercial units that exceeded a health-based benchmark for either lead, dioxin, PAH, or some combination of the three compounds.

Based on post-cleaning data, an additional three residential units and one common area exceeded a healthbased benchmark for either asbestos, lead, MMVF, or alpha-quartz, or a combination of these compounds.

Cumulatively, nineteen sites inside the building or 76 percent exceeded a health-based benchmark for one or more contaminants associated with the WTC collapse. This indicates that some contaminant concentrations exceeded health-based benchmarks.

...

[There were 13 residential units and 6 businesses total.]

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, p. 108, http://epa.gov/wtc/confirmation_clean_study.htm]

It is very important to note that none of the WTC dust that EPA tested in any of the apartments or businesses in the buildings was over 1% asbestos. (See page 17 of EPA study.) Thus, under the EPA, ATSDR, and NYC DOH guidelines for cleaning up WTC dust, no cleanup would have been required. Most of the apartments also had what EPA classified as “minimal dust,” another criteria for triggering a professional asbestos cleanup, according to many EPA statements.

This study contains other highly relevant data, which are discussed in later sections of this report. For example, this study showed that for 4 out of the 7 apartments which EPA itself stated had only “minimal” levels of WTC dust, EPA had to clean 2 times in order for them to meet EPA’s health criteria. For the 6 apartments with significant dust by EPA’s definitions, 2 of them required 2 abatements, and 2 of them required 3 abatements before they were able to meet EPA’s health standards.

Yet EPA had been advising citizens that they could do their own cleaning by the much less rigorous methods specified in the NYC DOH guidelines.

110 Liberty St. safety precautions contrast with NYC DOH do-it-yourself guidelines

As another admission related to this study, EPA considered even short term exposures to the dust inside 110 Liberty St. to be a hazard, even though it contained less than 1% asbestos. EPA would not allow the press access to observe the study, because they could not be outfitted with sufficient protective gear, like custom-size suits and HEPA respirators:

The U.S. Environmental Protection Agency (EPA) today began sampling for contaminants in 110 Liberty Street, a still-unoccupied building close to the World Trade Center (WTC) site, in what will be a comprehensive test of the effectiveness of various cleanup techniques. Cleaning procedures to be tested include those that were recommended following the collapse of the WTC as well as others that may have been used in cleaning residential units. Comprehensive sampling will be conducted before, during and after the pilot cleanup.

...

IMPORTANT NOTE TO EDITORS: Due to potential health and safety concerns, workers will be suited up in custom-sized protective gear. EPA cannot allow media access to the building. [emphasis in the original]

...

[EPA BEGINS WORK ON PILOT WTC DUST CLEANING STUDY, 6/19/02, <http://www.epa.gov/wtc/stories/061902.html>]

The final report on the cleaning study also described extreme measures to allow residents back into the building even for the short time to secure their possessions, as seen below:

Prior to commencement of cleaning operations, each tenant was contacted for the purpose of scheduling an appointment to determine the tenant's wishes relative to disposition of their belongings. At the appointment, residents were suited with hooded, powered air-purifying respirators (PAPR), which pull ambient air through a filter. The residents were advised of the applicable aspects of the Health and Safety Plan, including dust and respiratory hazards. (The Health and Safety Plan is discussed in Section 2.2 below.) The residents then accompanied EPA into the apartments to review contents and to discuss the planned disposition of personal property.

...

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, NY New York, NY, 5/03, EPA Region 2, http://epa.gov/wtc/confirmation_clean_study.htm]

To put all these extraordinary safety precautions into context, when EPA did their pilot cleaning study, it was not the first time anyone went into this building after 9/11. Almost a year before, the building had undergone professional abatement. Then, the fire department went in prior to EPA's pilot cleaning study to clean up any layers of dust. It was only then that EPA cleaned the 110 Liberty St. address using full cover Tyvek® suits and HEPA respiratory protection, with an extensive health and safety program for the effort.

EPA, NYC, and FEMA had recommended that citizens should perform do-it-yourself abatements in residences and offices using the NYC DOH cleanup guidelines. The NYC DOH guidelines explicitly stated that even a drugstore dust mask was not required, much less a HEPA respirator. EPA never told the citizens that they might not be able to get their place clean with only one try, or that they should test to see if it was sufficiently clean, etc.

EPA voluntary cleanup uses maximum protective gear unless tenant has already performed a do-it-yourself cleaning WITHOUT any protective gear

EPA is now cleaning up WTC-contaminated apartments at no cost to residents in lower Manhattan. EPA has two different methods, depending on whether the apartment has high or low levels of WTC dust. If EPA believes that there is "substantial" dust, they will require the abatement workers to use full protective equipment, including full body suits and HEPA respirators. Residents will not be allowed to be present during the abatement for fear they could be exposed. The apartment has to be sealed off. Etc. The following are EPA's specifications for how workers and residents as well must be protected cleaning up apartments with "significant" WTC dust. Note that even residents have to be excluded from the work area for the brief one-time period that the cleaning takes place, because EPA now believes that it is too hazardous to be there.

Scope of Work B

Application: A visual inspection was performed and large or significant accumulations of dust or debris from the collapse of the WTC was observed in common spaces, residences or portions thereof (such as windows, terraces or balconies).

Residents will not be allowed in the work area. Residents may be present in the residence during cleaning in cases where the work area can be isolated by the erection of isolation barriers. In all other applications of Scope B it is assumed that residents will not be present in the residence.

...

3. At least one asbestos supervisor shall be present at each work place (work place is defined in Title 15, Chapter 1 of RCNY as the work area and the decontamination enclosure system).

4. Personal protective equipment including disposable clothing, gloves, and respirators shall be worn during this cleaning activity.

5. Warning signs shall be posted at all of the approach to the work area.

6. A decontamination enclosure system shall be installed at the entrance to the work area. The shower room shall be equipped with at least a 6-foot flexible hose for waste decontamination. A remote holding area with a lockable door for waste shall be located at the site and shall comply with all applicable storage rules and regulations. Waste removal shall not occur during worker shift changes or when workers are showering or changing.

An entry/exit log in compliance with the requirements set forth in Title 15, Chapter 1 of RCNY shall be maintained in the clean room. A remote decontamination enclosure system shall be considered when appropriate, i.e. inability to comply with the provision due to space limitation or other agency rules, such as for compliance with New York City Fire Department egress requirements.

7. HVAC systems shall be shut down and locked out or isolated locally.

8. Isolation barriers shall be installed with two layers of 6-mil polyethylene sheeting and sealed with tape.

9. Negative pressure ventilation equipment (air filtration devices (AFDs)) shall be installed and operated during all cleaning activities. Equipment shall run continuously until clearance air monitoring. A minimum of one air change every 15 minutes shall be provided. When ducting to the outside is not possible, a second negative pressure ventilation unit compatible with the primary unit may be connected in series.

10. When conducting cleaning of common space in apartment buildings, the elevator control shall be modified to bypass the work area.

11. Prior to any cleaning of common spaces, isolation barriers (i.e. sealing off of all openings, including but not limited to windows, corridors, doorways, barriers, skylights, ducts, grills, diffusers, and any other penetrations of the workplace) shall be installed with two layers of 6-mil plastic sheeting sealed with tape. All seams of HVAC or other system components that pass through the work place shall also be sealed. All openings shall be HEPA vacuumed prior to installing the isolation barrier.

...

3. After the removal of debris, all surfaces will be cleaned in accordance with the procedures specified in Scope A. After all surfaces have been cleaned, a second cleaning shall be performed. This results in two full cleanings of all surfaces, with the following exception. Water extraction cleaning of carpets and fabric covered furniture will be conducted only once. Surfaces include but are not limited to walls, floors, ceilings, ledges, trims, appliances, equipment and furnishings.

...

[http://www.epa.gov/wtc/factsheets/cleaning_sow.pdf]

By requiring all these safety procedures in EPA's voluntary cleanup program, EPA is implying that there were hazards to all the citizens who cleaned up their own apartments and offices with "significant" accumulations of dust/debris, using the NYC DOH do-it-yourself guidelines. EPA is implying that citizens also should have taken at least the same precautions as in EPA's "Scope B" cleaning protocols. As demonstrated in Sections E and F, citizens performed their own do-it-yourself cleanups where there were heavy layers of dust, with no respiratory protection or any other precautions.

The following is another piece of evidence implying an EPA conclusion of hazard during do-it-yourself citizen cleanups: EPA actually stated that the full moon-suit protective gear would not be required if the apartment had already been cleaned up by citizens:

Following the assessment, the Project Monitor will determine the appropriate cleanup approach. Most residences that have already been cleaned will be addressed under EPA's "Scope A" cleanup described in detail below. [*"Scope A" does not require respiratory protection, containment, or exclusion of residents during cleaning.*] Residences where there is still significant accumulation of WTC dust and/or debris (typically unoccupied) will be dealt with under EPA's "Scope B" cleanup which adds precautions to protect workers and prevent spreading possible contamination while removing the bulk dust/debris. Where pockets of bulk dust are found in previously cleaned homes (between windows, inside air conditioners, etc.), these pockets of dust will be addressed under a "Modified Scope B" cleanup. [*emphasis added*]
 ...
 [WTC RESIDENTIAL DUST CLEANUP PROGRAM CLEANING & TESTING FACT SHEET, <http://www.epa.gov/wtc/factsheets/cleantest.html>]

This means that any prior cleaning by the citizens (or volunteers such as from the Southern Baptist Convention) should have required the same protective gear and other measures in order to protect their health.

Admissions of inadequate indoor air measurements and cleanup hazards

The following is EPA's own account of a 10/9/01 meeting, where it admits that its outdoor air tests are not relevant to indoor air measurements. This EPA statement was included as an appendix to a report by the FEMA Office of the Inspector General. EPA's statements also constitutes an admission that there was a hazard to citizens living in, using, or cleaning up residences and offices without protective measures and professional abatement:

A group of concerned legislators from lower Manhattan coalesced as the "Ground Zero Elected Officials Task Force." These officials began early on to request assistance be provided to residents in the cleanup of their buildings. They identified several buildings which they wanted sampled indoors. EPA consulted with representatives of the New York City Department of Health regarding whether NYC wanted any support in testing these buildings. New York City did not request EPA action. The Ground Zero officials

commissioned a sampling effort the results of which were provided in a report dated October 12, 2001 to EPA and others.

On September 28, 2001 EPA attended a public meeting at which lower Manhattan residents requested cleanup assistance to be able to return to their residence. FEMA was represented at this meeting by Marianne Jackson.

On October 9, 2001 EPA representatives (Bruce Sprague, Kathleen Callahan) met with FEMA representatives including Larry Somer and Kathryn Humphrey to discuss whether FEMA's assistance programs could provide residents with the additional financial support that would be needed to have professional asbestos abatement cleaners hired to clean the residences. FEMA invited EPA to sit in on a meeting that day with lower Manhattan residents, community board representatives and representatives of the Battery Park Business coalition. This meeting's principle topic was the additional support residents needed to cleanup safely and the business coalition was considering providing funding support. Ultimately, this initiative did not take place. FEMA did attempt to provide greater assistance to residence who were displaced from their affected apartments. However, there continued to be pressure for more government assistance for residential cleanup. Although most air samples taken for asbestos in the outdoor (ambient) environment did not show levels of asbestos exceeding the benchmark EPA used to assess the state of the environment surrounding the WTC site, the dust did contain asbestos in variable amounts and locations and with cleanup activity this could be entrained in the air, posing an inhalation health risk. *[emphasis added]*

...

[EPA's comments on draft FEMA report, included as Appendix H in: FEMA's Delivery of Individual Assistance Programs: New York - September 11, 2001, dated: December, 2002, p. 65, <http://www.fema.gov/ig/iaprograms.shtm>]

Testimony by EPA Region 2 Administrator is admission of hazard

The testimony by Jane Kenny, EPA Region 2 Administrator, in February, 2002, also constitutes an admission that prior statements by Administrator Whitman about long and short term safety were incorrect:

2/12/02

US Representative Jerrold Nadler, a Democrat who represents Lower Manhattan, said he was "alarmed and outraged" by Whitman's statement. Even Thurston, more optimistic than most outside witnesses, agreed that Whitman was "too quick to declare the air 'safe.'"

Jane M. Kenny, EPA's regional administrator, defended the agency. "We used the most extensive testing ever," she said. "There was a lot of confusion about what exactly was safe, and was not. . . . The people in public service were doing the best they could."

...

[Concerns intensify on ground zero dust, By Fred Kaplan, Boston Globe, 2/12/2002, coverage of the US Senate hearing of 2/11/02]

2/12/02

On Sept. 18, just one week after the World Trade Center collapse, tens of thousands of office workers near Ground Zero were given the go-ahead by federal and local safety officials to return to their jobs. At the time, our government leaders wanted to return to normal as soon as possible, and especially wanted to reopen the nation's critical financial markets.

...

Several times during the hearing, Lieberman asked EPA regional administrator Jane Kenny to respond directly to criticisms that Whitman's early reassurances to those who were feeling ill from the downtown air may have been confusing.

"I don't know whether the comments were confusing or not," said Kenny in a halting, trembling voice. "People were hearing different things."

...

[Casting a Dark Cloud Over City, EPA, by Juan Gonzales, NY Daily News, 2/12/02]

Admission that indoor air testing necessary – outdoor testing irrelevant

EPA Headquarters has acknowledged now that its outdoor testing was irrelevant to showing asbestos levels indoors. On February 12, EPA Administrator Christine Whitman wrote to Senator Hilary Clinton, stating:

Fortunately, the results of our testing of outdoor environmental conditions to date have consistently indicated that air quality in Lower Manhattan does not pose a long-term risk to those who live, work, or visit there.

...

People are also justly concerned about indoor environmental quality. The enormous amount of particulates released by the collapse of the World Trade Center towers permeated many of the surrounding buildings, including apartments, offices, and other indoor spaces throughout the area surrounding Ground Zero.

As you may recall, in the days immediately following September 11th, the City of New York assumed responsibility for indoor environmental quality. . . . Despite the City's best efforts to address indoor environmental issues, it is apparent that many concerns and challenges remain. I am committed to providing additional assistance to the City and its residents and stand ready to do so. In addition, as you suggested yesterday, I will be working with our local, state, and federal partners to establish a Task Force on Indoor Air in Lower Manhattan, so that we can move as quickly as possible to address the remaining concerns we all share.

...

[emphasis added] [EPA Administrator Whitman to US Senator Clinton, letter dated 2/12/02, one day after US Senate hearing on indoor air]

From Section B of this report, there were many official statements by EPA equating outdoor air measurements with indoor air measurements. The NYC Dept. of Environmental Protection (NYC DEP) made a point of testing outdoor air near each public school, and then using these tests as a basis for claiming there were no hazards to the children inside, breathing and stirring up WTC dusts in a confined space, unless, of course, that dust was over 1% asbestos, which it rarely was.

As discussed in Section E, the NYC DEP instructed landlords only to test dust indoors. They were not told to test interior air at all. The following is a letter where residents in Battery Park city are told that the outdoor air in their area was been tested and found safe, and that the only criteria for opening of the buildings was whether the dust, not the air, inside apartments was over 1% asbestos.

10/25/01

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 the 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 with the Battery Park City Authority and owners of area buildings to perform cleanups of all dust in exterior areas with HEPA vacuums and wet washing. NYCDEP and EPA have both conducted tests in exterior spaces and all exterior areas of Battery Park City passed their strict protective standards before being opened again to the public.

EPA is using the 1% definition in evaluation 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. All Battery Park City 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 the certified personnel. [emphasis in the original]

...

[letter from NYC DEP Commissioner Meile to residents of Battery Park City, 10/25/01]

Although neither EPA nor the NYC DEP or DOH did any indoor air testing prior to Clinton's initiation of a Senate oversight hearing, EPA and NYC were active in issuing statements that there was no problem with indoor air or outdoor air, as seen from Sections B and C.

Professional abatement and better testing of NYC EPA building

Section N provides a detailed account about one of EPA Region 2's most shameful actions in the WTC aftermath, their evacuation and professional abatement of their own building at 290

Broadway, far north of what EPA and NYC DOH officials were then calling the contamination zone near Ground Zero.⁴ EPA had its building tested on 9/13/01 and 9/14/01, and decided to professionally abate the building within the week.

This incident constitutes admissions on several levels by EPA on 9/14/01:

- a. The zone of contamination was much farther north than being admitted to the public. The EPA building at 290 Broadway is north of the Warren Street boundary, the furthest north point where the NYC DOH recommended special apartment and office cleaning measures in its 9/17/01 do-it-yourself cleaning guidelines.
- b. The necessity of indoor dust testing was admitted. If air tests were negative, which they all were for the 290 Broadway building, then apparently testing of the settled dust was also necessary to determine whether there was a hazard. EPA found nothing in the air. But the dust revealed asbestos. On the basis of dust testing alone, it abated its own building, evacuating employees for a week for their whole building cleaning. EPA has denied testing settled dust inside buildings for the rest of NYC, saying that it is not an indicator of any hazard and unnecessary. EPA was adamant that only air will be tested, despite intense lobbying by concerned citizens and environmental groups.
- c. Better test methods were needed for assessing the contamination. EPA had electron microscope TEM tests for settled dust in their building. They were positive for asbestos. However, the light microscope tests of the same dust in their building (PLM method) were negative. EPA only used the PLM light microscope methods for the rest of NYC after the WTC. And EPA even refused free TEM electron microscope dust method capabilities for the rest of the city on 9/12/01, when Region 8 called them and offered to divert their laboratory contracts using TEM scopes to the WTC evaluation.

Although more details are given later in this report, the following juxtaposition of news articles is telling. Just three days after the disaster, EPA claims to the press that testing in its own building showed no hazards. Then, EPA admits to buying respirators for its employees.

9/15/01

EPA spokeswoman Bonnie Bellow said Friday that air tests Thursday in two federal buildings in lower Manhattan - 290 Broadway and 26 Federal Plaza - did find airborne asbestos, but that none of the samples exceeded one-tenth of the maximum level allowed in workplaces by the Occupational Safety and Health Administration.

"There's nothing at this point that indicates that business can't resume" in the Wall Street area on Monday as scheduled, she added.

...

[Tests: Dust Not a Danger Here, by Dan Fagin, Newsday, 9/15/01,
<http://www.newsday.com/news/health/ny-lidust152367598sep15.story>]

10/9/01

Even as they were reassuring the public, EPA officials distributed respirators late last week to their own employees in the Federal Building. The handouts came in response to complaints from the employees of terrible air quality in the building, a few blocks from the Trade Center site.

EPA spokeswoman Mary Helen Cervantes said the masks were distributed for the voluntary use of those employees who might have respiratory ailments or who feel some temporary discomfort from the air.

...

[Asbestos Higher in Newer Test, 10/9/01, by Juan Gonzalez, NY Daily News]

1/18/02

After the World Trade Center attacks, the EPA told residents near ground zero to clean their apartments with wet rags and mops. At the same time, the EPA had its downtown offices professionally cleaned for hazardous materials.

...

Reports that the EPA's Manhattan offices had been professionally cleaned came out in a Dec. 19 conference call . . . for the EPA's regional and national asbestos coordinators, said Cate Jenkins, a senior chemist in the EPA's Hazardous Waste Identification Division. Walter Mugdan, the EPA's counsel for Region 2, told listeners, including Jenkins, that the offices had been cleaned professionally for hazardous materials.

...

[House Member Questions EPA Office Cleanup, by Christine Houghney, Washington Post, 1/18/02]

5/9/02

But Ms. Jenkins and other critics of her agency's performance have said that one of the EPA's failings was its unwillingness to urge New York to use the most-up-to-date method of asbestos testing -- a method employing electron microscopes that the EPA has used elsewhere. The city instead advised building owners to use only an older technique, in which testers search for contaminants using polarized-light microscopes that work much like ones used in high-school chemistry labs. Electron microscopes, used with computers, can detect asbestos fibers that light scopes don't reveal.

The EPA's experience with its own New York building illustrated the distinction. Just days after Sept. 11, EPA officials in lower Manhattan had their building lobby at 290 Broadway decontaminated after tests using an electron scope turned up particles of asbestos. Tests by a light scope had failed to turn up anything.

...

[AFTERMATH OF TERROR, Bureaucratic Buck-Passing Delayed Asbestos Cleanup After 9/11 Attacks, By JIM CARLTON, 5/9/02, THE WALL STREET JOURNAL]

“Potential long term health risks” admissions by EPA

Although not completely definitive, EPA started making statements to the press and in its internet postings using vague phrases like “confidence” and “assurance” and “potential health risks” after their 2/12/02 announcement to study indoor air, and particularly after the 5/8/02 announcement that it would offer free voluntary residential cleanups. Emphasis is added in the excerpts below

There are two key studies, which were conducted for EPA, which examined the effectiveness of various cleaning methods on carpets impacted by asbestos. The first found that cleaning asbestos- contaminated carpets with a hot-water extraction cleaner was most effective, reducing asbestos levels by approximately 70%. The second study again found that a hot-water extraction cleaner was most effective, producing a 60% reduction in asbestos levels in contaminated carpets.

...

However, because of the results of these studies, EPA cannot guarantee to residents that all asbestos fibers, if present, can be removed from fabric items. EPA anticipates that available cleaning methods for fabric items that were significantly impacted by dust or debris may not be sufficient to address the concerns of residents or EPA's concern for people's long term health.

...

[WTC Residential Dust Cleanup Program: Carpets, Upholstered Furniture and Other Fabric Surfaces Fact Sheet, undated, <http://www.epa.gov/wtc/factsheets/fabrics.html>]

8/16/02

EPA announced today that it will start the scheduling of testing for airborne asbestos in residences in lower Manhattan today . . . Residents living below Canal, Allen and Pike Streets may ask to have their homes cleaned and tested for airborne asbestos by certified asbestos contractors or they may ask for testing alone . . .

...

Some dust from the World Trade Center collapse has been shown to contain asbestos and other contaminants. EPA believes this action-oriented cleanup and testing program will reduce risk of possible long-term exposure and related health effects.

...

[WTC RESIDENTIAL DUST CLEANUP PROGRAM MEDIA & HOTLINE ADVISORY Asbestos Testing to Start Immediately; Deadline for Assistance Requests Extended, 8/16/02, <http://www.epa.gov/region02/news/2002/02080.htm>]

9/4/02

Mears, the EPA spokeswoman, conceded that the HEPA vacuuming and wet extraction the agency is offering will remove only 60% to 70% of asbestos fibers.

...

[A Toxic Legacy Lingers as Cleanup Efforts Fall Short, By Maggie Farley, Los Angeles Times, 9/4/02]

8/16/02

[EPA press release]

EPA announced today that it will start the scheduling of testing for airborne asbestos in residences in lower Manhattan today . . . Residents living below Canal, Allen and Pike Streets may ask to have their homes cleaned and tested for airborne asbestos by certified asbestos contractors or they may ask for testing alone . . .

. . .

Some dust from the World Trade Center collapse has been shown to contain asbestos and other contaminants. EPA believes this action-oriented cleanup and testing program will reduce risk of possible long-term exposure and related health effects.

. . .

[WTC RESIDENTIAL DUST CLEANUP PROGRAM MEDIA & HOTLINE ADVISORY Asbestos Testing to Start Immediately; Deadline for Assistance Requests Extended, 8/16/02, <http://www.epa.gov/region02/news/2002/02080.htm>]

5/28/03

In an interview with CQ Homeland Security, Mary Mears, EPA's chief of public outreach development for New York, New Jersey, Puerto Rico and the Virgin Islands, said the risk to health was not immediate. "While the risk is low, there is still a long term health concern for residents who did not have World Trade Center dust professionally cleaned out of their homes," she said by telephone Tuesday.

. . .

[Poisons from Towers Crash Still Loose in Manhattan, Rep. Nadler Says, Calling EPA a 'Disgrace,' By Kent Vander Wal, 5/28/03, <http://www.columbia.edu/cu/libraries/indexes/cq-homeland-sec.html>]

Admission that exterior dusts responsible for "recontamination"

There are also implied admissions of hazards to occupants of buildings during EPA's program cleaning building exteriors in lower Manhattan:

The cleanup of residual dust and debris from building rooftops, facades and canopies began June 8, 2002.

. . .

The work is being done to prevent resuspension of WTC dust in the air. Facade cleaning, requiring manual lifts for lower buildings and full scaffolding for others, addresses all faces of the building, with special attention given to window ledges and setbacks. Surfaces are HEPA vacuumed, wet wiped and then given a final wash. An independent contractor is conducting air monitoring to insure that the cleanup work itself does not cause resuspension. All work is checked by both NYCDEP and EPA inspectors.

. . .

If building owners are unwilling to either clean the dust and debris themselves or allow city contractors to do the work, NYCDEP will sample the dust and if sampling finds

asbestos, the city will issue a Commissioner's Order requiring the owner to conduct the cleanup.

EPA's indoor residential dust cleaning will be coordinated with the exterior cleanup work to avoid recontamination.

...

[emphasis added] [Remaining Exterior Cleanup Work Underway, EPA fact sheet, undated, after 6/02, <http://www.epa.gov/wtc/factsheets/exterior.html>]

4/6/02

Within a few weeks, efforts will begin to clean the exteriors of hundreds of buildings around the World Trade Center site, to keep pollutants like asbestos from blowing off them and into apartments, city and federal officials said today.

...

"A lot of what we're seeing occur, and what we think is coming into apartments, may be coming, blowing in with the wind," said Christie Whitman, the Environmental Protection Agency administrator. "While the streets were cleaned up, the outsides of the buildings themselves were not cleaned up."

...

[emphasis added] [Cleaning Set for Exteriors Near 9/11 Site By RICHARD PÉREZ-PEÑA, 4/6/02, NY Times]

After-the-fact claim of advice to use professional cleaning constitutes admission

The fact that EPA falsely claimed after-the-fact that it recommended professional cleaning, discussed later in this report in Section E, also constitutes an implied admission of hazard. EPA did not make any recommendations for professional cleaning, which is easy to demonstrate by the written record. Nonetheless, the claim that this recommendation was made strongly implies a recognition of hazard.

FEMA grants to professionally clean apartments constitutes finding of hazard

An implicit finding that residents were being exposed to hazardous materials in their residences, and during any do-it-yourself cleanups, comes from FEMA. FEMA provided grants to individual residents to either relocate or have their apartments professionally cleaned. This FEMA action was on 10/17/01, a little over one month from the disaster. This was long before the EPA voluntary cleanup program was announced on 5/8/02.

10/17/01

Residents affected by the Sept. 11 WTC attack who receive a check for rental assistance may use the funds for cleaning if it will solve their housing needs.

"People may use their assistance checks to meet needs specific to this disaster," said Michael Cosbar, a housing officer for the Federal Emergency Management Agency (FEMA). "That means giving people the option to decide what makes the most sense for them - either cleaning their homes and apartments to move in more quickly or finding someplace else to live."

Anyone who receives a check for temporary rental assistance will also receive a letter clarifying how to use the check. The letter explains that the assistance check may be used for housing-related expenses other than rent if the occupant believes the amount of the check will be sufficient to meet housing needs. Those who use the check for purposes other than rent, such as cleaning, will not be eligible for additional rental assistance.

[Options for Using Your FEMA Rental Assistance Checks, 10/17/01, <http://www.fema.gov/diz01/d1391n32.shtm>]

If you were affected by the World Trade Center attack and receive rental assistance from the Federal Emergency Management Agency (FEMA), you may use the funds to clean your residence.

"We're giving people the option to decide what makes the most sense for them either cleaning their dwellings or finding someplace else to live," said Michael Cosbar, FEMA housing officer. Instead of using the check to rent another place, renters can use the funds to clean their residences.

...

[Assistance for cleaning your apartment, FEMA Disaster Assistance Guide, 11/2/01, Issue No. 2, New York, http://www.fema.gov/pdf/rt/2001_ny_2.pdf]

FEMA does not explicitly state concerns over hazardous materials, but the record shows that FEMA had already been participating in meetings with EPA and NYC officials over the indoor asbestos contamination and cleanup problem.⁵

FEMA IG final report – "residential cleanup programs should have begun earlier"

The program to test and clean residences in lower Manhattan did not commence until months after the disaster. Although FEMA has the responsibility to coordinate recovery from presidentially declared disasters, FEMA must depend on the particular expertise of EPA in circumstances involving possible air contaminants or environmental hazards. EPA must confirm that such hazards constitute a public health and safety threat before FEMA can provide funding for emergency response. FEMA should be more proactive in requesting EPA to conduct necessary testing and/ or studies to determine if a public health or safety threat exists in future, similar disasters so that cleaning efforts can begin much earlier in the recovery phase. FEMA also should address the roles of State and local agencies in such circumstances, as consultation with these agencies would provide useful information in review or evaluation.

...

[FEMA's Delivery of Individual Assistance Programs: New York - September 11, 2001, dated: December, 2002, p. 31, <http://www.fema.gov/ig/iaprograms.shtm>]

FEMA IG draft report says that legislation is needed so FEMA would have power to force EPA to do indoor testing

The FEMA IG draft report contained a direct criticism of EPA for not conducting testing of inside residences earlier. It called for legislation to change the Federal Response Plan (FRP, the authority under the Stafford Act which authorizes FEMA activities) so that it could force EPA to conduct indoor testing for hazardous substances.

However, EPA was critical of this finding, and the FEMA IG removed it from their final report. The statement in the draft FEMA IG report was as follows:

Despite FEMA's and EPA's apparent regulatory and legislative authority to act, their actual roles and responsibilities were not defined early on in the recovery effort. To avoid this ad hoc approach in the future, FEMA, in conjunction with EPA, should amend the Federal Response Plan, authorizing FEMA to direct EPA to conduct testing and cleaning of residences for hazardous materials during similar disaster recovery efforts.

...

[FEMA's Delivery of Individual Assistance Programs: New York - September 11, 2001, dated: December, 2002, Appendix H, EPA's comments on FEMA IG draft report, which reiterated the language in the draft FEMA IG report, p. 68, <http://www.fema.gov/ig/iaprograms.shtm>]

The final FEMA IG report instead states the following:

The unparalleled terrorist events of September 11, 2001, in New York City resulted in catastrophic physical damage and loss to the business and residential infrastructure in the lower part of the Borough of Manhattan. The majority of individuals affected by this disaster required assistance to address economic losses, the possibility of air contaminants in residences, and crisis counseling. Because the Federal, State, and local governments had never before experienced some of the consequences of this kind of event, FEMA re-examined its authorities under the Stafford Act and updated, as necessary, its interpretations for administering applicable programs. The authorities of the Stafford Act are not necessarily sufficient to meet all needs or demands but Congress did not intend for FEMA to return all disaster victims to their pre-disaster status. *[emphasis added]*

...

[FEMA's Delivery of Individual Assistance Programs: New York - September 11, 2001, dated: December, 2002, p. 7, <http://www.fema.gov/ig/iaprograms.shtm>]

Report by EPA's ORD admits hazardous exposures

A draft report issued 10/02 by EPA's Office of Research and Development contained findings which constitute admissions of at least potential, as yet undefined hazards. All of the data summarized in the EPA ORD report had been available to EPA and the public as soon as September, 2001, and the immediate months that followed. Thus, EPA cannot claim that any information in the 10/02 draft ORD report was new to them.

Except for exposures on September 11 and possibly during the next few days, persons in the surrounding community were unlikely to suffer short-term or long-term adverse health effects caused by exposure to elevations in ambient air concentrations of the contaminants evaluated in this report. These elevated concentrations were measured mostly within and very near Ground Zero, and they lasted for 1 to 3 months after September 11. . . . Exposures that were specific to the indoor environment were also not explicitly addressed in this assessment. . . . This assessment focuses on the inhalation pathway. Exposure can potentially occur via inhalation, dust ingestion and dermal contact with contaminated dust on surfaces. . . . The health assessment conducted in this study assumed that ambient air measurements were representative of long- and short-term exposures. In some cases, this could be misleading or inappropriate, particularly if indoor concentrations are higher than outdoor concentrations. It is emphasized that the evaluations in this document focus on ambient, outdoor measurements. *[Emphasis added. Note that the report carefully differentiates between ambient and indoor exposures.]*

. . .

Some additional future considerations could include: evaluating other contaminants that were measured, evaluating the indoor environment in more depth, evaluating other pathways of exposure and other exposure media such as dermal contact to contaminated dust, investigating the combined effects of exposure to more than one contaminant, conducting further toxicity testing with laboratory animals, and considering results from ongoing epidemiological studies.

. . .

After late September, indoor exposures to such dust probably warrant more concern than outdoor exposures for possible acute irritative effects or more chronic health effects, not only because of the basic nature of some constituent particles but also because of other unusual features, such as slender microscopic glass fibers with toxic materials attached to them or very fine particles composed of unusual combinations of silica coalesced with lead or other toxic materials.

. . .

However, susceptible persons (especially any pregnant women) who may have experienced extended exposures to elevated Pb levels within WTC Ground Zero work areas while not wearing appropriate respiratory protective gear or who were exposed to indoor WTC-derived dusts with high Pb loadings could possibly be at increased risk for chronic health effects.

. . .

Limited available evidence suggest the incursion of asbestos to the indoor environment. A small study which sampled the indoor environment of two apartments on September 18 showed very high indoor levels of asbestos. A larger and more systematic study which sampled in November and December of 2001 suggested that indoor levels of asbestos in dust were slightly higher near the WTC as compared to indoor levels in dust

further away. Current efforts by the EPA focus on the measurement and clean-up of residential apartments near the WTC.

...

The highest measurements of asbestos available for evaluation in this report were taken within two apartments sampled on September 18, 2001. One apartment was highly affected by the collapse of the WTC towers with completely shattered windows and dust piled throughout the apartment. The other was in a building that had little exterior damage, but had visible dust on surfaces within the building and in the apartment sampled. In the severely damaged apartment, five air measurements of asbestos ranged from 6277 to 10,620 S/mm² using the AHERA protocol. . . . The six indoor samples in the less impacted apartment exceeded the 70 S/mm² AHERA standard at levels ranging from 141 to 379 S/mm².

...

For residents, contacts with contaminated dust will occur mostly indoors where people spend the majority of their time. The health assessment conducted in this study assumed that ambient air measurements were representative of long- and short-term exposures. In some cases, this could be misleading or inappropriate, particularly if indoor concentrations are higher than outdoor concentrations. It is emphasized that the evaluations in this document focus on ambient, outdoor measurements.

...

Individuals visiting, residing, or working in buildings not adequately cleaned before reoccupation could have been subjected to repeated, long-duration exposure to many of the components from the original WTC collapse found by Lioy et al. in settled dust to the east of the WTC. Lioy et al. noted that long, narrow glass fibers in the WTC-derived dust had various potentially toxic materials attached to them and could contribute to acute short-term irritative effects and possibly to more chronic health risks.

Also of potential concern would be any extended indoor air exposures to finely pulverized building materials (e.g., calcium, silicon, iron, and sulfate) in PM particles, to PM of either fine or coarse size containing marked elevations of certain metals, or to fine PM containing usual combinations of silicon coagulated with metals or other toxic materials. Lioy et al. directed notable attention to indoor dust loadings of lead as posing potential chronic health risks. The possible contributions of certain other metals (e.g., nickel, chromium) found in settled dusts or airborne PM to irritative symptoms also need further evaluation. The discussions below for lead, nickel, and chromium contain more information on the possible bases for concern with these particular metals. The issue of potentially greater toxicity being associated with unusually increased quantities of very fine or ultrafine particles present in airborne PM also needs to be evaluated further.

...

Some newly available findings from the laboratory toxicity studies of WTC-derived dusts may offer insights into potential health responses associated with exposures on September 11 to WTC-derived materials in the initial WTC building collapse dust cloud and later exposures to WTC-particles deposited indoors. . . . These results suggest possible limited, short-term lung inflammation effects from exposures to high concentrations of WTC dust (as may have occurred mainly on September 11) or possible long-term airway hyperresponsiveness that might portend more prolonged sensitivities and irritative symptoms for persons experiencing extended high-level exposures to WTC-derived dusts indoors.

...

However, as Lioy noted, indoor exposures to lead-contaminated WTC-derived dust that penetrated indoors could continue to pose risks to individuals re-occupying buildings not

cleaned by effective decontamination procedures.

...

Some of the key conclusions of the NYCDOHMH/ATSDR final report are: . . . Some settled surface dust could become airborne if disturbed. Therefore, people could potentially inhale the asbestos, SVF, mineral components of concrete (quartz, calcite, and portlandite), and mineral components of building wallboard (gypsum, mica, and halite) found in settled surface dust of some lower Manhattan residences. Because the weight of dust present in the areas sampled was not determined, it is not possible to determine whether any particular residence had an elevated dust loading.

...

[emphasis added] [Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster, External Review Draft, 10/02, National Center for Environmental Assessment, Office of Research and Development, EPA, Publication Nos. NCEA - W - 1395, or EPA/600/P-2/002A, <http://www.epa.gov/ncea> or http://oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=36387]

The EPA ORD report was described as follows in one press story:

12/31/02

The report is titled "Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster" and was authored by the EPA Office of Research and Development in Washington.

...

According to Lowenherz, a comprehensive study should include data on indoor air tests and on contaminant levels in settled dust. The EPA report acknowledges that "evaluating the indoor environment in more depth" is one of several future areas of study.

"EPA's Region 2 office is continuing studies of indoor air," said Washington based EPA spokeswoman Suzanne Ackerman. "It was more a question of priorities, and the outdoor air was what people were most concerned about at first."

...

[EPA Report Buries a Revelation, 12/31/02, By Juan Gonzalez, Daily News]

"Forum" investigating inferior tests after 9/11 compared to other EPA sites

EPA has convened a new "forum" to investigate why EPA Region 2 used inferior laboratory test methods after 9/11, compared to the test methods that were being used by EPA Region 8 for the Libby, MT Superfund site. Convening this forum is an admission that NYC citizens were treated disparately, and worse, than other communities by EPA. This new forum is discussed in Section M.

Please see Section L for information on the refusal by Region 2 of free, superior testing methodologies from Region 8. On 9/12/01, in a conference call, Region 8 offered Region 2 free access to its superior testing facilities using electron microscopes to find asbestos in WTC fallout.

But Region 2 refused, saying:

We don't want you fucking cowboys here. The best thing they could do is transfer you to Alaska.

The following news article describes this new forum. Notice that EPA has expressed concern over being sued for using inferior test methods after the WTC disaster.

EPA OFFICES BEGIN EFFORT TO ENSURE CONSISTENT ANALYTIC METHODS

Date: March 19, 2003 -

With backing from top agency enforcement officials, EPA's research office has begun an initiative to ensure the uniformity of the agency's analytical methods across regions and program offices.

The new Forum on Environmental Measures is likely to enhance the credibility and defensibility of EPA assessments of environmental conditions in court, sources say. As a result, it is being strongly endorsed by EPA enforcement chief J.P. Suarez, in part because it would enhance the agency's legal clout and standing with the regulated community.

The effort was prompted by concerns following Region II's investigation of environmental hazards at the World Trade Center site and their consistency with asbestos measures used by EPA Region VIII in Libby, MT.

"When the agency uses different measures, then people can begin to ascribe motives, so the Administrator prompted us to look into this," according to EPA research chief and science advisor Paul Gilman. "It's hard to have credible decisions without credible data," Gilman adds and notes that enforcement officials are actively supporting the plan in part because of their need to defend environmental forensic techniques in court.

An EPA official adds "this is an effort to make the science better, to put good science out there for the regulated community to use. If it's clear what's expected and companies still ignore validated measures, then there will be less argument about going after those who are out of compliance." The agency's Office of Research & Development is poised to formalize the charter for the new group that will examine the creation, verification and validation of environmental methods and training across the agency.

. . .

EPA officials say several flaws in how some measures work in the field . . . have hurt EPA in court even though in the lab the methods were sound. "In certain management scenarios, these methods needed to be refined" to accurately measure what they were intended for, according to one EPA source.

The new group will be co-chaired by Ramona Travato of EPA's Information Office and Region II's William Muszynski. . . .

. . .

[emphasis added]

[Inside EPA Environmental Policy Alert, 3/19/03, www.insideepa.com]

E: RE-OCCUPYING AND CLEANING

– EPA and NYC DOH UNSAFE INEFFECTIVE RECOMMENDATIONS

“Did people return . . . without properly cleaning their home of WTC dust? . . . EPA’s intended message . . . Plan to address these issues in survey of 5,000 NYC residents. Survey poses 43 questions about communications received by the public and actions taken by the public. . . . may not have been effective in consistently getting public to take desired precautions before returning.” [1/27/03 EPA IG report]

False implication in IG report that EPA desired citizens to take precautions

The EPA IG report itself is creating a misconception by assuming that EPA had a desire for citizens to take precautions::

. . . may not have been effective in consistently getting public to take desired precautions before returning.

The written record shows EPA never attempted to get citizens to take any precautions other than the unsafe do-it-yourself NYC DOH guidelines for cleanup for residences and offices. These NYC guidelines state that even dust masks are unnecessary, much less HEPA respirators, for the heaviest layers of WTC dust.

EPA did not advise citizens to use professional abatement or to presume that the dust contained asbestos. This is proven beyond any doubt later in this section.

No need for EPA IG survey on whether citizens did safe cleanup of WTC dust or were adequately informed of the hazards

The EPA IG has no need for any questionnaire on what type of cleaning measures citizens used to clear their homes and offices of WTC dust and debris. The NYC Department of Health (NYC DOH) already conducted this survey. The NYC DOH survey asked if citizens even used the unsafe NYC DOH do-it-yourself guidelines, which do not even recommend dust masks, much less respirators. Less than 40% of apartments that were inhabited in December, 2001 had been cleaned using even these unsafe, ineffective protocols.

Dust and debris from the WTC were ubiquitous in lower Manhattan following the attack. Given the fears regarding safety associated with the debris, it is important to note that only 40% of residents reported their apartments had been cleaned according to the recommended methods of wet mopping hard surface floors and using HEPA vacuums on carpeting. Of those who did not report cleaning properly, 53% said they had received information regarding recommended clean up procedures. Overall, 59% reported receiving information about cleaning procedures. In addition, in households that were not cleaned according to these recommendations, many interviewees reported needing financial assistance and/or physical assistance with cleanup efforts.

...

[A Community Needs Assessment of Lower Manhattan Following the World Trade Center Attack, NYC DOH, 12/01, <http://www.ci.nyc.ny.us/html/doh/pdf/chw/needs1.pdf>]

Early EPA recommendations for cleanup did not even recommend HEPA vacuums

The NYC DOH guidelines for citizen do-it-yourself cleanups did not exist until 9/17/01. Before this date, EPA recommended simple vacuuming, not even mentioning HEPA vacuuming, much less respiratory protection.

Whitman is quoted as saying in her 9/13/01 speech in NYC as recommended the following do-it-yourself cleanup procedures, even after it was announced that some dust samples were over 1% asbestos:

9/14/01

"We're getting in there and testing to make sure things are safe," Whitman says.

"Everything will be vacuumed that needs to be, air filters (in area buildings) will be cleaned, we're not going to let anybody into a building that isn't safe. And these buildings will be safe. The president has made it clear that we are to spare no expense on this one, and get this job done."

Of the 24 dust samples the agency took in the first two days of the chaos, many contained asbestos, but only one registered levels above acceptable maximums, says EPA spokesperson Tina Kreisher. That sample, taken from very near the epicenter of the disaster in Manhattan's financial district, contained 4.5% asbestos fibers. . . .

...

For the thousands of New Yorkers who lived near the World Trade Center and have been evacuated, Whitman is offering similar advice: Vacuum everything, including air-conditioning filters, and wipe all surfaces with a damp cloth. . . . [emphasis added]

...

[Newsweek, 9/14/01, Asbestos Alert, by David France and Erika Check, <http://msnbc.com/news/629268.asp?0sp=w12b2&cp1=1>]

Documentation – EPA only recommended NYC DOH cleanup guidelines

EPA clearly and unambiguously told residents to use the lenient NYC Department of Health (NYC DOH) guidelines for cleanup for all residential and business spaces, and gave no additional recommendations. EPA never told citizens that they should use professional abatement for heavy dust layers, or to presume that WTC dust contained asbestos. EPA never told citizens that the NYC DOH guidelines were meant to apply only to spaces that had been pre-cleaned or tested for asbestos or other toxic substances by landlords.

If EPA had made such recommendations, there would be a record of it. There is not. EPA failed to produce any such documentation in response to a FOIA request. In fact, the record shows that the EPA web site, even to this very day, recommends and links to the exact same 9/17/01 NYC DOH do-it-yourself cleanup guidelines.

Testimony by EPA official states that EPA recommends NYC DOH do-it-yourself cleanup guidelines without any qualifiers

In 11/1/01 testimony before the NYC In the News Before the New York City Council Environmental Protection Committee, Kathleen Callahan, Region 2's Acting Deputy Regional Administrator did in fact recommend that citizens clean up homes and offices using the lenient NYC DOH guidelines, without any disclaimer that over a certain level or whatever, professional abatement should be used. This testimony was posted on the Region 2 website, and still is posted there today.

11/1/01

We do know that some people returning to area homes and businesses are finding dusty environments. If you find that your home or office has dust or debris from the collapse, you should follow the recommendations of the New York City Departments of Health and Environmental Protection on how to clean up properly.

...

[Statement of Kathleen Callahan, Acting Deputy Regional Administrator, Region 2, Before the New York City Council Environmental Protection Committee, 11/1/01, <http://www.epa.gov/region02/news/speeches/011101k.htm>]

EPA hotline recommends NYC DOH do-it-yourself guidelines, no professional abatement

In response to a Freedom of Information Act (FOIA) from the NY Environmental Law and Justice Project, EPA produced the following two boiler-plate direct communications with citizens who asked how to clean up apartments and offices. Note that both mention the fact that the person requesting the information either lives very near the WTC, and in one instance across the street. Despite this, EPA again recommended using the NYC DOH guidelines. There are no

statements about first making sure that the landlord has done some type of “hazardous materials clearance.” There is also no mention of some criteria like “minimal dust” or “assume the presence of asbestos.” The one phrase “should the need arise to investigate the requirements for remediation of your residence” in no way is an instruction to use professional abatement or assume asbestos at harmful levels, particularly in light of the extensive press coverage of EPA statements claiming that asbestos was not a problem.

Good Afternoon, Per our conversation this morning, below is the information we discussed earlier today including web pages to enable you to obtain additional information. Since you work very close to the World Trade Center (WTC), it is important to discuss the effects of both the ambient (outside) and indoor air quality on the health of you and your family. ... presentation made by the Acting Deputy Regional Administrator, Ms. Kathleen Callahan, on November 1st. . . .

Indoor Air Quality (IAQ)

The EPA does not have jurisdiction or oversight of indoor air quality or indoor cleanups. New York City (NYC) has the primary authority and responsibility for re-occupancy of buildings and health issues.

Since you work very close to the WTC it is important that the recommendations of the New York City Department of Health (NYCDOH) and the New York City Department of Environmental Protection (NYCDEP) on how to clean up be followed. ...

The NYCDOH fact sheet on the internet (<http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>) contains recommendations for people reoccupying commercial buildings and residents re-entering their homes. Should the need arise to investigate the requirements for remediation of your residence, the NYCDEP has compiled a list of asbestos investigators, remediation contractors and air monitoring firms.

. . .

*[boiler-plate form follow-up letter from Region 2 to residents who inquired. Unknown date, but at least after the 11/1/01 speech by Callahan.]*⁶

SUBJECT: Response to and EPA Inquiry -

Good Afternoon,

Your e-mail request of October 10 to the US Environmental Protection Agency ... In your e-mail you stated that you are concerned about asbestos levels inside the building where your husband works. Since your husband works across the street from the World Trade Center it is important that the owner/manager of the building follow the cleanup guidelines in the September 16 City of New York Public Notice... In addition, the New York City Department of Health has a fact sheet on the internet (<http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>) that contains recommendations for people re-occupying commercial buildings and residents re-entering their homes.

. . .

[The reference to the 9/16/01 NYC notice says owners need only address “possible contamination” in common areas, and not any “possible contamination” in privately occupied tenant spaces. See Section E of this report for an abstract of the 9/16/01 notice.]

*[Region 2 response to email, dated at least after 10/10/01]*⁷

EPA website still advises citizens to use the NYC DOH do-it-yourself cleanup guidelines

By 10/3/01, the EPA WTC web pages were instructing citizens to use the NYC DOH do-it-yourself cleanup guidelines, and directly linked to them. At no place on the EPA website did EPA give any qualifications to their recommendation to use the NYC DOH cleanup methods, such as if the dust was heavy, use a professional contractor, or assume that it contains asbestos.

Possibly because of fear of liability, the EPA web site still directs citizens to use the NYC DOH guidelines, and provides a direct link to them. If the facts in a matter are the same before and after, changing course or changing recommendations is suspect, and can provide a basis for litigation. Any deletion of this advice to use the NYC DOH guidelines would be an admission by EPA that the original advice was unsound. Perhaps for the same reasons, the NYC DOH still posts their original 9/17/01 do-it-yourself cleanup guidelines.

On 1/13/02, a major news article appeared in the St. Louis Dispatch, syndicated by more than a hundred other print newspapers, as well as being carried by television. This article noted specifically that the EPA web site was still directing citizens to the grossly inadequate NYC DOH cleanup guidelines. An EPA spokesperson denied that the EPA website directed citizens to the NYC DOH guidelines, and falsely claimed that EPA had removed the recommendation and linkage to the NYC DOH guidelines:

1/13/02

The EPA and the state and city told residents who knew they had asbestos to "mop it up, wash it down and throw it away" and "avoid inhaling dust while doing so."

But throughout the nation, asbestos removal is intensely regulated by state and federal law. The laws, which carry steep penalties, demand that the cleanup be done by personnel wearing special respirators, full head-to-toe protective suits and gloves, and the waste disposed of only at authorized sites.

The EPA and New York health departments point fingers at each other as the source of the misleading information.

Bellow admits that the EPA's web site linked to incorrect guidance for office and apartment landlords and renters.

"It wasn't our information. It was from the (New York) state or city health department, and we removed it from our Web site last month," the spokeswoman said. "Obviously, our asbestos program was overwhelmed by a catastrophe of this magnitude. We are usually only concerned with asbestos from renovations and building demolition."

However, a check of EPA's web Saturday found the same links were being used.

...

[emphasis added] ["NY officials underestimate danger" by Andrew Schneider, 1/13/02 St. Louis Post-Dispatch. Updated by the St. Louis Dispatch on its anniversary date, 1/13/03, under a new title, "World trade center attack asbestos health threat" and can be found at www.stltoday.com]

I was working closely with the reporter who wrote the article above, and was able to correct the misinformation that EPA was telling the journalist. My 1/11/02 memorandum, distributed just prior to the Andrew Schneider article said:

To this date, EPA still recommends the unsafe and ineffective cleanup recommendations of the NYC Department of Health (NYC DOH). The EPA web page from early October until this present day specifically states that schools, businesses, and residences should be cleaned using the NYC DOH methods. Not only are these methods ineffective, they are also unsafe to those who follow them, as detailed in my December 3 and 19, 2001 memoranda. . . . *[Jenkins' 1/11/02 memo]*

Check it out for yourself. Use the following links described in my 11/15/01 memo to find out that EPA still recommends the NYC DOH cleanup guidelines. EPA cannot claim that it was unaware of my memo, because Region 2 both received and commented publically about the points in this memo.

The EPA set up web pages to give information on its involvement with the World Trade Center contamination problem and cleanup. These pages direct people to the NYC DOH lenient guidelines instead of the strict EPA national regulations.

Go to the EPA web site page titled "EPA Response to September 11" at:

<http://www.epa.gov/epahome/wtc/> *[now at www.epa.gov/wtc]*

Look at the box to the right *[now on the left side]* on the web page which has active links. Look under "Data Tables" and choose the link titled "Asbestos in Bulk Dust." Bring up that page.

You will see a map of Manhattan with green dots *[now the dots are red]* for the different locations where EPA tested for asbestos. Click on any one of the green *[red]* dots. On the page that comes up, you will then see the following statement by the EPA:

"If dust or debris from the World Trade Center site has entered homes, schools or businesses, it should be cleaned thoroughly and properly following the recommendations of the New York City Department of Health."

An active link is then provided by EPA to the NYC DOH web page which provides their lenient guidelines. This link goes to the following web site:

<http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>
. . . *[Jenkins' 11/15/01 memo]*

In my personal opinion, EPA's IG office should be investigating why EPA denied that they were still directing citizens to use the NYC DOH guidelines through their web site, claiming they had removed the links when they had not.

The FEMA website also still posts nearly identical unsafe cleanup guidelines for citizens.

The FEMA website also still posts its original unsafe do-it-yourself guidelines which are almost identical to those of the NYC DOH. This is the web address:
<http://www.fema.gov/diz01/d1391n24.shtm> .

Like EPA and the NYC DOH, FEMA provides no qualifiers to this do-it-yourself advice, like hiring a professional contractor for more than minimal dust, or assuming the dust contains asbestos. The FEMA website, like EPA's, does announce the voluntary free cleanup for residents, but that is immaterial.

“We recommended professional cleaning for heavy dust” – EPA's 1st defense

EPA has claimed after-the-fact that they had recommended professional abatement whenever there was “more than a minimal amount of dust.” This is untrue.

Administrator Whitman's claims that professional abatement was recommended

The following is from a 2/22/02 letter from Administrator Whitman to Congressman Nadler:

In regard to your concern that EPA guided residents to the New York City Health Department for direction on cleanup of homes, this was appropriate since traditionally, the health agencies make recommendations to the public on health-related issues. Our Agency also advised residents in frequent public appearances, press releases, and phone conversations on our 24-hour hotline, that if they had more than minimal dust they should hire a certified asbestos cleanup contractor. For those with only minimal dust, EPA also continued to recommend wet wiping, mopping, and HEPA vacuuming in these situations, consistent with what the City's recommendations. [sic]

...

[letter, 2/22/02, from EPA Administrator Whitman to US Representative Jerrold Nadler, posted on the NY Environmental Law and Justice website at www.NYenviroLAW.org]

Whitman's claims are easy to disprove, because she said that there were press releases, frequent public appearances, and phone conversations. EPA maintains an archive of all press releases from both Headquarters and the Regions at www.epa.gov. Although there are many press releases concerning the WTC, none recommend professional abatement. If EPA really did advise the public this through frequent public appearances, then there should be some quotations to that effect in the press. There are not.

And, EPA's 24-hour hotline definitely did not advise citizens to use professional abatement. Earlier in this section, quotations are given of what EPA was actually advising citizens through its

hotline. This was the information that EPA itself provided in response to a FOIA which had requested documentation of any advice to the public on cleaning. This advice said nothing about professional abatement. However, the hotline advice did recommend using the NYC DOH do-it-yourself guidelines, even for someone who lived across the street from Ground Zero.

EPA had no trouble getting any message it wanted heard and covered by the press. For example, EPA did recommend that rescue workers at Ground Zero wear respirators, even though EPA is not OSHA and did not have regulatory authority over the rescue workers. There were many press articles quoting EPA recommending respirators for the rescue workers. But there are no press articles recommending that citizens use professional abatement, except for the one found from 12/8/01, recommending it only for dust thick enough to be measured with a ruler.

Testimony by EPA's Callahan on 11/1/01 certifies that EPA only recommended the NYC DOH do-it-yourself cleanup guidelines, followed by 11/26/01 reversal claiming EPA in past had recommended professional abatement

In 11/1/01 testimony before the New York City Council Environmental Protection Committee, Kathleen Callahan, Region 2's Acting Deputy Regional Administrator recommended only the unsafe NYC DOH do-it-yourself cleanup guidelines. There were no qualifiers, such as for heavy layers of WTC dust, professional abatement should be used. This testimony is still posted on the Region 2 website.

11/1/01

We do know that some people returning to area homes and businesses are finding dusty environments. If you find that your home or office has dust or debris from the collapse, you should follow the recommendations of the New York City Departments of Health and Environmental Protection on how to clean up properly.

...

[Statement of Kathleen Callahan, Acting Deputy Regional Administrator, Region 2, Before the New York City Council Environmental Protection Committee, 11/1/01, <http://www.epa.gov/region02/news/speeches/011101k.htm>]

On 11/26/01, Callahan again said to follow the NYC DOH guidelines in her testimony. However, this time, she claimed that EPA was giving this advice only for “minimal dust.” Callahan testified as follows:

11/26/01

I want to briefly address a piece in the *Daily News* last week [*Feds, City Ignore Asbestos Cleanup Rules, Says EPA Vet*, by Juan Gonzales, 11/20/01, *New York Daily News*], which cited a scientist from our Washington, D.C. office [*Cate Jenkins, Ph.D.*] who independently wrote a memo asserting that EPA asbestos regulations apply to the cleaning of apartments and asserted that EPA waived these regulations. EPA strongly disagrees. . . . For apartments with a minimal amount of dust, EPA has recommended that people follow New York City Department of Health guidelines for cleaning. These

guidelines involve using a HEPA vacuum and a damp cloth to remove the dust. EPA has recommended that dust masks be worn during cleaning.

...

[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S. Environmental Protection Agency, Before the New York State Assembly, 11/26/01]⁸

This claim by Callahan that EPA was recommending professional abatement is specious for the many reasons:

- a. As discussed earlier, there is no evidence in the record that EPA gave that advice.
- b. Her change in testimony never translated into fact, into any actual warnings to the public to use professional abatement after her 11/26/01 testimony.
- c. Her 11/1/01 testimony that did not recommend professional abatement was posted on the EPA web site. However, her 11/26/01 testimony claiming that EPA recommended professional abatement was not posted on the web site. EPA did not want that advice by way of testimony widely distributed.
- d. The 11/26/01 testimony of Callahan appears to have changed over her 11/1/01 testimony solely as the result of criticism the scientist she mentions, myself. Callahan refers to me in the same paragraph where she claims that EPA had always been recommending professional abatement for heavy WTC dust. My 11/15/01 memo and the 11/20/01 press coverage of my memo⁹ was very critical of EPA's recommendations of the NYC DOH do-it-yourself cleanup methods. Callahan's testimony was only an attempt to refute the press resulting from this memorandum.

In 1/02 FOIA response, EPA could produce no documentation of any recommendations for professional cleaning

On 1/3/02, the New York Law and Environmental Justice Project submitted a Freedom of Information Act (FOIA) request explicitly asking for any documentation that EPA recommended professional cleaning. The FOIA requested the following:

Please provide all documents providing such recommendations or relating to EPA Region II recommendations to citizens on the use of professional asbestos abatement contractors for the cleanup of buildings in Lower Manhattan.

Please provide all documents defining what is meant by a "light dusting" from the fallout from the collapse of the World Trade Towers. . . .

The documents provided in response to the FOIA show just the opposite.

The only document even hinting at a recommendation for professional asbestos document was an internal draft. The draft did advise to the public to use professional abatement, but obviously it was never finalized and actually given to the public. If it had been finalized, a copy of it would have been available, and EPA would have produced it as part of the other documents it supplied with its FOIA response. Furthermore, there would be evidence that EPA had given it to citizens, such as a referral to it in press release or posting on the EPA web site.

There was another document supplied by EPA in response to the FOIA which referred to advising the public to use professional abatement. However, it was only an internal draft EPA document that merely claimed that EPA had recommended professional abatement for significant WTC dust layers. This document did not constitute actual advice to the public.

We have further advised people to use professional asbestos abatement contractors to carry out cleaning wherever there is more than a minimal amount of dust.

...

[DRAFT: November 27, 2001, ATTORNEY WORK PRODUCT, ATTORNEY-CLIENT COMMUNICATION, by Walter Mugdan, EPA Region 2 Counsel]

NYC DOH was delegated by EPA to advise citizens

Remember that EPA had delegated the cleanup of interior spaces to the NYC DEP and DOH. The NYC DOH was the particular entity who was active in advising citizens of what they should be doing about indoor air and indoor cleaning. EPA says as much many times. The following is a quote from Administrator Whitman. Also see Section V on the use of the National Contingency Plan and EPA's delegation of indoor issues to NYC.

2/22/02

In regard to your concern that EPA guided residents to the New York City Health Department for direction on cleanup of homes, this was appropriate since traditionally, the health agencies make recommendations to the public on health-related issues.

...

[letter, 2/22/02, from EPA Administrator Whitman to US Representative Jerrold Nadler, posted on the NY Environmental Law and Justice website at www.NYenviroLAW.org]

As reviewed in another part of this section, the NYC DOH issued several press releases directed at citizens. These press releases said to follow the NYC DOH do-it-yourself guidelines. I am told that the NYC DOH distributed large quantities of these press releases to the affected buildings in lower Manhattan for building managers to distribute. (I am also told that in least one case, the flyers were not distributed to tenants.) None of these NYC DOH press releases (or the cleanup guidelines themselves) mentioned professional abatement for heavy WTC dust accumulations, or even the word asbestos in most cases. Extensive excerpts of these NYC DOH documents are given later in this section.

These NYC DOH press releases are still posted on the NYC website. EPA claims that it also issued press releases aimed at citizens, advising them to use professional abatement for heavy WTC dust. However, there are no press releases on the EPA website that make any such statements.

It is absurd for EPA to now claim that it intervened and advised citizens to clean up in any way that differed from the NYC DOH.

NYC DOH officials deny that EPA ever recommended professional cleaning

In May, 2002, long after the time citizens had already cleaned up, EPA made statements in an Associated Press article claiming that it had recommended professional cleaning earlier. However, the Assistant Commissioner of the New York City Department of Health, Jessica Leighton, disputed EPA's claim:

But EPA officials say they also warned residents and cleaning companies that they should presume the dust had asbestos levels high enough to require professional contractors with respirators to clean up heavy deposits. "We knew that there was asbestos in the dust and the recommendation was to use professional abatement contractors," agency spokeswoman Bonnie Bellow said.

"I never heard EPA say that," said Jessica Leighton, assistant commissioner of the New York City Department of Health. "It was not the assumption we're working under."

Instead, the city said as early as Sept. 17 that residents could clean their own apartments using wet rags, mops, and high-efficiency vacuum cleaners.

Leighton said that recommendation applied only to buildings where landlords had not detected enough asbestos to require professional cleaning.

But that qualification wasn't mentioned on many Health Department press releases and fliers posted on downtown buildings.

"At the time when people were starting to get back into their homes, it was unclear," she said.

"There was no leadership from the city, state, or federal government on this." Artist Nancy Manter said she is recovering from pneumonia she developed after cleaning inches of dust from her apartment two blocks from Ground Zero.

"Cancer, of course, is a huge concern," she said. "You feel like you're not being told the truth."

...

[AP, 5/19/02 - *Dust may not settle for years over cleanup*, by MICHAEL WEISSENSTEIN]

What is interesting is the fact that the NY Times reports that this same NYC DOH assistant commissioner also cleaned her own apartment with paper towels. It would be interesting to find out whether Ms. Leighton later had her apartment professionally abated, either under the free EPA cleanup program or otherwise, or whether she had her apartment tested, either by EPA or a private firm. If she did, then she would have been doing much more than her employer, the NYC DOH, had recommended to other citizens of NYC.

Beth Kaltman, 22, a model, cleaned her own apartment using paper towels. So did Dr. Jessica Leighton, an assistant commissioner of risk and environmental communication at the New York City Department of Health.

...

[February 8, 2002, With Uncertainty Filling the Air, 9/11 Health Risks Are Debated, By KIRK JOHNSON, 2/8/02, NY Times]

EPA did not take advantage of American Lung Association program that handed out the NYC DOH do-it-yourself cleanup guidelines, gloves and non-HEPA masks to citizens

The American Lung Association (ALA) made an announcement that it would be distributing copies of the NYC DOH do-it-yourself cleanup guidelines, along with latex gloves and non-HEPA masks to 10,000 citizens in lower Manhattan. EPA would have been well aware of this effort through the AP article below. However, EPA made no attempt to intervene or participate and ask that the ALA also distribute the mythical EPA advice to use professional abatement for heavy dust.

The American Lung Association announced Wednesday it will distribute more than 10,000 cleanup kits to help people in areas near the ruins of the World Trade Center return safely to their homes.

"Going home is a fundamental step in the healing process," said Cindy Erickson, chief executive officer of the American Lung Association of New York. "Hopefully, when armed with information and tools, these New Yorkers will be ready to rebuild and resume their lives."

Each "Operation Return Home" kit will include recommendations from the city Department of Health regarding how to clean apartments affected by the Sept. 11 destruction of the Trade Center as well as a dust mask and a pair of latex gloves for cleaning.

...

*[Associated Press, American Lung Association To Distribute Cleanup Kits For Residents Near The WTC, 9/26/01,
http://abclocal.go.com/wabc/news/WABC_092601_cleanupkits.html]*

As an aside, the American Lung Association has aggressively parroted both the NYC and EPA official line that there are no long term hazards from WTC fallout. The following is a quotation from 9/26/01, saying that residents who even wear dust masks near Ground Zero, much less

respirators, are “self indulgent.”

Some experts are convinced the ash presents no long-term health hazards to citizens. Louise Leavitt of the American Lung Association's New York office feels that residents walking around with dust masks are being a little self-indulgent. 'It may make them feel better but it's not necessary or even recommended.'

...

[emphasis added] [Uneasy breathing, As the dust settles in New York, concerns linger about health risks in the air, 9/26/01, By Francesca Lyman, MSNBC, www.msnbc.com]

Cost of professional abatement prohibitive, even if EPA or NYC DOH advised it

Even if a citizen wanted to use professional abatement, the cost was too high for many. See the press articles below, as well as the many stories in Section F about citizens performing do-it-yourself cleanups.

FEMA's acting regional director, Joseph F. Picciano, said the federal government would foot the entire bill for the newly announced cleanup, but he declined to estimate the total cost. "There is no cap set on this," he said. New York's Mr. Ward estimated that the average cost for a two-bedroom apartment would be \$3,000 to \$5,000. He said the process would take two to three days.

...

[AFTERMATH OF TERROR, Bureaucratic Buck-Passing Delayed Asbestos Cleanup After 9/11 Attacks, By JIM CARLTON, 5/9/02, THE WALL STREET JOURNAL]

Many renters were forced to remove the dust themselves because they didn't have enough insurance to hire a professional. Rep. Jerrold Nadler (D-Manhattan), whose district includes Ground Zero, said the Lower Manhattan Development Corp. should make sure there is a testing and cleanup program in place.

Nadler said the federal government should pick up the tab and estimated that it would cost about \$10,000 to professionally clean the average contaminated apartment.

...

[Agency May Gauge Indoor Air Downtown, By GREG GITTRICH, NY Daily News, 2/22/02]

A number of companies clean textiles. . . . charges a minimum of \$125 a visit, \$2.50 a square foot to clean Oriental carpets and \$25 a linear foot for upholstered furniture; there is a surcharge of up to 50 percent for construction-related dust. . . . hand washes delicate and antique fabrics; figure that it will cost about \$400 to clean a queen-size quilt. Services that specialize in disaster cleanups use refrigerator-size air cleaners and industrial rubber sponges that trap soot. Maxons Restorations (212-447 6767) estimates that it could finish a 3,000-square-foot loft in three days, with a team of six to 10 employees in masks and goggles; work would include cleaning electronics, artwork, area

rugs, curtains and clothes off site, which would take several weeks. Total cost: \$5,000 to \$10,000.

...

[Cleanup Specialists, 9/20/01, NY Times]

Isolated 12/8/01 EPA advice for professional abatement, but only for “dust you can measure with a ruler”

The following is a statement by EPA in a 12/8/01 United Press International story. This is the only written documentation obtained of EPA directly communicating with any citizen that professional abatement should be used from the day of the disaster to the end of the year 2001.

However, EPA said that only dust layers that were thick enough to be measured with a ruler needed professional cleaning. This is very unsafe advice, and contradicts EPA’s current guidelines for when to use highly skilled full protective abatement for EPA’s voluntary NYC cleanup program. Furthermore, this 12/8/01 EPA statement came long after most NYC citizens had already performed the NYC DOH do-it-yourself cleanup, much too late to be effective.

12/8/01

Although the Environmental Protection Administration in Washington has issued a number of statements saying hazards were low, EPA Region II spokeswoman Mary Helen Cervantes said, "We recommend that if there is more than a minimal amount of dust in an apartment, and this is subjective, but if you can put a ruler in it, a professional contractor should be called to remove it." For minimal amounts of dust the EPA recommends following the city Health Department guidelines.

...

[emphasis added. UPI - 12/8/01 -WTC dust makes some ill, by Alex Cukan]

There is no alternative definition on the EPA website or elsewhere for either “minimal dusting” or “light dusting” of WTC fallout. EPA has not been able to produce any other criteria for what it considers to be “minimal dust,” even when required to do so by a FOIA request.¹⁰

Later after-the-fact EPA press statements claiming professional abatement recommended

As discussed earlier, on 1/3/01, the NY Environmental Law and Justice Project requested that EPA supply all documentation that it had advised citizens to use professional abatement for more than minimal layers of WTC dust. This probably put EPA on the defensive.

In a 1/12/01 press statement, EPA claimed it had been recommending all along that citizens have their spaces professionally cleaned. As seen above, there was no evidence to support this claim. This press statement cannot be construed as actual advice to the public to use professional abatement. This is because it came so long after citizens were already back in their offices and

apartments, having already performed unsafe do-it-yourself cleanups.

1/12/01

Environmental Protection Agency brass found themselves sharply at odds yesterday with the agency's proposed investigation into charges that the EPA concealed evidence of dangerous contamination at the World Trade Center disaster site.

...

At issue were assurances from EPA chief Christie Whitman and other agency officials that environmental conditions at the site were safe even as agency tests showed dangerous warning signs.

...

An EPA spokeswoman shot back that Whitman never said the area was without risk. "That's a mischaracterization of what was ever said," said agency spokeswoman Bonnie Bellow. Whitman advised rescue workers to wear respirators and people returning to homes and offices in the area to hire contractors to remove asbestos, Bellow said.

Much of the dispute has centered on the release in late October of data from earlier EPA samples that showed elevated levels of dioxins, PCBs, lead and chromium. PCBs are toxic chemical compounds believed to cause skin diseases, birth defects and cancer.

...

[1/12/02, Battle Over EPA Denials Of Dangers Downtown, NY Daily News, By RUSS BUETTNER]

The following is another isolated, long after the fact claim that EPA had always been recommending professional cleaning.

2/7/02

"We have from the start been clear that what we found on the outside was likely to have gotten inside people's apartments," Bellow says. "And if people were returning to dusty offices and homes, they could assume that that material was asbestos-containing and that they needed to get that material cleaned up using professional contractors."

...

[USA Today, Cherrise Jones, 2/7/02, ANXIETIES OVER TOXINS RISE AT GROUND ZERO, http://www.ban.org/ban_news/anxieties_over.html]

After the 2/11/02 US Senate hearing on indoor air, Mayor Bloomberg made a half-hearted statement recommending professional cleaning of apartments. But this came only after EPA had agreed to address the issue. This advice also was offered after most residents had already completed their own cleaning.

2/22/02

Mayor Bloomberg said there was little cause for worry.

"If you have an apartment down there that has not been cleaned, common sense says you should have it cleaned professionally before you move in," he said. "But the air quality is safe in downtown Manhattan."

...

Many renters were forced to remove the dust themselves because they didn't have

enough insurance to hire a professional. Rep. Jerrold Nadler (D-Manhattan), whose district includes Ground Zero, said the Lower Manhattan Development Corp. should make sure there is a testing and cleanup program in place.

...

[Agency May Gauge Indoor Air Downtown, By GREG GITTRICH, NY Daily News, 2/22/02]

“We said to presume the dust contains asbestos” – EPA’s 2nd defense

In a draft document dated 11/27/01 EPA claimed that it advised the public to presume that any WTC dust contained asbestos:

We have advised people that if they have WTC dust in their homes or offices, it may be easiest for them to simply assume that it meets EPA’s definition for “asbestos containing material” (ACM), rather than paying to test each dusted area separately and awaiting the results before taking any further action. (EPA’s Clean Air Act regulations material is asbestos-containing if it is found to have more than 1% of asbestos content.) We have been giving this advice because about one third of the WTC bulk dust samples (*not* ambient air samples) that we analyzed did meet EPA’s definition for ACM that is, they had more than 1% asbestos in the sample of dust.

... *[DRAFT: November 27, 2001, ATTORNEY WORK PRODUCT, ATTORNEY-CLIENT COMMUNICATION, signed by Walter Mugdan, EPA Region 2 Counsel]* ¹¹

There is no evidence or documents to support EPA’s claim that it instructed or advised citizens in any way to assume that WTC dust contained asbestos, and thus should be handled as a hazardous material. The same 1/3/02 FOIA request discussed earlier in this section not only requested documentation of EPA’s claim that it advised citizens to use professional abatement, it also required EPA to produce any documentation that it had advised citizens to presume that any dusts in their homes and offices “contained asbestos” pursuant to EPA regulations for “Asbestos Containing Materials (ACM)” under the CAA NESHAP. EPA was unable to produce any such documents.

There are no statements by EPA in any press articles, and there is nothing in any of EPA’s press releases from either Headquarters or Region 2 remotely referring to advice to presume WTC dust contained asbestos.

In addition, the NYC DOH never said “presume asbestos containing,” and furthermore never mentioned the “A” word at all in advisories and press releases

Remember that EPA delegated interior spaces to New York authorities. Since EPA did not say anything to the public about assuming there was asbestos, did the NYC DOH? No, they did not. They instead had their do-it-yourself cleanup standards which did not even mention asbestos. In

addition, the NYC DOH issued at least 3 other fact sheets to residents that did not even mention the word asbestos. Instead, the NYC DOH just used the word “dust.” In one place, it said it might be good to get professional cleaning “help” (not abatement) if the person felt “uncomfortable” cleaning up (but not for the purpose of preventing health risks). These NYC DOH press releases are given later in this section, along with the NYC DOH do-it-yourself cleanup guidelines themselves.

**“There were hazardous material clearance certification before re-occupancy” –
EPA’s 3rd defense for recommending NYC DOH’s do-it-yourself guidelines**

EPA proffered a third story to justify its recommendations to use the NYC DOH cleanup guidelines. EPA claimed that its referral to the NYC DOH guidelines was meant only to apply “after the building owners certify that the building is safe to re-occupy” and “building owners have already addressed the asbestos issues.” This is untrue.

Some of these questions have been raised in a memorandum written by a Dr. Cate Jenkins, an environmental scientist employed in the Office of Solid Waste in EPA’s Washington Headquarters. Dr. Jenkins makes two major assertions: . . . (2) that EPA has not given appropriate advice to those who live and work in downtown Manhattan with respect to cleaning dust from their homes or offices.

. . .

In evaluating the NYCDOH guidelines it is important to understand their express purpose, and to understand the parallel role of another City agency, the NYCDEP. DEP has been the agency responsible for providing guidance to landlords and managers of buildings affected by WTC dust. Like EPA, DEP has advised such persons to use professional asbestos contractors; indeed, DEP provides a list of certified asbestos contractors on its web site. By contrast, the DOH guidelines which Dr. Jenkins attacks explicitly state that they provide information to building occupants concerning what cleaning they may want to consider after the building owners certify that the building is safe to re-occupy. In other words, these guidelines assume that the building owners have already addressed the asbestos issues.

. . .

[DRAFT: November 27, 2001, ATTORNEY WORK PRODUCT, ATTORNEY-CLIENT COMMUNICATION, signed by Walter Mugdan, EPA Region 2 Counsel] ¹²

NYC DOH did not require hazardous material certifications or even cleanups or testing

The NYC DOH guidelines contain no requirements for landlords to test, clean, or certify that there are no hazardous materials present in rented spaces like apartments and offices. They only say that the landlords themselves need to have approved the building for re-occupancy, by some unknown process. See the language in NYC DOH guidelines below. (A longer version of the NYC DOH guidelines are given later in this section.)

9/17/01

Recommendations for People Re-Occupying Commercial Buildings and Residents
Re-Entering Their Homes

What steps should I take upon returning to my workplace or home?

If you were evacuated from a residence or workplace south of Warren Street, west of Broadway, and north of Exchange Street, and have been approved to resume tenancy by your building manager, you are advised to wear a dust mask upon entering this area to decrease the possibility of dust inhalation and throat irritation. Outside these boundaries, masks are not necessary, but may be worn for your own comfort. If there is dust present indoors, it should not be necessary to wear this mask if you follow the cleaning procedures detailed below.

...

[<http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>]

The NYC DOH re-occupancy guidelines issued on 9/22/01 say absolutely nothing about prior cleaning or testing. The only criteria for certification are structural integrity, electricity, water, and air conditioning.

9/22/01

NYC HEALTH DEPARTMENT DISTRIBUTES HEALTH RECOMMENDATIONS FOR
RESIDENTIAL AND COMMERCIAL REOCCUPATION

Over the course of the past few days, New York City Department of Health (DOH) has been distributing health recommendations to tenants and business owners in Manhattan below Canal Street who are now able to re-enter their apartments and office buildings.

...

New York City Health Commissioner Neal L. Cohen, M.D., said "The Health Department is continuing to work with federal, state, and local agencies to assess the safety of neighborhoods affected by the collapse of the World Trade Center buildings. While there are no significant adverse health risks to the general public, residents and business owners who are allowed to return to their buildings should follow Health Department recommendations to minimize exposure to dust and other particulate matter that may cause throat and eye irritation. All residents and business owners should check with their building managers or owners to make sure that their buildings are safe, and have been certified for re-occupancy."

...

Residents should check with building managers and/or owners to make sure that their buildings have been assessed and certified safe by the City of New York. This includes structural stability; and the safe operation of gas, electrical, water, steam service, heating, ventilation, and air conditioning systems.

...

[NYC DOH, 9/22/01, press release,

<http://www.ci.nyc.ny.us/html/doh/html/public/press01/pr84-922.html>]

NYC DEP 9/16/01 voluntary instructions to building owners on asbestos only applied to exterior and common areas

The NYC DEP issued a 9/16/01 notice to building owners that they should use their own judgement, but when hazardous materials like asbestos were suspected to be present, to utilize qualified personnel. However, this directive only applied to the exterior and common areas of the buildings, not to apartments and offices.

10/25/01

EPA is using the 1% definition in evaluation 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 the certified personnel.

...

[Joel A. Miele, Sr., P.E. Commissioner, NYC Dept. of Environmental Protection, letter to Residents of Lower Manhattan, 10/25/01]

10/25/01

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 the 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 with the Battery Park City Authority and owners of area buildings 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 Battery Park City passed their strict protective standards before being opened again to the public. [emphasis added]

EPA is using the 1% definition in evaluation 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. All Battery Park City 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 the certified personnel. [emphasis in the original]

...

[letter from NYC DEP Commissioner Meile to residents of Battery Park City]

9/16/01

Notice to Building Owners Located South of 14th Street, Manhattan Building

Maintenance Issues Involved in Reopening Buildings Closed Since 9/11/01

Air Circulation Systems: Building owners are advised that air circulation systems not operated since Tuesday must have their filters replaced before the system is restarted. Systems should be run on a recirculated air setting and not on fresh air, if possible, until the WTC fire is extinguished.

Asbestos or other Hazardous Materials situations: Owners/managers should have possible contamination problems, indoors or at roofs, reviewed by competent professionals (i.e., R.A.s, P.E.s, Asbestos Inspectors, etc.) prior to beginning clean-up of buildings with maintenance personnel. Where no problems are noted, proceed with clean-up. Where problems (i.e., HazMat) are noted, contact DEP as indicated below.

All issues regarding air asbestos and/or hazardous material clean-up should be directed to the Department of Environmental Protection's complaint center at 1-718 DEP-HELP (337-4357). Help center operators will refer your call to Asbestos and Hazardous Materials staff from 8:00 a.m. to 8:00 p.m. every day including weekends until such time as the Mayor's office declares the emergency over. Staff will review each case individually on the telephone and verbally approve clean-up activities—paperwork to follow. Emergency situations which arise outside of these time frames will be handled by help center staff taking down the caller's name and contact phone number and notifying personnel on stand-by who will then contact the caller directly.

...

[THE CITY OF NEW YORK Department of Environmental Protection, PUBLIC NOTICE, 9/16/01, <http://www.nyc.gov/html/doh/pdf/alerts/dust.pdf>]

The fact that these instructions only applied to common areas and the exteriors of buildings was made clear in a letter that the NYC DEP sent to landlords during the period of February to May of 2002:

Dear Sir/Madam:

In September 2001, the New York City Department and Environmental Protection [*sic, which means this is an actual reproduction of the original; the word "and" is actually in the letter, and not "of".*] (NYC DEP) and the Department of Health (NYC DOH) advised building owners regarding building maintenance and re-occupancy issues following the collapse of the World Trade Center. The steps included the professional assessment of building contamination for possible hazardous components, including asbestos, and a retrospective filing, as required, if applicable.

The NYC DEP is hereby requesting copies of the environmental hazard assessments including bulk sampling results and air monitoring results and a summary of clean-up activities at the above referenced site. Please forward the requested documents to our offices within FIVE BUSINESS DAYS. . . .

Please be advised buildings owners are responsible for the cleaning of building exteriors, grounds, and common areas. Adherence to proper cleaning methods is important for the protection of public health and the environment.

Sincerely, R. Radhakrishnan, P.E., Director, Asbestos Control Program.

[Date: 5/02, Letter made available by the NY Environmental Law and Justice Project]

Whether the NYC DEP had any legal authority to require a response to their letter, or even to do any asbestos or other hazardous material evaluation, one thing is made abundantly clear:

NYC DEP SAYS THAT LANDLORDS ONLY NEEDED TO CLEAN COMMON AREAS, AND NO HAZARDOUS MATERIAL ASSESSMENT WAS REQUIRED

NYC DEP did not inspect or enforce cleanups of even common areas or exteriors

Note the careful wording in the letter above. There was no reference to any asbestos regulations. Instead, only a general duty clause was cited, that building owners were responsible for cleaning exteriors and common areas. There was no reference to asbestos or any other hazardous materials regulations, even though the NYC Director of Asbestos Control signed the letter.

If there were any legal authority, it would have cited clearly, as we do, and are required to do, in all correspondence from EPA requesting information. Included in the references is a copy of a typical letter that my division here at EPA would send to a facility requesting information.¹³ This is the type of language necessary to illicit a response, where all legal authorities are cited.

The NYC DEP commissioner, Joel Meile, admitted that his department had taken no enforcement action in testimony on 2/11/02.

Commissioner Miele went on to say that although the City had taken the lead on indoor air, it actually placed the burden for testing and remediating indoor common spaces on the landlords and property owners. The City has made very little effort to ensure that such testing or remediation actually took place, other than issuing one "public notice" on the subject. The issue of DEP enforcement of building owner's responsibility for common areas caused a great deal of stir at the Senate Subcommittee hearing when Commissioner Miele first stated on the record that his agency had enforced the law, and then, after being heckled, admitted that it had not:

Senator [Joseph] Lieberman: You're saying that every building was tested, every building had its indoor air tested before people were allowed to go back in?

Dr. Miele: That's the city regulation. That's correct. sir. [Interruption from audience.]

[Senator Lieberman questioned another witness for a moment.]

Senator [Hillary Rodham] Clinton: . . .we had some vocal audience member who responded when you said that's city regulation. Can you sit there today and tell us that every landlord and every building complied with the city regulations?

Dr. Miele: No, I can't tell you that. But the reason for the that, in large measure, has been the fact that we've let people back into buildings, that is to clean up the buildings, and then when we're comfortable that they've got the tests, let people back in. One of the things we did to try and facilitate it was to let people get back in when we were comfortable that they had cleaned up the buildings but before they had submitted the formal permit application to us and gotten the permits from us.

A September 22, 2002 DOH press release confirms that while the City required that buildings be certified for issues such as "structural stability," no such certification was required for environmental safety. The only record of any enforcement of common space testing and remediation seen to date is a letter sent by DEP to building owners the day after the Senate hearing, requesting documentation of cleanup measures taken. Moreover, that letter informed the landlords and property owners that they are only responsible for common or public areas of buildings. And, according to some experts, the type of testing that DEP instructed building owners and managers to use would not properly detect the hazardous materials.

...

[U.S. CONGRESSMAN JERROLD NADLER, *WHITE PAPER, LOWER MANHATTAN AIR QUALITY*, Last Updated, April 12, 2002,
http://www.nyenvirolaw.org/PDF/EPA%20White%20Paper%20Final%204_121.pdf
or <http://www.911digitalarchive.org/objects/112.pdf>]

The loudest reaction came when Joel Miele, commissioner of the New York City Department of Environmental Protection, said that landlords in Lower Manhattan were required to measure contaminants inside apartments and to clean them if the levels were dangerously high. But he acknowledged that his department does not confirm that the landlords are complying.

...

[*Concerns intensify on ground zero dust*, By Fred Kaplan, *Boston Globe*, 2/12/2002]

The city took jurisdiction over indoor cleanup of residences and offices affected by the World Trade Center fallout under a disaster plan coordinated by the Federal Emergency Management Agency. The EPA took responsibility for cleaning and testing outdoor areas under the same plan.

But the setup was criticized almost from the outset. For example, EPA Administrator Christine Todd Whitman drew fire when she asserted only a week after the attacks that the air and water around Ground Zero were safe. Yet tests afterward continued to show asbestos in rooftop debris and other exterior places which testing experts say could provide new sources of contamination. Apartment and condo residents also complained of coughing, wheezing and other irritations, which medical experts have said were likely linked to their exposure to fiberglass and other airborne particulates still inside buildings. Asbestos symptoms take years to develop and can lead to asbestosis and other deadly diseases.

Meanwhile, many residents have complained the city has done little to make sure landlords clean their buildings. Joel Miele, commissioner of New York's Department of

Environmental Protection, admitted as much under questioning before a Feb. 11 hearing convened by Democrat Sens. Hillary Rodham Clinton of New York and Joe Lieberman of Connecticut. In response to a question from Sen. Clinton whether he could say every landlord and building had complied with the city's cleanup regulations, Mr. Miele responded, "No, I can't tell you that."

...

[EPA, in Reversal, to Test Homes In Lower Manhattan for Asbestos By JIM CARLTON, 5/8/02, THE WALL STREET JOURNAL]

On 2/10/03, US Representative Nadler issued a press release documenting that the NYC DEP had not received many responses to their letters to landlords asking about their abatement procedures:

DEP sent an official request for environmental quality information from building owners and managers in February 2002.

...

However, Rep. Nadler announced that the results of a Freedom of Information Law (FOIL) request submitted by Joel Kupferman of the New York Environmental Law & Justice Project show that as of last month, DEP only possesses data from 218 downtown buildings. That is out of a total of approximately 1900 buildings -- little more than 11%. They are all below Canal, Pike and Allen Streets -- the same arbitrary boundary used by EPA for its residential cleanup plan. Many of these responses are incomplete or inadequate. For building owners or managers that did not respond, DEP has not issued a single citation.

...

[NYC WORKFORCE MAY FACE SERIOUS HEALTH RISK, 2/10/03, Press Release, Representative Jerrold Nadler, http://www.house.gov/nadler/EPA_021003.htm]

The question that has not been asked is whether the NYC DOH or NYC DEP had any legal authority to force landlord cleanups specifically for hazardous materials after 9/11. This might be a good subject for a Freedom of Law request. The NCP gives the federal government the authority to do cleanups, even forced cleanups inside buildings, as discussed in Section V of this report.

Stories of re-occupy a buildings supposedly "cleared" by NYC officials

The following are accounts of citizens who re-occupied buildings after they had gone through all NYC clearance processes.

2/11/02

I live 150 yards from Ground Zero . . . I saw the plane before it hit. Our building was evacuated. It was 8 days before we knew that it was structurally sound, another few weeks before we were assured that 1 Liberty wouldn't topple on us. .. It was after the City recertified our building for reoccupancy about 6 weeks after the attack . . . From a health perspective, there has been little guidance and fewer answers.

When I first returned to our apartment, I just sat down and cried. It was a mess and we

spent 2 hours cleaning it not the dust that covered everything, thinly in some places, like when the butler in English movies goes upstairs and reopens the ballroom that has been closed for 10 years, and thickly in others, like a blanket but the French toast that had been sitting on the table since my husband and son had hurriedly left 2 weeks before. It didn't occur to us to wear masks or take off our shoes. We just needed to straighten up. Recall, in this regard, that it is the City's job to certify for structural integrity, not for environmental safety; I knew this, but didn't quite get what it meant until later.

We then began the great education process which has made downtown residents experts in products and services we never knew existed: FEMA, HEPA, OSHA. We all learned fairly quickly which were the best cleaning companies and scientific testers, but what no one, to this day, can agree on is what clean means and how to measure it.

...

[Testimony of Elizabeth H. Berger, Before the United States Senate Committee on Environment and Public Works, Sub-Committee on Clean Air, Wetlands and Climate Change. 2/11/02]

11/8/01

My name is Diane Lapson. I am a Vice President of the Independence Plaza tenant association. . . . Independence Plaza is located on Greenwich Street, about five blocks uptown from Ground Zero. . . . All of the tenants of one of our buildings were evacuated. *[around 6000 tenants in building complex]* Many seniors wound up frightened in shelters . . .

For the past two months we have spent stressed out days, sleepless nights, because of the steel cement and whatever is attached to them, is carted to the pier alongside our buildings and dropped with the force of the most violent thunder sound you can imagine . . . the use of cheap tarp tears and are discarded and the debris has not been covered. Furthermore, the debris often has been smoking, spreading toxins into our neighborhood over and over again . . . we're having our own problems trying to get the Red Cross to help us, that's another issue. But we have to keep our windows completely shut in light of the fact that the debris is right outside of our complex.

...

We're having a big problem with children who seem to have some kind of asthmatic response to what's going on .. We already had six people move from our complex that we know about.

...

Actually we had some problems, too, because our management company said that according to EPA it was very safe and so they never cleaned our terraces or you know, we've asked them to wet down the common areas, but they really have not done it . . . They say that we are actually responsible for cleaning our individual apartments, that the law says they are not responsible. As far as the outside, they said that the EPA said our environment is safe, so they're not required to clean.

...

[Transcript of the minutes of the Committee on Environmental Protection, City Council, City of New York, 11/8/01, Testimony of Diane Lapson, representing Independence Plaza North, pp. 63- 77]

Excerpts from NYC DOH cleanup guidelines and press releases

NYC DOH do-it-yourself cleanup guidelines

The NYC DOH cleanup guidelines, below, do not even recommend dust masks, much less HEPA respirators indoors, even in the most contaminated spaces. The guidelines do not say anything about the building first being “cleared” prior to coming in to use these guidelines. The guidelines begin with the following paragraph, and get successively worse as they proceed. They do not say that the building needs to be cleared first by the landlord, nor do they say that if the dust more than some undefined “minimal,” a professional contractor should be used.

These unsafe inadequate guidelines need to be contrasted with the much more rigorous, whole-building cleanup that EPA performed on one building at 110 Liberty St. in lower Manhattan. Even EPA’s stringent cleaning measures were not able to lower asbestos and lead concentrations to EPA’s benchmarks with just one cleaning, even for the apartment with what EPA called “minimal” WTC dust (no visible dust, except under baseboard heaters). See Section G for a discussion of the 110 Liberty St. study.

Recommendations for People Re-Occupying Commercial Buildings and Residents Re-Entering Their Homes

What steps should I take upon returning to my workplace or home?

If you were evacuated from a residence or workplace south of Warren Street, west of Broadway, and north of Exchange Street, and have been approved to resume tenancy by your building manager, you are advised to wear a dust mask upon entering this area to decrease the possibility of dust inhalation and throat irritation. Outside these boundaries, masks are not necessary, but may be worn for your own comfort. If there is dust present indoors, it should not be necessary to wear this mask if you follow the cleaning procedures detailed below. *[emphasis added]*

In a workplace, speak to your supervisor to see if there are special startup and cleaning procedure. In very dusty places, clean-up may be necessary before equipment can be restarted. Follow the cleaning procedures discussed below.

In your home, you should first make sure that conditions are safe. You should enter your home dressed in a long sleeve shirt and pants, and with closed shoes.

...

Follow the cleaning procedures discussed below.

I have heard that asbestos was released from the collapse of the World Trade Center. What are the health effects of asbestos?

Because some asbestos was used in the building of the World Trade Center, City, State, and Federal agencies have been collecting dust, debris, and air samples since the World Trade Center collapse. As expected, some asbestos was found in a few of the dust and

debris samples taken from the blast site and individuals working in this area have been advised to take precautions. However, most of the air samples taken have been below levels of concern. Based on the asbestos test results received thus far, there are no significant health risks to occupants in the affected area or to the general public.

In general, asbestos-related lung disease results only from intense asbestos exposure experienced over a period of many years, primarily as a consequence of occupational exposures. The risk of developing an asbestos-related illness following an exposure of short duration, even to high levels, is extremely low.

...

How should I clean the dust in my apartment when I move back in?

The best way to remove dust is to use a wet rag or wet mop. Sweeping with a dry broom is not recommended because it can make dust airborne again. Where dust is thick, you can directly wet the dust with water, and remove it with wet rags and mops. Dirty rags can be rinsed under running water, being careful to not leave dust in the sink to dry. When done, used rags and mops should be put in plastic bags while they are still wet and bags should be sealed and discarded. Cloth rags should be washed separately from other laundry. Wash heavily soiled or dusty clothing or linens twice. Remove lint from washing machines and filters in the dryers with each laundry load. Rags should not be allowed to dry out before bagging and disposal or washing.

To reduce dust recirculation, the Health Department recommends using HEPA (high efficiency particulate air) filtration vacuums when cleaning up apartments, if possible. If a HEPA vacuum is not available, it is recommended that either HEPA bags or dust allergen bags be used with your regular vacuum. If these options are not available, wetting down the dust and removing it as described above is recommended.

Carpets and upholstery can be shampooed and then vacuumed.

If your apartment is very dusty, you should wash or HEPA vacuum your curtains. If curtains need to be taken down, take them down slowly to keep dust from circulating in the air.

To clean plants, rinse leaves with water. Pets can be washed with running water from a hose or faucet; their paws should be wiped to avoid tracking dust inside the home. How can I remove dust from the air?

Air purifiers may help reduce indoor dust levels. HEPA air purifiers are superior to other models in filtering the smallest particles. Air purifiers are only useful for removing dust from the air. They will not remove dust already deposited on floors, shelves, upholstery or rugs. Keep windows closed when using an air purifier.

...

[NYC DOH, 9/17/01, <http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>]

NYC DOH press releases concerning do-it-yourself cleanup guidelines

9/17/01

HEALTH DEPARTMENT OFFERS RECOMMENDATIONS FOR INDIVIDUALS
REOCCUPYING COMMERCIAL BUILDINGS AND RESIDENTS RE-ENTERING THEIR
HOMES

...

New York City Health Commissioner Neal L. Cohen, M.D., said "As some buildings near the World Trade Center may have sustained structural damage, experienced power loss, and/or been subject to migrating dust and debris from the blast, the Health Department working with numerous agencies have been actively monitoring the condition of buildings in and around the blast area to determine when occupants may safely resume tenancy. Property owners and managers are being instructed to assess the stability and safety of their buildings. This includes checking and, if necessary, restoring utility services."

...

Recommendations for Cleaning Homes and Office Space

The best way to remove dust is to use a wet rag or wet mop. Sweeping with a dry broom is not recommended because it can make dust airborne again. Where dust is thick, directly wet the dust with water, and remove it in layers with wet rags and mops. Dirty rags can be rinsed under running water, (try not leave dust in the sink to dry). Used rags and mops should be put in plastic bags while they are still wet and bags should be sealed and discarded. Cloth rags should be washed separately from other laundry. Wash heavily-soiled or dusty clothing or linens twice. Remove lint from washing machines and filters in the dryers with each laundry load. Rags should not be allowed to dry out before bagging and disposal or washing.

Because the dust particles are so small, standard vacuuming is not an efficient way to remove the dust and may put dust back into the air where it can be inhaled. HEPA (high efficiency particulate) efficiency filtration vacuums capable of trapping very fine particles can be used. If a HEPA vacuum is not available, either HEPA bags or dust allergen bags should be used with your regular vacuum. Carpets and upholstery can be shampooed and then vacuumed.

If your apartment is very dusty, you should wash or HEPA vacuum your curtains.

[emphasis added] If curtains need to be taken down, take them down slowly to prevent making dust in the air. To clean plants, rinse leaves with water. Pets may be washed with running water from a hose or faucet; their paws should be wiped to avoid tracking dust inside the home.

...

Additional recommendations include:

- Avoid sweeping or other outdoor maintenance;
- Keep outdoor dust from entering the home;
- Keep windows closed;
- Set the air conditioner to re-circulate air (closed vents), and clean or change the filter frequently;
- Remove shoes before entering the home for several days (once you first make sure there is no broken glass).
- Air purifiers may help reduce indoor dust levels. Air purifiers are only useful for removing dust from the air. They will not remove dust already deposited on floors, shelves, upholstery or rugs.

Keep windows closed when using an air purifier.

...

[Press Release, New York City Department of Health Office of Public Affairs, 9/17/01, <http://www.nyc.gov/html/doh/html/public/press01/pr80-917.html>]

9/22/01

NYC HEALTH DEPARTMENT DISTRIBUTES HEALTH RECOMMENDATIONS FOR
RESIDENTIAL AND COMMERCIAL REOCCUPATION

...

New York City Health Commissioner Neal L. Cohen, M.D., said "The Health Department is continuing to work with federal, state, and local agencies to assess the safety of neighborhoods affected by the collapse of the World Trade Center buildings. While there are no significant adverse health risks to the general public, residents and business owners who are allowed to return to their buildings should follow Health Department recommendations to minimize exposure to dust and other particulate matter that may cause throat and eye irritation.

...

To decrease the possibility of dust inhalation, persons who live or work within the general vicinity of the blast zone - south of Warren Street, west of Broadway, and north of Exchange Street - and who have been approved to resume tenancy, are advised to wear a dust mask while outside. Dust masks are not necessary for residents in other areas. It is unnecessary to wear a mask while inside buildings as long as cleaning procedures outlined below are followed. *[emphasis added]*

...

Residents should check with building managers and/or owners to make sure that their buildings have been assessed and certified safe by the City of New York. This includes structural stability; and the safe operation of gas, electrical, water, steam service, heating, ventilation, and air conditioning systems. *[emphasis added, note no mention of cleaning]*

...

Tenants are advised to use a wet rag or a mop to remove any dust. Sweeping with a dry broom is not recommended because it may make dust airborne again.

Where dust is particularly thick tenants are advised to directly wet the dust with water, and remove it in layers with wet rags and mops.

When done used rags should be put in plastic bags while they are still wet, and bags should be sealed and discarded.

To reduce dust re-circulation, the Health Department recommends using HEPA (high efficiency particulate air) filtration vacuums when cleaning up apartments, if possible. As an alternative, wetting the dust down with water and removing it with rags and mops is recommended.

Once situated, residents are advised to avoid sweeping or other outdoor maintenance, keep windows closed, set the air conditioner to re-circulate air (closed vents), and change or clean the filter frequently.

Run hot and cold water from each of the taps for at least two minutes, or until water runs completely clean.

...

[At no place in this "fact sheet" is the word asbestos ever used.]

[NYC DOH, 9/22/01, press release,

<http://www.ci.nyc.ny.us/html/doh/html/public/press01/pr84-922.html>]

12/14/01

The collapse of the World Trade Center (WTC) caused a large amount of dust, soot, ash, and other building materials to enter into some homes in the surrounding area. Because work continues at the site, dust can still be a concern for some residents. Dust can irritate your eyes, nose and throat, and make it hard to breathe. Small amounts of asbestos may also be present in some of the dust in the downtown area. If you are cleaning up dusty areas, you can take steps to protect yourself and keep the dust from getting in the air. If the dust is beyond a minimal amount or beyond what you feel comfortable cleaning up on your own, seek professional cleaning companies to help.

...

[At no place in this "fact sheet" is the word asbestos ever used.]

*[New York City Department of Health Responds to the World Trade Center Disaster
FACT SHEET FOR CLEANING HOMES NEAR THE WORLD TRADE CENTER,
12/14/01, <http://www.nyc.gov/html/doh/html/alerts/wtc11.html>]*

Criticisms of NYC DOH do-it-yourself cleanup guidelines

The unsafe ineffective do-it-yourself cleaning methods in the NYC DOH guidelines was widely criticized by health professionals and in the press. This is why EPA made all the false claims that it had actually recommended professional certified asbestos abatement, that citizens should assume that the dust contained asbestos, and that NYC was supposed to insure that landlords had both cleaned up individual apartments and offices before allowing anybody back.

On 9/22/01, Monona Rossol, industrial hygienist with Arts, Crafts, and Theater Safety¹⁴ wrote a press release critical of the NYC DOH cleanup guidelines. This press release was co-signed by the New York Environmental Law and Justice Project.

9/22/01

Summary. Health officials may think they are doing people a favor by withholding information, but there is no reason to assume that New Yorkers will not be just as courageous in dealing with air quality issues as they have been in dealing with the disaster. Failing to provide this information can cause people to take needless risks. For example, we see footage and have witnessed workers toiling in a haze of dust without respiratory protection or protective clothing.

And the New York Times on September 20, 2001 suggests that residents can clean up their apartments with a \$3 mask and a broom. Taking actions like these can damage health and may even shorten lives in the future. Instead, methods chosen to clean homes and offices must depend on analysis of the dust and the amounts present.

...

[Downwind from Disaster, NYELJP and ACTS, 9/22/01]

10/01

DUST HAZARDS. ACTS and the New York Environmental Law & Justice Project . . . became concerned about the health of the rescue and security workers and the people who live and work in lower Manhattan. We conducted dust sampling in and around the World Trade Center . . . Analysis of our samples and reports from EPA and other independent groups indicate that some dust samples contain up to 5% asbestos and others up to 80% fiberglass. Silica, dioxins and PCBs also may be present . . .

ACTS and the NYELJP believe that proper advice about cleaning up homes and businesses can only be provided when the composition of the dust in that particular location is known. We are providing referrals to laboratories

. . .

[ACTS Facts, monthly newsletter, Arts, Crafts and Theater Safety, 181 Thompson St., #23, NYC 212/777-0062, ACTSNYC@CS.COM, www.cseweb.com/ACTS]

11/01

LAWS BROKEN . . . These regulations require [respirators, fit testing, respirator training, other protective equipment, HEPA vacuums, sealing of wastes, analysis of samples to ensure proper cleaning] . . . Apparently, the NYC DOH and the NYS DOH have decided to waive these regulations in their guidance for the cleanup of dusts. . . . EPA even refers people at its web site to the less stringent NYC DOH guidance.

. . .

[ACTS Facts, monthly newsletter, Arts, Crafts and Theater Safety, 181 Thompson St., #23, NYC 212/777-0062, ACTSNYC@CS.COM, www.cseweb.com/ACTS]

11/15/01

The mechanism EPA used to waive its own asbestos regulations was to refer parties to the extremely lenient (and arguably illegal) asbestos guidelines of the New York City Department of Health (NYC DOH).

. . .

As stated earlier, the New York City Department of Health (NYC DOH) issued special guidelines directed at "people re-occupying commercial buildings and residents re-entering their homes" after the Trade Center disaster. These may be found at the following web site:

<http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>

The NYC DOH first claims that there is no health risk, stating:

"Based on the asbestos test results received thus far, there are no significant health risks to occupants in the affected area or to the general public."

The guidelines advise wearing a dust mask, but do not specify what type of mask. The guidelines then claim "it should not be necessary to wear this mask if you follow the cleaning procedures detailed below."

The NYC DOH then recommends the following cleanup procedures. They recommend that it is only "best," not required, to use a wet rag or wet mop, or if the apartment is very

dusty, a person should wash or use a HEPA (high efficiency particulate air filter) vacuum, and to take curtains down "slowly" to keep dust from circulating in the air. Air purifiers are recommended, but no specifications are given as to the volume of air that the purifier can process. HEPA air purifiers are also recommended, again with no guidelines as to the volume of air that can be processed by the HEPA air purifier.

The NYC DOH then recommends keeping outdoor dust from entering the home by keeping windows closed, and setting the air conditioner to re-circulate air and cleaning the air conditioner filter frequently. Removing shoes before entering the home for several days and avoiding sweeping or other outdoor maintenance.

In contrast, the EPA national regulations for asbestos cleanup and removal under 40 CFR Parts 61.145 and 61.150 are extensive. They do not even allow individual residents of apartments, coops, or condominiums, or renters of commercial spaces to perform their own cleanups, potentially exposing themselves or others to hazardous exposures. See earlier discussions of the EPA regulations.

The EPA national regulations do not allow optional respiratory protection, such as the NYC DOH suggestion of wearing unspecified types of "dust masks," where the mask does not meet OSHA requirements. The suggestion of using an air conditioner to recirculate air would not be allowed because an air conditioner filter would not trap the small, harmful asbestos particles. Taking dusty curtains "down slowly" would not be sufficient under the national regulations to obviate the need for respiratory protection, which was claimed by the NYC DOH. There are too many other deficiencies of the NYC DOH guidelines to discuss here.

And, as discussed earlier, the EPA national regulations do not allow individual residents or even building owners to plan or oversee their own asbestos cleanup a trained certified professional with qualifications specified in the national regulations themselves must be responsible.

The NYC DOH guidelines are contained on only two pages with fairly large typeface. The combined EPA and OSHA regulations, recommended practices, and supporting technical documents for asbestos control and removal are contained in hundreds of pages.

... [Jenkins' 11/15/01 memo]

11/20/02

Some of the advice the Health Department has posted for people on how to remove dust in their apartments, Jenkins said, is "ludicrous." One example, from the department's Web site: "If curtains need to be taken down, take them down slowly to keep dust from circulating." "EPA regulations do not allow anyone to oversee and perform ... asbestos removal, such as a resident in an apartment building or a building owner," Jenkins said.

...

[Feds, City Ignore Asbestos Cleanup Rules, Says EPA Vet, By Juan Gonzales, NY Daily News, 11/20/01]

1/13/02

But many of the 340,000 or so people who live in the lower part of that island feel they were abandoned and, at the least, fed conflicting information by federal, state and city officials on how to avoid asbestos exposure.

...

EPA and the state and city told residents who knew they had asbestos to "mop it up, wash it down and throw it away" and "avoid inhaling dust while doing so."

But throughout the nation, asbestos removal is intensely regulated by state and federal law. The laws, which carry steep penalties, demand that the cleanup be done by personnel wearing special respirators, full head-to-toe protective suits and gloves, and the waste disposed of only at authorized sites.

EPA and New York health departments point fingers at each other as the source of the misleading information. Bellow admits that EPA's Web site linked to incorrect guidance for office and apartment landlords and renters.

"It wasn't our information. It was from the (New York) state or city health department, and we removed it from our Web last month," the spokeswoman said. "Obviously, our asbestos program was overwhelmed by a catastrophe of this magnitude. We are usually only concerned with asbestos from renovations and building demolition."

...

[NY officials underestimate danger, Reporter Andrew Schneider: Published in the A-section of the St. Louis Post-Dispatch on Sunday, January 13, 2002. Updated by the St. Louis Dispatch on its anniversary date, 1/13/03, under a new title, "World trade center attack asbestos health threat" and can be found at www.stltoday.com]

FEMA accepts EPA's after-the-fact claim it recommended professional abatement

A draft report by the Federal Emergency Management Administration (FEMA) Office of the Inspector General had been critical of EPA. It said that for 8 months, EPA said there were no hazards and thus no professional abatement or special cleaning was necessary:

For eight months, EPA took the position that no environmental cleaning was necessary.

...

[emphasis added] [draft report as reiterated in EPA's comments on FEMA IG draft. EPA's comments were attached as Appendix H to the FEMA IG final report: FEMA's Delivery of Individual Assistance Programs: New York - September 11, 2001, dated: December, 2002, p. 65, <http://www.fema.gov/ig/iaprograms.shtml>]

EPA was allowed to review a draft of the FEMA IG report, and made the following comment:

This statement is inaccurate. EPA in many public statements, beginning in September 2001, and documents indicated that residents of lower Manhattan affected by dust/debris from the World Trade Center attack should cleanup using techniques that would be effective with asbestos containing material. EPA did this because under its FEMA mission assignment to assist in assessing and cleaning lower Manhattan exterior and

ambient environs, many samples were taken of bulk dust material (approximately 135) that was in the streets of lower Manhattan. Approximately 35% of these samples showed greater than 1% of the material was asbestos. Given these results EPA recommended that, if residents had any significant levels of dust/debris in their dwellings, they should use professional asbestos abatement cleaners and presume the material was asbestos containing.

...

[EPA's comments, Appendix H to the FEMA IG final report, FEMA's Delivery of Individual Assistance Programs: New York - September 11, 2001, dated: December, 2002, p. 65, <http://www.fema.gov/ig/iaprograms.shtml>]

Without asking for any documentation from EPA, the FEMA IG made the changes requested by EPA, and throughout its final report now claimed that EPA had advised citizens to get professional abatement.

The proof that EPA did not recommend professional cleaning for asbestos or other hazard abatement, or that EPA did not say to assume that WTC fallout contained asbestos, was given earlier in this section.

Motivation for FEMA accepting unsubstantiated EPA claims

Why did FEMA make the change EPA wanted, without requesting any documentation from EPA? The reason that the FEMA IG report adopted EPA's claims could be this: FEMA itself had almost the identical, unsafe do-it-yourself guidelines for citizens to clean apartments and offices of even the heaviest layers of WTC dust. These FEMA guidelines are still posted on the FEMA website today.

Thus, FEMA is as liable as EPA and the NYC DOH for needlessly exposing citizens to extremely high levels of toxic materials, unprotected, in those first critical months after the disaster when people were returning home.

Excerpts from FEMA do-it-yourself cleanup guidelines

The following are excerpts from the FEMA do-it-yourself cleanup guidelines. They are almost identical to the NYC DOH guidelines, which were quoted earlier in this section.

Disaster Officials Offer Cleanup Tips For Affected WTC Victims

...

How should I clean the dust in my apartment when I move back in?

The best way to remove dust is to use a wet rag or wet mop. Sweeping with a dry broom is not recommended because it can make dust airborne again. When dust is thick, you can directly wet the dust with water, and remove it in layers with wet rags and mops.

Dirty rags can be rinsed under running water, being careful to not leave dust in the sink to dry. When done, used rags and mops should be put in plastic bags while they are still wet and bags should be sealed and discarded. Cloth rags should be washed separately from other laundry. Wash heavily soiled or dusty clothing or linens twice. Remove lint from washing machines and filters in the dryers with each laundry load. Rags should not be allowed to dry out before bagging and disposal or washing.

To reduce dust recirculation, use a HEPA (high efficiency particulate air) filtration vacuum when cleaning up apartments, if possible. If a HEPA vacuum is not available, it is recommended that either HEPA bags or dust allergen bags be used with your regular vacuum. If these options are not available, wetting down the dust and removing it as described above is recommended.

Carpets and upholstery can be shampooed and then vacuumed.

If your apartment is very dusty, you should wash or HEPA vacuum your curtains. If curtains need to be taken down, take them down slowly to keep dust from circulating in the air. To clean plants, rinse leaves with water. Pets can be washed with running water from a hose or faucet; their paws should be wiped to avoid tracking dust inside the home.

How can I remove dust from the air?

Air purifiers may help reduce indoor dust levels. HEPA air purifiers are superior to other models in filtering the smallest particles. Air purifiers are only useful for removing dust from the air. They will not remove dust already deposited on floors, shelves, upholstery or rugs. Keep windows closed when using an air purifier. Additional recommendations include:

Keep outdoor dust from entering the home;

Keep windows closed;

Set the air conditioner to recirculate air (closed vents), and clean or change the filter frequently;

Remove shoes before entering the home for several days (once you first make sure there is no broken glass);

Avoid sweeping or other outdoor maintenance.

...

The Red Cross is providing cleaning supplies to the affected areas to assist residents as they attempt to clean their homes and return to a daily routine. In addition to distributing traditional clean-up kits, which consists of a mop, broom, bucket, rubber gloves and bleach/disinfectant, additional cleaning supplies will be available for use by the residents. They include dust caps (surgical type), dust masks, shoe and boot covers, lip moisturizer, large trash bags and liquid instant hand sanitizer.

...

[10/9/01, <http://www.fema.gov/diz01/d1391n24.shtm>]

Use of NESHAP cleanup methods, even if regulations not legally binding

The National Emission Standards for Hazardous Air Pollutants (NESHAP's) for asbestos under the Clean Air Act are regulations that require certain work practices, testing, and permits for cleaning up asbestos.¹⁵ They only apply legally to the intentional demolition and renovation of commercial buildings, or apartments with 10 or more units. States and cities may have additional regulations, however, that could address additional situations.

The EPA IG report of 1/27/03 stated the following, faulting the government for not obtaining formal waivers under the NESHAP:

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

...

[I]ndications are that NYC/DDC did not obtain a NESHAP waiver before demolition, and it appears no adsorbent agents were added to water sprayed on buildings; (adsorbents make water stickier), further ensuring asbestos particles do not become airborne. Also, there was a problem, particularly in the early weeks of the response, in getting trucks to stop and be wetted down before they transported asbestos-containing debris from the site. . . . [1/27/03 EPA IG report]

It is debatable whether the NESHAP regulations apply to anyone other than the owners of the property. The only person we know of responsible for the intentional demolition of the World Trade Towers is Osama bin Laden, but he didn't own them. The US government, in cleaning up the debris, was not involved in a demolition, but perhaps could be argued to be doing renovation work by removing the debris..

The NESHAP is not a funded regulation like CERCLA (which includes the NCP). The owner of a building is expected to pay all associated costs and obtain all necessary permits. If the government comes in to remove debris from Ground Zero, or a tenant wants asbestos removed from their own apartment, they would not be required to get a NESHAP permit or a NESHAP waiver. Local ordinances may require asbestos abatement contractors themselves to get permits, but not the renter.

EPA has issued guidance on how to manage asbestos releases in catastrophic situations.¹⁶ The situations given as examples in this guidance included a Con Edison asbestos-lined steam pipe explosion in Gramercy Park, NYC, where residents were forcibly evacuated from apartments for a government coordinated cleanup, where whole apartment buildings were wrapped in Tyvek® sheeting and cleaned at one time. See the extensive endnote in this report which describes this incident. Other situations included Hurricane Hugo and the San Francisco earthquake. A range of statutory authorities is discussed, including but not limited to the CAA NESHAP for asbestos. The use of CERCLA (which includes the NCP) when a federal response is required in a disaster is discussed. Any federal response would not be under the NESHAP, but instead under the NCP.

Applicability of NESHAP work practices, if not regulations

It is generally recognized that the work practices specified under the NESHAP should at a minimum be used in remediating any asbestos release, even if the NESHAP regulations are not legally applicable. Work practices include things like wetting down all friable asbestos contaminated materials before removal or using some equally protective technique, air testing, use of proper protective equipment like HEPA respirators, etc.

My 11/15/01 memorandum stated that EPA had essentially waived the NESHAP regulations for the WTC disaster. In hindsight, it might have been better to have said that EPA had waived the tested asbestos abatement protocols established through the NESHAP regulatory and guidance system. EPA responded as follows to my memorandum:

11/26/01

I want to briefly address . . . a memo asserting that EPA asbestos regulations apply to the cleaning of apartments and asserted that EPA waived these regulations. EPA strongly disagrees. The Agency did not waive any requirements. The regulations cited apply to facilities being demolished or renovated. These regulations were clearly not intended to address acts of terrorism, nor to cleaning up dust from apartments and offices. In fact, the requirements could not be reasonably applied to such spaces. Under EPA's regulations, materials must be completely soaked. Obviously, soaking carpets, couches, stereo equipment and other belonging would damage them and might make it harder to completely remove the dust.

. . .

[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S. Environmental Protection Agency, Before the New York State Assembly, 11/26/01. ¹⁷

By this testimony, EPA is falsely claiming that the work practices under the NESHAP would have required wetting down personal belongings. There is a whole system of guidance under the NESHAP which specifies work practices to abate a range of objects, including household furnishings, which do not require wetting them down. Certified asbestos abatement professionals routinely use these techniques and obtain waivers pursuant to NESHAP procedures from any requirements for the baseline wetting down of all surfaces prior to removal and disposal as asbestos containing wastes. The wetting down process only applies to the disposal of wastes under the NESHAP, not to the abatement of objects which will be retained.

A day later, an internal EPA document did admit that the NESHAP regulations did not require soaking all materials with water.¹⁸ The new argument was proffered that it would be impossible for EPA or the NYC DEP to approve the paperwork for the standard waivers for other procedures, like HEPA vacuuming, etc. All these rationales by EPA are a ruse to get around the fact that EPA's recommendations to use the NYC DOH do-it-yourself guidelines are both unsafe and ineffective.

11/27/01

We have been asked to respond to questions that have been raised about whether certain federal Clean Air Act regulations are applicable to the cleaning of apartments and office spaces that have dust from the World Trade Center collapse.

Some of these questions have been raised in a memorandum written by a Dr. Cate Jenkins, an environmental scientist employed in the Office of Solid Waste in EPA's Washington Headquarters. Dr. Jenkins makes two major assertions: (1) that these regulations apply to the cleaning of apartments and offices, and that EPA has waived these regulations . . .

. . .

- The regulations in question were not intended to address acts of terrorism, nor any broad-scale contamination that may ensue from such acts. The regulations she cites apply to owners and operators of a facility carrying out a “demolition” or a “renovation” where those activities will cause the disturbance or removal or more than a specified amount of asbestos-containing material. Whether or not the cleaning of apartments and offices could be interpreted to constitute “renovation” as that term is defined in the regulations can be debated. What is clear, however, is that the instructions in those regulations for how to remove and handle asbestos-containing materials during a “renovation” are generally not practical for or germane to the task of cleaning residential and office space of WTC dust that may contain relatively small amounts of asbestos.

. . .

- By contrast, the instructions in the EPA demolition/renovation regulations would *not* be either helpful or germane to the problems faced by residents and workers in downtown Manhattan. These regulations require that when ACM is to be disturbed during a demolition or renovation activity, it must first be thoroughly wetted down before removal. This would be completely impractical in homes and offices, where dust has covered papers, files, clothing, bedding, carpeting, upholstery, and so on. Soaking all such items with water would destroy the very items that people are trying to clean and protect. And it would make it much harder perhaps even impossible to then remove the soaked dust from those items; the items themselves would probably have to be discarded. Imagine what would happen if you had dust on your carpet, or on your sofa, and then soaked it with water before trying to scrape up the dust; it wouldn't work. Moreover, much of the dust was actually pulverized concrete, which might pose even larger problems if it were soaked with water. In short, advising people to follow the instructions in the NESHAPs demolition/renovation regulations would be unhelpful even absurd and we can be sure such advice would not be followed.
- Under the NESHAPs regulations, a person carrying out a demolition or renovation may, with EPA's prior approval, remove ACM without first wetting it, if the person can demonstrate that wetting the ACM would “unavoidably damage equipment” But even if EPA grants such approval, there are alternate requirements in the regulations that are impractical for an apartment or office space (*e.g.*, specially designed ventilation and particulate collection systems). Moreover, it is unrealistic to think that each resident, building or office manager in downtown Manhattan could have made a written request for such approval from EPA, with full supporting documentation; or that EPA could meaningfully evaluate such requests.

- ...
- Note: There are some situations in which the demolition/renovation regulations *would* apply to buildings affected by the WTC disaster. For example, if a building was damaged in the disaster, and will be renovated before being re-inhabited, the rules would apply if there is asbestos in the building, in quantities exceeding the regulatory threshold, in the area(s) to be renovated.

...

In summary, EPA has given consistent, practical and protective advice to residents and workers in downtown Manhattan with respect to cleaning their spaces. The federal demolition/renovation regulations were designed for completely different circumstances, and indeed have only limited value as guidance in this unprecedented situation. EPA has certainly not “waived” these regulations; but EPA has properly looked beyond the regulations in providing good advice.

...

[DRAFT: November 27, 2001, ATTORNEY WORK PRODUCT, ATTORNEY-CLIENT COMMUNICATION, signed by Walter Mugdan, EPA Region 2 Counsel]

F: STORIES OF CITIZENS

The following are excerpts of news reports of citizens attempting to clean up WTC dust themselves, problems citizens have with breaking leases when they try to move away from the pollution, and health problems.

The problem with not being able to break leases and move away from the contaminated zone is an important issue. Since 9/11/01, I have heard many other stories like this first hand, because citizens would try to get me to testify on their behalf, which I could not as a government employee.

9/12/01

"Mountains of soot tore through the city's narrow downtown streets like giant tornadoes, blanketing everything in an inch or more of dust as office workers tried desperately to race ahead of the wave. Day turned into night -- and then into hell -- as the wave enveloped thousands of people. An unknown number may have suffocated. 'A lot of the vehicles are running over bodies because they are all over the place,' said Emergency Medical Service worker Louis Garcia after reports indicated that bodies were buried beneath 2 feet of soot on streets around the Trade Center. Thousands of other New Yorkers, many covered in the heavy ash that rained from the top floors of the 1,250-foot towers, stood staring in disbelief as the buildings thundered to the street. In their place rose two plumes of thick gray smoke that were visible for miles, an eerie reminder that hung in the air for hours. Firefighter's Fright Firefighter Tom Boccarossa, 43, from Engine 205, was standing right outside the building when the first tower collapsed. 'I got tossed and buried,' he said . . . 'I crawled under a car. I couldn't see. It was totally black. I thought my life was over.' . . . Joel Graber had narrowly escaped the first collapse -- 'It was a black tidal wave of soot that roared down Cedar St.' -- when the second one hit . . . 'I saw people falling down, having seizures, exploding in tears.' Carol King, who works for the city's corporation counsel at 100 Church St., had just come out of the subway when she saw a wall of soot coming toward her. 'I was blinded,' said King, who lives in Queens."

. . .

[Debris & Death Drape Downtown, 9/12/01, NY Daily News]

9/23/01

Worried about potential environmental hazards, lack of services and the possibility of more attacks, hundreds of Battery Park City residents are desperate to break their leases and move far away from the remains of the World Trade Center. Some buildings are trying to accommodate their wishes. Others are not, or are unsure what to do...Cheryl Graham, 28, who is eight months pregnant with her first child, wants to avoid courtrooms even though her landlord at 400 Chambers St. is taking a hard line. She said if she and her husband break their lease, they will forfeit their security deposit and be liable for the rent until their \$4,300-a-month, two-bedroom apartment is rented again. But she doesn't want to give birth while living near Ground Zero, either. 'When you bring a baby into the world, it's not the safest, happiest area,' she said. 'For the next six months, they'll be picking up debris. I'm really concerned about air quality.'...Those issues have led to the organization of the Battery Park City Residents Association, which is trying to negotiate lease cancellations and rent reductions. They may also hire experts to study air quality

and landfill stability, according to founder Donald Scherer.

...

[Fearful Tenants Fight to Break Leases: They want out of Battery Park, 9/23/01, NY Daily News]

9/26/01

Two weeks after the catastrophic attack on the World Trade Center towers, thousands of evacuated New Yorkers are returning to nearby homes and offices, counting their blessings that they escaped the disaster. But fires still smolder downtown and crews continue to sift through the rubble and carry away debris laden with asbestos and other potential health dangers. As the dust clears, too, some residents wonder what else might be in the plume of ash and smoke that exploded over their city.

A BLANKET of gray soot an eighth-of-an-inch deep has settled on everything in their apartment, from the oversized couch decorated with pillows, to the magazine-lined coffee table and sheet music-covered piano. Dusty? "Pompeii-esque is more like it," says Diane Miller, a New Yorker who recently returned to her co-op apartment two blocks from the scene of the devastation. She rejoices that her family escaped the terrible attack and that their building still stands. "I don't want to sound ungrateful," she says. "We're alive that's what's important."

Still, like others who returned to downtown, she's concerned about what is in the dust and ash, and has decided to hire professionals to do the cleanup. With an infant, and being herself asthmatic, the family decided to even delay moving back in, despite public assurances of safety.

"Moving back into our building as fires still smolder, and as clouds of dust, several stories high, rise up when debris is lifted by heavy equipment to be removed, does, in my book, constitute a health hazard, especially for a 1-year-old baby," she says.

Miller and her husband are now researching the possibility of moving everything out, having it cleaned item by item and stored until the apartment can itself be cleaned, including the ducts.

Most New Yorkers are still in a state of shock from the terror attacks, says another resident of the financial district, Marcy Gordon, and few thought much about the air they were breathing, at least initially, she says. Now people are concerned. "For the first few days, it felt like we were breathing glass. I'd like to know what it was," she says.

...

[Uneasy breathing, As the dust settles in New York, concerns linger about health risks in the air, 9/26/01, By Francesca Lyman, MSNBC, www.msnbc.com]

10/19/01

No more than a few hours after the World Trade Center fell, the media were reporting that the north tower had contained 40 floors of asbestos, all of which was now swirling around downtown Manhattan. City health officials, the Occupational Safety and Health Administration and, most importantly, the Environmental Protection Agency, landed on the scene to conduct air-quality tests. What they did next was nothing less than astonishing: They said it was safe to be downtown.

For anyone who knows the history of these agencies, such proclamations are akin to heresy. For decades, the EPA has taken the lead in zero-tolerance policies toward any "carcinogenic" substance unlucky enough to have caught its eye--whether it be pesticides, Hudson River PCBs or asbestos. This draconian approach has served to encourage unfounded health scares, and created an environment in which people no longer make rational decisions about health risks. It has also led to the nightmare of trial lawyers, lawsuits and corporate bankruptcies.

But on Sept. 11, as with so many things, the EPA's world changed. Faced with a public health scare that could have sent thousands in Manhattan fleeing the city or jamming hospitals, the EPA decided to cough up the truth about asbestos. Its officials bent over backward to get out the message that asbestos was harmful only if breathed at high levels and over sustained periods of time. When reporters pointed out that some of the tests had exceeded the EPA's safety levels, the agency hurried to explain that this was a "stringent standard based on long-term exposure" and repeated that the public was not at any real risk.

...

The EPA Comes Clean on Asbestos Federal officials stop chasing a phantom risk. BY KIMBERLEY A. STRASSEL, Wall St. Journal, 10/19/01]

11/8/01

My name is Diane Lapson. I am a Vice President of the Independence Plaza tenant association. . . . Independence Plaza is located on Greenwich Street, about five blocks uptown from Ground Zero. . . . All of the tenants of one of our buildings were evacuated. [around 6000 tenants in building complex] Many seniors wound up frightened in shelters

...

For the past two months we have spent stressed out days, sleepless nights, because of the steel cement and whatever is attached to them, is carted to the pier alongside our buildings and dropped with the force of the most violent thunder sound you can imagine . . . the use of cheap tarp tears and are discarded and the debris has not been covered. Furthermore, the debris often has been smoking, spreading toxins into our neighborhood over and over again . . . we're having our own problems trying to get the Red Cross to help us, that's another issue. But we have to keep our windows completely shut in light of the fact that the debris is right outside of our complex.

...

We're having a big problem with children who seem to have some kind of asthmatic response to what's going on .. We already had six people move from our complex that we know about.

...

Actually we had some problems, too, because our management company said that according to EPA it was very safe and so they never cleaned our terraces or you know, we've asked them to wet down the common areas, but they really have not done it . . . They say that we are actually responsible for cleaning our individual apartments, that the law says they are not responsible. As far as the outside, they said that the EPA said our environment is safe, so they're not required to clean.

...

[Transcript of the minutes of the Committee on Environmental Protection, City Council, City of New York, 11/8/01, Testimony of Diane Lapson, representing Independence Plaza North, pp. 63- 77]

1/8/02

There was something about the air. For a while after Sept. 11, George Tabb and his wife tried to stick it out in their apartment just north of the World Trade Center, tried to ignore his twice-nightly asthma attacks and her pounding headaches.

EVENTUALLY, THEY moved in with Tabb's stepfather. But Tabb still goes home to pick up his mail, and within 20 minutes the metallic taste returns to his mouth, and the wheezing. "All of a sudden, boom, I've got a nosebleed, the asthma, a headache," he said. Recently Tabb received evidence that the air in his apartment may be as dangerous as he suspects.

Independent tests results of which are disputed by the city found that dust taken from an air vent in his apartment building's hallway contained 555 times the suggested acceptable level for asbestos. Samples from a bathroom vent show dangerous levels of fiberglass. "No one knows what was burning down there" at ground zero, he said. "I am concerned that in five years or 10 years, I'm going to be part of a cancer cluster."

...

Many of those who live or work downtown report strikingly similar symptoms: nosebleeds, sore throats, bronchial infections and an endless racking cough.

"People's airways are narrowing down," said Dr. Stephen Levin, medical director of the nationally renowned Mount Sinai I.J. Selikoff Center for Occupational and Environmental Medicine. "We have cases of new onset reactive airway disease for people who were in excellent physical condition prior to September 11th."

About one-fourth of the city's firefighters have complained of severe coughing after working at ground zero, and more than a thousand have filed notices of claims against the city. Last week four Port Authority police officers were reassigned from the site after they tested positive for elevated mercury levels in their blood.

Dozens of students at nearby Stuyvesant High School have complained of rashes, nosebleeds, headaches and respiratory infections. Three teachers have left because of respiratory problems. "I'm really concerned," said Marilena Christadoulou, head of the school's Parents' Association. "It's a concern that comes from the whole unprecedented and unknown nature of what is down at ground zero."

The EPA, which has conducted thousands of tests of Lower Manhattan's air since Sept. 11, has repeatedly assured residents that the air is safe to breathe. Doctors note that some symptoms could be caused or enhanced by stress and many will undoubtedly dissipate as the last smoldering fires go out and the air grows clearer. But Levin and others fear the unpredictable effects of the combination of many dangerous substances released into the downtown air could lead to significant long-term health problems.

"Nobody knows," said Regina Santella, a professor at the Mailman School of Public Health at Columbia University and director of the National Institute of Environmental Health Sciences Center. "We know what the monitoring data tells us and we know the symptoms of what people have. It's just hard to reconcile the two pieces of information."

...

[In *New York, Taking a Breath of Fear*, by Christine Houghney, *Washington Post*, 1/8/02]

1/13/02

Those continuing the recovery effort at ground zero have hundreds of environmental and occupational health specialists hovering nearby, trying to keep the workers in the pit safe and diminish future exposure to asbestos and other dangerous material.

But many of the 340,000 or so people who live in the lower part of that island feel they were abandoned and, at the least, fed conflicting information by federal, state and city officials on how to avoid asbestos exposure.

"It's like all of us who live down here really don't matter to anyone in any government. We've pretty much been left to fend for ourselves," said Steve Swaney, who, with his wife, lived in a Battery Park apartment.

The World Trade Center, two blocks away, which once filled his view, has been reduced to a huge hole in the ground. It spews an acrid dusty stench, nothing like the time-honored bouquet of roasting chestnuts which used to permeate lower Manhattan through the fall and winter. The Swaney's patio doors were open when the buildings collapsed. Their one-bedroom apartment, like many of the 238 others in their 15-story building, was covered in dust. Those with insurance paid as much as \$10,000 to have professional asbestos crews clean their apartments, Swaney said. The landlord cleaned the rest. "But there was still dust all over the place, and we couldn't get anyone to tell us how much asbestos was still there," he said. The tenants paid to have the dust analyzed, and the dust contained levels of asbestos above 1 percent, which the EPA considers unsafe.

The landlord sent in another cleaning crew. On the streets nine floors below Swaney's balcony, men in air tanks and moon suits slowly waddle behind and beside huge gushing mobile water tanks and purring SuperVac vacuum trucks. The bizarre ballet was precisely orchestrated to wash out, suck up and capture the most minute pocket of dust from Battery Park's promenade, playgrounds, sidewalks, and even children's sand boxes in the park.

Swaney, a 58-year-old computer consultant, has a sick wife. Her ribs are sore from hours of gagging, coughing and choking from the same dust that EPA crews are so carefully removing on the street out front. He wonders why the crews working on the street are so meticulous, using special micro-filter vacuums, wearing special protective clothing and respirators.

But in his apartment, the three-person pickup band of day laborers the landlord hired used brooms, dustpans, old mops and buckets and everyday vacuum cleaners. "They didn't even have masks," he said. "My wife had to find masks for them." He wondered what government officials knew about the dust that they weren't sharing. "To those of us in the middle of this, it's obvious that there is a conscious effort not to put out the facts," said Swaney, who heads his building's tenant association. "I don't know whether it's the White House, or the governor's mansion or the mayor's office, but someone doesn't want this truth about asbestos getting out.

"They don't want to close down lower Manhattan. We're talking about a lot of money, a lot of jobs. That's OK, but is it safe to live here?" Swaney and his wife moved out of lower Manhattan. "Christie Whitman says it fine to return to our homes," he noted. "She's the EPA boss. Should we not believe her when she says our apartments are safe? But how does she know?" That's a question that many are starting to ask.

...

[NY officials underestimate danger, Reporter Andrew Schneider:Published in the A-section of the St. Louis Post-Dispatch on Sunday, January 13, 2002. Updated by the St. Louis Dispatch on its anniversary date, 1/13/03, under a new title, "World trade center attack asbestos health threat" and can be found at www.stltoday.com]

1/14/02

No pregnancy book could have prepared Dinella Ascenso for Sept. 11, or for the ominous cloud of white dust that covered her within moments of the first tower's collapse, as she watched in horror from her apartment four blocks away.

With a wet rag covering her face, Ascenso, nine months pregnant, walked from Fulton St. to her mother's house in Greenwich Village, where she stayed for the next week. On Sept. 25, she gave birth to a healthy 8 pound, 12 ounce boy with brown curly hair. But she is not at peace. "It still worries me because he is so young and I am breast-feeding," said Ascenso, whose apartment still fills with so much fresh dust that she has to wipe down every surface and clean the caked filters in the baby's humidifiers every day.

Now, researchers at Columbia University's School of Public Health and the Mount Sinai School of Medicine want to know whether Ascenso and the unknown number of pregnant women who were near the World Trade Center on Sept. 11 have cause for concern.

...

Jill Strickman-Ripps was in her third trimester when the planes hit. "I was a basket case," said Ripps, a casting director who lives in Tribeca with her husband and two young sons 12 blocks from the site. "I was consumed with fears about what we were breathing and what could be the long-term effects, which I don't think anybody knows," she said. "I still sometimes wonder, were we just being stupid for not leaving, for not getting out? "I hope they don't find anything scary," she said, adding that she's interested in signing up for the study. "They don't know a lot about what was in those buildings." Oliver Ripps weighed in at 7 pounds, 14 ounces Dec. 17. "So far he seems fine," his mother said, although she and her husband have suffered from dry throat and other respiratory discomforts.

...

[Keeping a Watchful Eye On 9/11 Babies, Docs search for toxic fallout from fires & dust, By HEIDI EVANS, NY Daily News, 1/14/01]

2/7/02

Lower Manhattan's biggest commercial landlord is raking in big profits, even though tenants are vacating its buildings and fleeing downtown in a post-Sept. 11 exodus. Brookfield Properties, owner of One Liberty Plaza and most of the World Financial Center, reported yesterday its profits increased 9.5% from a year ago \$54 million, or 30 cents a share, up from \$46 million, or 25 cents a share.

They're making these kinds of numbers by holding tenants to leases even if they didn't return to their downtown space after Sept. 11.

...

One Liberty Plaza, a 2.2 million-square-foot tower, stands across the street from Ground Zero. Immediately after the attack, some news organizations mistakenly reported it to be collapsing. In the months following its reopening, tenants have been slow to return to

One Liberty.

...

Yesterday, Brookfield chief executive Ric Clark said it was just 50% occupied, though fully leased. And all these tenants are still paying rent.

...

But Brookfield had protected itself by signing long-term leases with its tenants during the height of the recent real estate boom, analysts said. As a result, tenants are on the hook for years to come, unless they can find firms to sublease the space.

...

[Tenants Gone, Rents Remain Lower Manhattan landlord profits from long-term leases, By ERIC HERMAN, 2/7/02, NY Daily News]

2/8/02

Five-year-old Phoebe Kaufman's room was once filled with her artwork. Now all that remains is a single picture of a flower, which hangs by her bed. Her parents threw out everything else because paper is porous and might have absorbed dust from the collapsing World Trade Center towers that blasted into their Lower Manhattan apartment through an open window. No one knows whether Phoebe's artwork had become dangerous, and air tests done in that apartment building, about a block from ground zero, have shown the air to be safe. But decisions still had to be made, so everything absorbent — stuffed animals, mattresses, coats — went into the trash.

It's the floor that has the family in a quandary now. The family's insurance company said it would pay to have their old wooden floor refinished, but that idea was shot down by their pediatrician, who said that the trade center dust, perhaps containing asbestos or other hazardous materials, was deep in the floor's cracks and that sanding would throw it back into the air.

Community leaders in Lower Manhattan have estimated that about 75 percent of the roughly 20,000 people who lived within a half mile of the trade center have returned to their homes since the Sept. 11 disaster. And all of them are facing the same series of questions and choices about how to live in this altered place and how to assess the environmental risks that the proximity to a disaster site and cleanup project may entail.

This being New York, the diversity of conclusions is boundless. Some people see downtown as a toxic nightmare, a kind of Manhattan Love Canal that has permanently poisoned the area's buildings and apartments with asbestos or chemicals. Others believe the risks are overblown or nonexistent. But in another way, many residents say, the diversity of views reflects the deeper problem they face: that no answer seems certain, scientifically airtight, or obvious. Because there has been little government testing of apartments for air quality — and some tests conducted months ago have still not been published — there is no public body of facts, no set of numbers that can bestow a feeling of certainty. Some building owners have had their properties privately tested; others have not. And every test that is done becomes ammunition for one side or another — those who see great risk and those who do not. How to clean an apartment or an office that was contaminated, how to know when it is clean enough, whether to pay for expensive tests or filters, whether to worry about how well the neighbors cleaned their apartments and rooftops, are all questions that have for the most part been left to individual tenants, owners and workers.

"People have essentially been left to their own devices," said Representative Jerrold

Nadler, a Democrat from Manhattan who represents downtown, and who believes that what he calls the microclimates of downtown – the homes and offices, the personal spaces and lives of residents and workers – have been mostly neglected in the disaster response.

...

Beth Kaltman, 22, a model, cleaned her own apartment using paper towels. So did Dr. Jessica Leighton, an assistant commissioner of risk and environmental communication at the New York City Department of Health. Noreen Hennessy and her husband, Elliot Freeman, who live on Warren Street, a few blocks from the disaster site, hired professional cleaners. In the converted factory building on Broadway where Phoebe Kaufman and her family live, some people ripped up their floors. Some mopped up and vacuumed, and others never came back.

Phoebe's father, Frederick Kaufman, installed filters to cover the air ducts that connect to the rest of the building, working on the theory that dirtier air from other apartments or common areas of the building could infiltrate. He cannot say that this, like throwing away Phoebe's artwork, was a necessary step; he also cannot say, when it comes to the health of his daughter and his son, Julian, 2, that it was not necessary, either.

...

[February 8, 2002, With Uncertainty Filling the Air, 9/11 Health Risks Are Debated, By KIRK JOHNSON, 2/8/02, NY Times]

2/15/02

The first "World Trade Center syndrome" trial began this week in a cramped, overheated Manhattan courtroom. The bitter tenant/landlord dispute in civil court, before state Supreme Court Justice Douglas E. Hoffman, pits residents of 31 apartments at 80 John St. against the management company, known as WSA Management of Garden City. The residents have withheld their rent since November in an attempt to convince the management firm, led by Fred Oliver, to spend more on cleanup of the trade center dust, replace air conditioners, grant rent rebates and allow them out of their leases.

Early on, Oliver's firm did some cleaning of the building and gave tenants a one-week rebate. But in December, the firm sued the tenants for the back rent, which by this month totaled nearly \$500,000. So far, settlement negotiations have been fruitless. "We've experienced health problems, the psychological toll of witnessing the destruction and losing friends, and added financial burdens," said Cynthia Lane, the president of the 80 John Street Tenants Association.

...

"The government has taken a hands-off attitude toward the buildings, allowing the owners to set their own testing standards," Lester said. "We're hoping this case will set a precedent for the cleanup."

The trial yesterday resulted in another first: An indoor air quality specialist named Uday Singh became the first person qualified by a judge as an expert in World Trade Center dust contamination. He was testifying on behalf of the tenants. Singh said in court that on Feb. 2, nearly five months after the attacks, he found the telltale black and gray dust in several apartments, in the stairwell and on or near fans, air conditioners and other ventilation areas.

...

[Tenants vs. Landlord In WTC Cleanup Case, By Graham Rayman, 2/15/02, Newsday]

2/21/02

New York City is willing to pay people to live downtown. In an effort to help Lower Manhattan to recover from the September 11th terrorist attacks, the city is willing to cut a check to get would-be tenants to move in.

...

You've heard of programs that help people get their first homes or move into economically depressed, or blighted neighborhoods. Now, state redevelopment officials will approve a hundreds of million dollars in grants for people who move to Lower Manhattan or commit to staying there for the near future. The program has the potential for luring many residents downtown and keeping many others there.

The money is coming from the agency that oversees rebuilding downtown, the Lower Manhattan Development Corporation. Reportedly, some \$200 million dollars will be available for downtown residents, or people who move there and will stay for at least two years.

The grants are available to anyone who lives or moves below Canal Street and are tied to a residents proximity to Ground Zero. The closer they are to the Trade Center site, the more they get. Its available for rent, maintenance or mortgage payments

...

In all, this may sound like a good deal, but you have to think about this fact. A lot of people that currently live in Lower Manhattan, are still concerned about environmental issues following the attack on 9/11.

...

[WABC New York, Money For Moving To Lower Manhattan? 2/21/02,
http://abclocal.go.com/wabc/news/WABC_022102_money.html]

2/24/02

David Newman, an industrial hygienist with the New York Committee for Occupational Safety and Health, a non-profit, union-based health and safety organization in Manhattan

...

Newman maintained that widely publicized statements made after Sept. 14 and later by EPA Administrator Christie Todd Whitman downplaying any hazard influenced subsequent government response efforts as well as subsequent behavior by workers, employers, residents and landlords.

...

Landlords and employers, relying upon EPA statements, have encouraged or forced workers and tenants to return to or remain in offices and residences which, in many cases, have not been adequately tested for contaminants or appropriately cleaned or abated, Newman added.

...

Brickman said that she and her family evacuated after the attacks, but the lung problems from the fires at Ground Zero led her to keep her son in midtown Manhattan. When they returned they tried to get out of their lease but her landlord refused to let them break their lease.

"Basically, we were bombed and we wanted to leave for our safety but our landlord

wouldn't let us out and required us to pay more than \$3,000 as a penalty," Brickman said. "We have air ducts from the rooftop air-conditioning system that shower us with dust because the landlord refuses to clean the air conditioning system."

Brickman's building staged a rent strike and as a result she can leave in April and pay half of the lease penalty. She and her husband cleaned dust in common areas in their building with a broom and vacuumed their apartment with a regular vacuum cleaner. Brickman worries that after her family leaves someone moving in will open the ducts for air conditioning and dust will sift in on them because they don't know it's there.

...

"It's ironic that the Lower Manhattan Development Corp. is now offering grants of up to \$12,000 for those willing to move near Ground Zero when they just ignore the health issue of the dust, Brickman said. "People are crazy to move here and take the money, I'm appalled at how they've handled this and how it all comes down to a money and no humanity."

The Lower Manhattan Development Corp. has approved grants of up to \$500 a month or 30 percent of a rent or mortgage payment for tenants who sign a two-year lease.

...

[WTC air quality questioned at hearing, 2/24/2002, by Alex Cukan, United Press International, <http://www.upi.com/view.cfm?StoryID=24022002-032529-7986>]

5/8/02

The federal Environmental Protection Agency will lead an effort to clean up and test apartments south of Canal Street in Lower Manhattan that were fouled by the dust and ash from the destruction of the World Trade Center, a person who was briefed on the plan said.

The cleanup plan is a sharp reversal in policy by the E.P.A. and the other government agencies that led the environmental response to the disaster. For months, despite criticism from politicians and residents who said that the government was shirking its responsibilities, the agency said indoor spaces were the province of owners and residents, not the government. So most people, if only to get on with their lives, followed that guidance and did the cleanup work themselves or hired others to do so.

...

[E.P.A. to Lead Cleanup Effort of Homes Close to Ground Zero By KIRK JOHNSON, 5/8/02, NY Times]

5/9/02

"It has been totally willy-nilly as far as cleanup down there," Cate Jenkins, a veteran environmental chemist at the EPA's Washington headquarters, said in an interview. "A lot of asbestos fell through the cracks."

...

But the cleanup guidelines New York issued to building owners and residents were widely criticized as inadequate. The city recommended, for example, wiping down surfaces with a wet rag. But it didn't specify what protective gear should be worn during the cleaning or how to tell if potential hazards had been eliminated.

...

But Ms. Jenkins and other critics of her agency's performance have said that one of the EPA's failings was its unwillingness to urge New York to use the most-up-to-date method of asbestos testing -- a method employing electron microscopes that the EPA has used elsewhere. The city instead advised building owners to use only an older technique, in which testers search for contaminants using polarized-light microscopes that work much like ones used in high-school chemistry labs. Electron microscopes, used with computers, can detect asbestos fibers that light scopes don't reveal.

Some residents who have arranged for their own tests using electron scopes have found asbestos missed by light testing. At 150 Franklin St., a seven-story cooperatively owned building several blocks north of the disaster site, residents each vacuumed and wiped down their apartments, following the city's guidelines. They also swept the roof and other common areas.

...

Still, electron-scope testing last month found asbestos levels of between 1.2% and 1.8% of sampled material. One sample was taken from a third-floor elevator shaft, near a day-care center. Similar levels were found at two locations on the building's roof. Medical experts say there isn't a "safe" level of the substance, but the federal government requires asbestos removal from work sites if the level exceeds 1%.

...

[AFTERMATH OF TERROR, Bureaucratic Buck-Passing Delayed Asbestos Cleanup After 9/11 Attacks, By JIM CARLTON, 5/9/02, THE WALL STREET JOURNAL]

6/18/02

Nine months after the attacks on the World Trade Center forced the staff of The Wall Street Journal to flee its nearby offices, the paper's executives say the former newsroom is ready to reopen. But many of the reporters and editors say they are afraid to go home.

Yesterday, in a last-ditch effort to dissuade the Journal's management, a group of reporters and editors presented the paper's managing editor, Paul E. Steiger, with the results of an employee survey indicating that a large majority of the news department opposed a return to the World Financial Center. Of the 175 reporters and editors responding, 126, or 72 percent, wanted The Journal to find permanent space elsewhere.

The debate over the psychological and health effects of returning to the site of the World Trade Center's collapse has raged for months within The Journal's newsroom.

...

The most common anxiety expressed by the staff was the uncertainty over lingering health hazards. "We don't have a clue about what the real health issues are," one respondent wrote, according to a copy of the survey results obtained by The New York Times. "Why is Dow Jones making us guinea pigs?" Seventy-seven percent of those opposed to the move feared health hazards either inside the office or from sites nearby. Another 36 percent cited traumatic memories of the collapse of the World Trade Center.

In interviews yesterday, however, several reporters said some recent reversals in the company's position had undermined its credibility. On May 9, the company notified its employees that the office space met air safety tests and reconstruction was about to begin. Then, on May 21, the company told employees that construction had halted because overlooked pockets of asbestos had turned up inside the building's ducts. Finally, on June 3, Dow Jones once again told its employees that all asbestos was removed and the construction was resuming.

"That shook the confidence of some people around here," said Carlos Tejada, a Journal reporter who is researching and tracking the company's safety efforts on behalf of the staff. He has sent critical assessments of its progress to the staff. The union is also paying to conduct its own tests.

Joe Dizney, The Journal's design director, said: "The big problem is not going to be in the office. The big problem is going to be the surrounding area and there is no way around that." He added, "The prevailing winds, thank God, are from the west to the east, and we are on the water side."

...

[Some at Wall St. Journal Fear Return to Manhattan, By DAVID D. KIRKPATRICK, NY Times, 6/18/02]

6/19/02

Located one block north of the World Trade Center, the 1 million square-foot office at 100 Church St. suffered serious damage on Sept. 11. Over 500 windows were blown out, and much of the building was permeated with toxic dust. Its tenants, including the Bank of New York, Merrill Lynch and the City of New York's legal department, were forced to relocate until it was safe to return.

But when was that? According to the owner, Zar Realty Management Corp., the building wasn't ready to be reoccupied until early spring. But Allianz Insurance Co., the property's insurer, believes 100 Church was safe for tenants to return in January. The fight is continuing even though most of the tenants are now back in the building.

...

The dispute is one of the many that have erupted among landlords, insurance companies and tenants following Sept. 11 over how much cleanup work is necessary before buildings are habitable.

...

So they had to figure out the rules as they did the work, and towards the end of 2001, Zar and Allianz began to disagree over what those rules were.

...

According to the insurance company, Zar's environmental engineer, Ambient Group Inc., conducted air tests in January that failed to disclose the presence of asbestos at unsafe levels. "Thus, as of January 2002, the premises were certified as restored and ready for re-occupancy by Ambient," states a letter sent to the Insurance Department by Albert Bosch, an Allianz assistant vice president.

...

But the New York Law Department also hired an environmental engineering firm, TRC, to check on the safety of the building, and TRC came up with different results. TRC analyzed dust samples from the building's mechanical rooms and heating-and-ventilation system and found that asbestos and lead levels were unsafe. "Based on these results, TRC recommended a recleaning and encapsulation of the return-and-supply ducts and air-handling units in the building, Mr. Stein pointed out in a letter to the Insurance Department.

Then it was Allianz's turn to reinspect. The insurance company hired Lawrence Kornreich, of Enviro-Sciences Inc., to evaluate TRC's tests. Mr. Kornreich reported that TRC's tests "were based upon surface wipes and micro vac sampling tests, which are not the testing methods prescribed" by the city's Department of Environmental Protection, according to Mr. Bosch's letter. In addition, Mr. Kornreich stated that the "aggressive air

samples" tested by Ambient "were sufficient to demonstrate that the premises could be reoccupied," the letter states.

So the battle was down to dueling testing methods. Mr. Stein said it's not clear whether the contamination that TRC found occurred on Sept. 11 or whether those areas were cleaned and then recontaminated during the cleanup process. But once TRC found the dangerous dust, Zar had little choice but to clean it up, and Allianz was responsible for reimbursing the costs, he said. The air-quality tests performed by Ambient in January "were voided by the discovery of areas that were contaminated," he said.

...

*[Landlord and Insurer Battle over 9/11 Cleanup, 6/19/02, By PETER GRANT, Wall Street Journal, Special to RealEstateJournal.com,
http://homes.wsj.com/columnists_com/bricks/20020619-bricks.html]*

6/19/02

Ariel Goodman, already afflicted with asthma, has an apartment opposite Ground Zero. She remembers watching as church volunteers cleaned her place last October. "Two hours into the cleanup I got dizzy. I had a real bad asthma attack and was sick for a week," says the 35-year-old financial consultant, who is living elsewhere until she's sure her apartment is safe. In the meantime, she says, "I feel dizzy and nauseous from diesel and bus fumes. They never bothered me before."

Lower Manhattan resident Kathryn Freed, who's been diagnosed with chemical bronchitis, says that today her body is so sensitive she's "better than a smoke detector."

"I immediately react to smoke and any kind of strong smells," says Freed, who, on September 11, was close to finishing a 10-year term as a New York City councilwoman and spent day after day checking on constituents. "My nose, my throat, my lungs burn, I get heartburn, and I feel like I'm breathing dust."

She may be. After leaving Manhattan residents on their own for eight months, the Environmental Protection Agency announced in early May that residents could have their apartments tested and cleaned of dust and debris by calling a special hotline. The unprecedented program came about after the EPA was besieged by residents afraid that their homes were contaminated with asbestos or other life-threatening chemicals in dust that settled after the twin towers went down.

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Before the disaster, Freed says she never had allergies or difficulty breathing. But that suddenly changed. From September 11 until the end of January, she had nosebleeds every other day. Now she uses an inhaler twice in the morning and twice at night.

Physical ailments haven't been the only problems resulting from 9/11. Until very recently, Freed and her neighbors were under constant siege. Their 5,000-unit complex, five blocks north of where the World Trade Center towers stood, is right next to the barge on the Hudson River that hauled away all the WTC debris. Every day, 24 hours a day, diesel trucks dumped massive loads of concrete and steel, throwing up clouds of dust. The debris was then shoveled up by giant cranes and dropped with a thundering crash onto the barge. "Every time you hear it," Freed said while the cleanup was still under way, "it's like the planes hitting again."

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[Health Fallout from Trade Center Attack, 6/19/02, By Laurie Udesky

CONSUMER HEALTH INTERACTIVE,
http://www.ahealthyme.com/topic/wtc?_requestid=52192]

7/23/02

On the morning of Sept. 11, John and Miriam Wardzala had been married less than a year and had already been through some tough times.

John had had two bouts with cancer. Doctors had recently removed a tumor from Miriam's throat, leaving her with a tracheal hole to assist her in breathing. That morning, they were in their tiny 11th-floor studio apartment on John St., a few blocks from the World Trade Center, when they heard the first explosion. John, a technology coordinator for The Wall Street Journal, was late for work, so he didn't pay much attention to the noise.

But as he headed out the door a few minutes later, he bumped into a neighbor who told him there was some kind of accident at the twin towers. John rushed back to his apartment to get Miriam. He grabbed his camera, and the two headed outside, where they joined thousands of bystanders all staring in disbelief at the flames and smoke.

John kept snapping photos until he heard an even louder roar, looked up, and saw the sky falling. They made a mad dash into the subway station at John St. and Broadway, but the tornado of dust followed them inside and covered them with soot. John took off his shirt and wrapped it around this wife's neck to keep the dust out of her tracheal hole.

Once they could see again, they emerged from the station and inched their way up the street. Just as they reached their building, the second tower fell and another dust cloud enveloped them in the lobby. They finally made it back upstairs to their apartment, washed off the dirt, packed duffel bags and left to stay with Miriam's sister uptown.

Asked to break lease. When they were allowed to return a few days later, there was no electricity, dust was everywhere and the acrid smell from the fires at Ground Zero was unbearable. "I couldn't breathe that stuff and my nose started bleeding," John said.

In November, they wrote to the owners of their building, the Kibel Co., explained their health conditions, and asked if they could break their lease.

"I have a trach and must sleep with it unplugged," Miriam wrote. "I must also unplug when food becomes caught in my esophagus during meals. Unplugging now in the apartment at mealtimes and at night with the inescapable foul air has made breathing here sickening."

They were offered a reduction of \$100 in their \$1,785 monthly rent.

"We're both in our late 30s and were planning on children," John said. "Lower Manhattan was just no place for a pregnant woman."

So they packed their furniture, walked out on their lease and found a place in uptown Manhattan. In December, Miriam became pregnant, and on the Fourth of July she gave birth to premature twin boys, Joseph and John. The twins are still in the intensive care unit of a local hospital.

Just around the time her children were born, Miriam was served with a Civil Court summons by Aubry Bennett Stollow, the lawyer for the Kibel Co.

Their old landlord had sued them for \$5,887.30 in back rent. He also wanted an additional \$2,500 in legal fees.

...

Contacted by this reporter, lawyer Stollow seemed embarrassed by the facts. He said he would talk with the owners immediately and get back to me. He called back within an hour. "This case is going nowhere," Stollow said. The letter the couple sent in November explaining their situation had apparently never "reached the hands of the ultimate powers who make the decisions," Stollow said.

...

[Out of the dust, a happy ending, 7/23/02, by Juan Gonzales, NY Daily News]

9/6/02

When the World Trade Center exploded in a cloud of dust and fire last year, LaVerna Bradley, 71, watched in horror from her apartment on Madison Street, just ten blocks away. . . . A cloud of thick, gray dust blew through their open windows before Arthur was able to close them. . . . A fine powder quickly coated everything in their home, including the kitchen counter, the velvet sofa, and the bed the couple had bought when they got married in 1984. "It was like being in England during the blitz," says LaVerna. "Everything was confused."

...

Residents who remained in lower Manhattan also resumed life without masks, choosing to believe the government's assurances. The EPA says it has no regulations or standards regarding indoor air quality and deferred decisions about cleaning indoor spaces to New York City. The city, in turn, delegated those cleaning duties to tenants and building owners who could decide for themselves how much, or even whether, to clean. While some residents hired professionals, others like the Bradleys couldn't afford the costly effort and instead cleaned sporadically using mops or vacuums in the months following the attacks. "You can't sweep this stuff," says the grandmother of 17. "It's hidden in corners and underneath furniture. I had to buy a cover for the couch because every time my grand kids sit down a light dust rises up."

...

[The Air Down There A year after the attacks, concerns linger over the long-term health effects on residents and rescue workers who breathed in contaminated air By Julie Scelfo and Suzanne Smalley NEWSWEEK WEB EXCLUSIVE, 9/6/02, <http://www.msnbc.com/news/802911.asp#BODY>]

9/4/02

Nina Lavin, a jeweler, is one of those convinced she's living in a poisoned building and is angry that the EPA didn't do more to warn people of the hazards. Her apartment, seven blocks north of the World Trade Center site, faced the towers, and her belongings were coated with dust after the buildings fell. Reassured by EPA chief Christie Whitman's claims two days after the disaster that "there appears to be no significant levels of asbestos in the air in New York City," Lavin followed the New York Department of Health's recommendations to clean up with a mere wet mop and rags. Trusting the agency, she said, turned out to be a mistake. Months later, Lavin couldn't stop coughing

and developed chronic bronchitis, she said.

The building manager refused to pay for a professional cleanup. The Federal Emergency Management Agency turned down her request to be relocated, insisting that her building was "structurally sound." Certain that there was still something wrong, she paid to have her apartment tested, and she found that it contained 12 times the maximum legal level of asbestos.

Lavin is now living in a hotel until her apartment is thoroughly cleaned. But even then, she risks recontamination from other tenants who share the air system in the 460-unit building but who haven't signed up for the scrub-down. "It's really distressing to learn that I've been living with these contamination levels for all these months," Lavin said. "I have no idea what the long-term prognosis is for me or for all of us."

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[A Toxic Legacy Lingers as Cleanup Efforts Fall Short, By Maggie Farley, Los Angeles Times, 9/4/02]

9/30/02

Physicians in the city have made it clear: The malady now officially called World Trade Center cough is like nothing they've ever seen, and hundreds -- perhaps thousands -- of people are experiencing it. The extent of this lung disease is not known, and for a combination of bureaucratic reasons, the extent of the human health impact may be understated. Moreover, cleanup efforts may be inappropriately focused on a single element of the debris: asbestos. The ailment, as described recently by Dr. Kerry Kelly, the New York Fire Department's chief medical officer, is characterized by a reduced lung capacity and a hyper-reactivity of the airways to inhaled particles, bacteria and viruses. The cough is dry and nonproductive and can leave the sufferer gasping for air. . . . Rather, the culprit appears to be microscopic bits of glass.

...

[Air of Infirmary, City struggles to contend with widespread WTC cough, NY Newsday, By Laurie Garrett, 9/30/02]

10/1/02

A year after the World Trade Center's collapse, doctors have just begun to get a grasp of the scope - and persistence - of respiratory disorders left in the disaster's wake. Many have even begun to wonder whether more serious illnesses, such as heart disease and cancer, await.

In addition to asthma, a new condition called World Trade Center cough and another relatively new medical disorder known as reactive airways dysfunction syndrome - RADS - are the ailments most commonly treated in firefighters, police officers and others who responded to or lived near the site. RADS is a type of occupational asthma, a wheezing condition that occurs usually after exposure to high concentrations of environmental irritants. It can evolve into full-blown episodes of asthma, studies have shown.

Doctors say a rarer condition - hypersensitivity pneumonitis, also known interchangeably as farmer's lung and coffee worker's lung - may yet be established. The cough is the most common of the post-9/11 respiratory illnesses.

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Terry Algranati, 34, was not in Manhattan on the day of the attack nor did he work on the pile of debris. But he could see smoke rising like a thunderhead over lower Manhattan.

He now has a persistent and debilitating cough, and he and his doctors blame the dust from Ground Zero. On Sept. 12, 2001, Algranati drove to Fort Lee, N.J., to play basketball with friends. His game was cut short by the air's thickness and acrid smell, which caused him to cough. Algranati now has been plagued by the cough for a year. His doctors have no idea whether it will subside, and he now relies on an inhaler. "From that point on I have had trouble breathing," Algranati said. His doctors term the condition preasthma.

And it worsens in certain positions. "When I lay on my back, I get a hacking cough," he said. Algranati, robust and athletic before 9/11, said he had always been healthy. "I never went to doctors that much; never took any medicine. I'm certainly not a hypochondriac. So this has been a real surprise."

Hardest hit were the hundreds of rescuers at Ground Zero. Medical investigators from New York City's fire department and the Centers for Disease Control and Prevention wrote recently in the New England Journal of Medicine that the "clinical and physiological severity [of the cough] was related to the intensity of exposure."

...

[Assessing The Scope Of WTC Ailments, Experts study how lung ills may worsen, 10/1/02, by By Delthia Ricks, Newsday, <http://www.newsday.com/templates/misc/printstory.jsp?slug=ny%2Ddstop2947197oct01§ion=%2Fnews%2Flocal%2Fnewyork>]

11/20/02

Lower Manhattan resident Ilona Kloupte is just one example of the hundreds of residents the Environmental Protection Agency continues to place in danger because of its lack of an acceptable cleanup plan for interiors still contaminated by hazardous dust from the World Trade Center collapse. Today, at a press conference inside her home, Rep. Jerrold Nadler (D-NY) detailed her case - making a stunning argument that the EPA isn't even following its own guidelines - and continued to press the EPA for immediate action.

"Ilona Kloupte is just one example of what life is like for people whose homes are contaminated with hazardous WTC debris, and who must fight with the EPA to get the agency to do its job, and do it right," said Rep. Nadler. Immediately after 9/11, Ms. Kloupte was given was a bucket and a mop after contacting Federal agencies for help. For three days, she scooped up dust, and immediately suffered health problems. Testing found high levels of and numerous hazardous substances. Her doctor advised her not to live in this apartment under these conditions. Left to her own devices, unable to afford a comprehensive cleanup, she has been in a Red Cross Shelter ever since.

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[THE FACE OF EPA NEGLIGENCE Rep. Jerrold Nadler Tours Contaminated Lower Manhattan Home Still Not Clean of WTC Dust; Says Residents Getting The "Most Atrocious of the Atrocious", 11/20/02, http://www.house.gov/nadler/EPA_112002.htm]

2002

During a U.S. Senate subcommittee hearing in February 2002, Miele [NYC Department of Environmental Protection Commissioner] testified that his department had only sixteen employees assigned to asbestos oversight and that his agency had been overwhelmed just by the requirements necessary to ensure that the city's water supply was safe.

The city's inability to oversee the cleanup created a gaping hole for unscrupulous landlords to perform slipshod abatement, or to do nothing at all. Some owners did perform responsible testing and cleanup, but horror stories abound from downtown residents about shoddy efforts. Eric Mandelbaum, for example, has lived for decades in a luxury apartment building on Gold Street, several blocks east of the trade center. A retired city worker, he is also president of his building's tenant association. He and several other tenants were furious when they returned to their building the week after the attack and discovered that one of their janitors, together with a couple of immigrant day laborers, had been dispatched to use household vacuum cleaners to remove the thick dust that was coating their apartments. "The building management told us that the tenants would have to be there to move our own furniture while these men cleaned," Mandelbaum said.

Marisa Ramirez de Arellano confronted a similar harrowing experience with her ninth-floor apartment at 333 Rector Place in Battery Park City. The day of the attack, large amounts of dust from the collapsed Twin Towers entered the apartment through an open glass sliding door. With the electricity gone, she evacuated for several weeks. The building's management took air samples for asbestos and other contaminants and reported to her that no elevated levels were found. By the end of September she had developed breathing problems. "As soon as I returned to the apartment, my breathing problems worsened," she said. "The apartment had been 'cleaned' but there was still gray dust everywhere." When she complained to the building management they agreed to send a professional cleaning firm to do the job again. "They brought brooms and a vacuum cleaner; none of them were wearing dust masks or respirators as I would have expected a hazardous material cleaning crew to wear," she wrote in an official complaint to the city's Department of Environmental Protection. The workers who arrived were all immigrants who spoke only Spanish and "had no idea how to clean a contaminated room." After the second cleanup, so much dust still remained that she and other tenants arranged for their own testing of the dust. A firm they hired reported that the dust contained up to 2 percent asbestos.

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[Fallout. The Environmental Consequences of the World Trade Center Collapse. by Juan Gonzalez. Published by The New York Press, NY, 2002]

1/22/03

Glenn H. Abatemarco got sick two weeks after terrorists attacked the World Trade Center, and he has still not fully recovered his ability to breathe normally. That in itself is not terribly unusual. A lot of people in Lower Manhattan who were exposed to the acrid, alkaline dust and smoke from ground zero developed the persistent pattern of lung irritation known as World Trade Center Cough.

...

But Mr. Abatemarco does not fit the pattern, and therein lies a medical mystery. First of all, he lives in Brooklyn, miles from ground zero, and works in Midtown Manhattan, where he is a vice president at a financial services firm. He had no intense exposure from the dust cloud from the towers' collapse and no chronic exposure afterward of the sort that downtown workers and residents faced as smoke from the smoldering fires swirled through the streets. He is 41 and generally fit, his physicians say, and while he had asthma as a younger man, he had not been bothered by it for 17 years.

But he got sick anyway, and did not get well. The only explanation his doctors have been able to come up with after three trips to the emergency room, a CT scan, a battery of

allergy tests, a second medical opinion, dozens of days of lost work and a six-week exile in Arizona last fall to try a desert cure — is the date his symptoms began. In the scientific borderland where environmental medicine, epidemiology and diagnosis intersect, cases like Mr. Abatemarco's are called outliers.

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As he and three co-workers were fleeing the city — heading for Brooklyn in an open-top Jeep — they were coated with material blowing from the site. (None of the co-workers, as far as he knows, became ill.) Dust, visible every morning on his car, also blew around his home in Bensonhurst over the next four or five days. And he was under severe stress in those days, he said — along with almost every other New Yorker — and stress is known to be a trigger for chronic obstructive pulmonary disease with severe persistent asthma, which is his formal diagnosis.

...

"My doctor's diagnosis was that whatever I had sucked in on 9/11 just hypersensitized me," he said. Public health experts say that Mr. Abatemarco's illness underlines how little is known about the consequences of the terror attack. Although a base of expertise and knowledge has developed around the firefighters, downtown workers and residents who got sick, no one can say exactly where the borders of the disaster are. And the questions, they say, go beyond medicine.

Is Mr. Abatemarco a crime victim, for example? Is he entitled to compensation from the State of New York for the thousands of dollars he has spent on medications, not to mention his stay in Arizona, which was not covered by insurance? Or is he just a man who through misfortune and happenstance became ill?

And most important of all, perhaps: are there others like him?

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[Man With Few Trade Center Ties Traces His Asthma to 9/11, By KIRK JOHNSON, 1/22/03, NY Times]

G: EPA 110 LIBERTY STUDY AND DEUTSCHE BANK DEMOLITION – PROOF DO-IT-YOURSELF ABATEMENTS INEFFECTIVE AND UNSAFE

*“Did people return . . . without properly cleaning their home of WTC dust? . . .
[1/27/03 EPA IG report]*



This section discusses two new important pieces of evidence demonstrating that no do-it-yourself cleanup using the NYC DOH guidelines can dependably reduce levels of WTC toxic constituents to even EPA’s high benchmarks, much less the lower levels that EPA should be requiring.

The first evidence is EPA’s newly released pilot cleaning study at 110 Liberty St, a building on the perimeter of Ground Zero which had its windows blown out.¹⁹ EPA used all of the best abatement procedures known, like abating the whole building inside and outside simultaneously, sealing off windows and vents before abatement and testing, elevating major appliances off the floor and HEPA vacuuming their working parts while simultaneously using specialized brushes, etc. Furthermore, EPA had the fire department come in to do the heavy cleaning before they even started, and the landlord had performed a whole-building professional abatement several months before that.

But even for those apartments with what EPA called “minimal” dust, some apartments could not pass air or wipe tests after one thorough abatement. Some of the more heavily contaminated units were never able to pass EPA’s aggressive air testing, even after 3 abatements. After continuing to fail EPA’s established aggressive air testing, EPA tried to disown its aggressive air testing techniques, saying they were unrealistic. This is false, and unsupported by any evidence by EPA. If it were established that aggressive air testing was somehow inferior or unrealistic, then EPA would have never used it in the first place for the 110 Liberty St. study. There already would have been EPA documents and changes to the regulations which verified that aggressive testing was no longer appropriate. It was only after-the-fact, finding units that could never pass this test, that EPA tried to claim that aggressive testing was inappropriate.

The second piece of evidence is the Deutsche Bank building at 130 Liberty St., just 300 feet away from the 110 Liberty St. address. This building was thoroughly abated for mold and pronounced mold-free by the NYC DOH. Ceilings, walls, and carpet were torn out. The building was structurally sound, even though a gash had been cut in one side by the falling towers. However, the owners are going to demolish the building because of the asbestos and other WTC-related toxic constituents it was found too difficult to remove them.

People are now living and working in offices that they believe are safe because they followed the NYC DOH do-it-yourself guidelines, needlessly exposing themselves during the process. They did not take advantage of (or were ineligible for) the EPA voluntary cleanup program.

Participating would have been a lot of extra trouble, and EPA never stressed that it was needed. EPA surrounded the voluntary cleanup program with press releases saying the only purpose was psychological. See Section B of this report for the EPA press releases during the period from 5/8/02 to 12/02.

EPA 110 Liberty St. study shows NYC DOH guidelines cannot remove WTC toxics

The following is a direct quote from a study released 6/4/03 by EPA. A mixed use residential and commercial building at 110 Liberty Street was found by EPA to have hazardous levels of WTC-related contaminants, such as asbestos, lead, silica, and fiberglass. These are EPA's conclusions, not the conclusions of somebody else interpreting the data.

The pre-cleaning analytical results for all of the data sets listed above were also evaluated to determine if the concentration of contaminants in the dust were elevated above health-based benchmarks. . . . Based on pre-cleaning data, there were ten residential units and five commercial units that exceeded a health-based benchmark for either lead, dioxin, PAH, or some combination of the three compounds.

Based on post-cleaning data, an additional three residential units and one common area exceeded a healthbased benchmark for either asbestos, lead, MMVF, or alpha-quartz, or a combination of these compounds.

Cumulatively, nineteen sites inside the building or 76 percent exceeded a health-based benchmark for one or more contaminants associated with the WTC collapse. This indicates that some contaminant concentrations exceeded health-based benchmarks.

. . .

[Emphasis added. There were 13 residential units and 6 businesses total.]

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, p. 108, http://epa.gov/wtc/confirmation_clean_study.htm]

EPA had to come back and reclean 2 and 3 different times in the same apartment to get levels down to EPA's benchmarks for some of the WTC cleanup. Even after 3 abatements in some cases with the best equipment available, some of the apartments were never able to meet EPA's criteria for WTC contaminants. In other words, the sophisticated professional abatements did not work.

Of importance is this fact: 7 out of 13 of the apartments only had what EPA described as "minimal" dust; no visible dust except under the baseboard heating units. Still, these apartments with minimal dust had to be re-abated, even after EPA's careful procedures, because they could not pass air and wipe tests.

Difference between 110 Liberty abatement methods and NYC DOH guidelines

The following is an abstract of the abatement methods EPA used at 110 Liberty St. For comparison, see the simple cleaning methods in the NYC DOH guidelines given earlier in this section. There is a night-and-day difference between the two. The abatement methods used by EPA at 110 Liberty are far superior, and could never be performed by any apartment or office tenant by themselves.

Prior to commencement of cleaning operations, each tenant was contacted for the purpose of scheduling an appointment to determine the tenant's wishes relative to disposition of their belongings. At the appointment, residents were suited with hooded, powered air-purifying respirators (PAPR), which pull ambient air through a filter. The residents were advised of the applicable aspects of the Health and Safety Plan, including dust and respiratory hazards. . . . The residents then accompanied EPA into the apartments to review contents and to discuss the planned disposition of personal property.

. . .

Both Cedar Street and Liberty Street were closed to traffic after the WTC attack. Tenants were not permitted to enter the building. EPA, other governmental officials, and the building owner had been the only individuals authorized to enter the building since September 11, 2001. Presently, the residential spaces of the building are being re-occupied. The NYC Building Department inspected the building for structural integrity prior to EPA mobilization to the site. The building interior had been professionally cleaned by the building owner, Liberty Street Associates, LLC, shortly after the collapse of the WTC. Those cleaning activities focused on the removal of gross dust and debris. Floors, walls and ceilings were cleaned using HEPA vacuums, AFDs and wet wiping using soap and water. Personal items, such as furniture, clothing, electronics and kitchenware were not cleaned. The cleaning began on October 29, 2001 and was completed on November 11, 2001.

Although the cleaning discussed above took place prior to implementation of the study, there had been significant redeposition of dust that had become airborne during the removal of the WTC- related debris. . . . The New York City Fire Department vacuumed dust from these units just prior to commencement of the study

. . .

During the initial cleaning, the doors and broken windows facing Liberty Street had been secured with plywood. However, they were not secured in a manner that would sufficiently seal them to prevent the entry of dust being generated during debris removal operations. Likewise, skylights located on the top floors of the building had been damaged and offered a pathway for dust to migrate into the building. These conditions existed during most of the WTC recovery effort.

. . .

Residents were advised that retention of porous items was not recommended due to the difficulties associated with cleaning and testing. Residents were given the option of having their possessions: cleaned on the spot so the resident could immediately take possession, cleaned later and left in the apartment, or disposed of by EPA.

. . .

Security. The first cleaning activity in each unit related to the securing of potential access points from air infiltration, such as wall and window mounted air conditioning

units. It was necessary to clean the access points as they were secured, to ensure that use of the access points after cleaning activities would not result in re-contamination. In order to limit unauthorized access to the building and to protect equipment and supplies during daytime work hours, previously damaged windows were secured and the entrance door to the building was continuously monitored. At the end of the work day, the entrance door on the Cedar Street side of the building was locked.

...

Intact windows were opened, and the jambs, sashes, and sills were cleaned thoroughly. The windows were then closed. In windows where an air conditioning unit was present, the air conditioning unit was removed from the window. The temporary protection on the exterior of the window was removed. The window cabinet that had housed the air conditioning unit was vacuumed, then covered with plastic to prevent air filtration. The air conditioning unit was vacuumed to remove loose dust, wrapped in plastic, and disposed. Wall mounted air conditioning units were removed from the wall, and sealed in plastic. The wall cabinet that had housed the air conditioning unit was vacuumed, then covered with plastic to prevent air infiltration. The air conditioning unit was vacuumed to remove loose dust, wrapped in plastic, and disposed. Disposal of the air conditioning units and installation of new self-contained ductless systems was performed by the building owner following completion of the study.

...

Vacuuming. Vacuuming commenced at the entrance doorway of the unit. Working from the ceiling to the floor, toward the furthest area of the unit, all surfaces were vacuumed of loose dust and debris. Walls, ceilings, doors, pipes, ledges, closets, cabinets, shelving, trim, fixtures, and electrical outlets were vacuumed as they were encountered. Upon reaching the furthest point in the unit, the direction of cleaning was reversed and the same cleaning procedures were followed while returning to the point of origin at the entrance doorway. This procedure accomplished the cleaning of each unit twice using the designated cleaning method.

...

Carpet Cleaning . . . Two methods were utilized to clean the carpets . . . 1) Nilfisk. vacuum with HEPA filtration, and 2) wet vacuuming. Carpets were wet vacuumed in the . . . Mattress Store, using standard carpet shampooing equipment available to the public at rental stores. The carpets were cleaned twice. . . . Initially, the carpets were cleaned running in the direction of the room from front to back (Liberty Street to Cedar Street). The carpets were then cleaned again, in a direction crossing the room from side to side. Soap (carpet shampoo) and warm water were used in the Mattress Store. . . . *[the air tests failed after EPA cleaned the carpet using only industrial HEPA vacuum cleaners, which is more than is recommended in the NYC DOH do-it-yourself guidelines. The tests for asbestos in air were below EPA's criterion only after this special wet vacuuming process.]*

...

Wet Wiping. Wet wiping was performed on all horizontal surfaces to remove dust. The WRS cleaning crew applied wet wiping to all horizontal surfaces, including the floor, as they progressed from the furthest point of the interior of the unit back to the door. Wet wiping was the last activity performed in the unit.

...

Use of water without soap on horizontal surfaces resulted in smearing and re-deposit of the dirt. Water and ammonia-based cleaner (Windex.) did not smear. . . . The work plan initially called for use of soap and water to accomplish wet wiping. Windex® brand was used because it is a commonly used cleaner believed to be readily available in most people's homes. Furthermore, it is non-damaging to most surfaces, from wood to

fiberglass. Typically, this soap does not “over-suds”. It provides an effective detergent-based protection of surfaces when combined with cold water.

...

Cleaning Air Conditioning Units. . . . [These were privately owned air conditioning units, in addition to the wall units that the landlord had removed and disposed] two types of air conditioning systems were used in the residential living spaces: window/wall mounted air conditioners, and ceiling-mounted ductless air conditioners with remote condenser/compressor units. Bathroom fans also presented airflow routes that needed to be cleaned. Ceiling-mounted air conditioners were cleaned using HEPA-filtered equipment. The grills were removed to provide access to the interior. The condenser and compressor units on the roof were visually inspected and found to be clean. Removal of the ceiling cover to access the bathroom fan assemblies was necessary. The fan and motor were vacuumed; the fan housing was wet wiped. The interior of the exhaust duct was vacuumed to the first foot. The unit was reassembled and covered with poly sheeting.

Baseboard heating components, including the hydronic finned radiation systems, were cleaned. The protective covers were removed to expose the heating elements. The fins were then vacuumed and brushed simultaneously to remove dust. The space located under the heating element was vacuumed. The protective covers were reattached.

Cleaning of Refrigerators, Dishwashers and Stoves (including exhaust fans). Prior to cleaning refrigerators, the appliance was unplugged and checked for food contents. If present, food was removed, bagged and disposed. The coils, underbody, compressor compartment, and back of each refrigerator was cleaned. Dust from the cooling coils was cleaned by elevating the appliance and simultaneously using vacuums and specialized brushes. Upon completing these activities the floor area where the refrigerator had been located was cleaned. Prior to cleaning, each stove unit was disconnected from its electric receptacle and gas line. Old exhaust fan lights and filters were removed and replaced. The first foot of the exhaust duct was vacuumed. The stove hood was vacuumed. Prior to cleaning dishwashers, the toe plate was removed and dust was vacuumed from under the appliance. After cleaning, all appliances were staged on plastic for subsequent removal by the owner, who had decided to replace them.

...

HVAC systems . . . were cleaned by professional duct cleaning companies using standard cleaning procedures. . . . They mirrored the procedures used by HVAC cleaning companies when responding to ordinary HVAC cleaning requisitions. The following cleaning activities were conducted, in the following order:

1. A clean plastic barrier was installed on the floor surface, three feet to either side of the suspended HVAC system, from the return intake to the furthest supply grill.
2. Access points were selected at the return and supply sides of the duct system. A HEPA filtered vacuum collection system was installed at the end of the supply run to collect internal dust.
3. A rotating brush system was used to dislodge dust in the direction of the vacuum collection system.
4. Degreasing agents were used on the HVAC internal coil units and cleaned. Supply grills were cleaned in a similar fashion.
5. A biocide agent was applied to the duct's internal components and allowed to dry.
6. An encapsulant was applied to the internal surfaces in order to ensure that residual dust was sealed in.
7. The work area was cleaned of all equipment and plastic protection.

8. The system was visually inspected at the air handling unit access panels for view of internal components. The duct work was visually inspected for dust in the return and in the supply lines.

...

Common Areas. The common areas were the first areas of the building cleaned, in order to provide a dust-free area for Level D entry through the common spaces, and to provide a safe location for equipment storage. All foyers, stairways, and halls were vacuumed using commercial quality HEPA vacuums. All horizontal and vertical surfaces in the common areas were wet wiped [with soapy water] where possible. The common areas were re-cleaned as necessary due to traffic.

Stairwells were cleaned commencing at the Cedar Street doorway vestibule starting in the stairwell at the ground entrance and proceeding to the rooftop access door. The stairwells were then re-cleaned, following the same route back. The ceilings, walls, handrails, balusters, treads, risers, fire protection equipment, lighting, and trim were cleaned.

The hallways of each floor were accessed through fire doors at the stairwell platform for each floor. Access to each floor remained closed until each stair well had been cleaned from bottom to top, and from top to bottom. The hallways were cleaned in the same manner as the stairwells, except that not all of the hallway walls were wet wiped. The second floor hallway floor was covered with vinyl tile. It was wet wiped. However, the third and fourth floor walls were made of plywood. Wallpaper originally applied to the wall surfaces had been removed, leaving a rough paste finish that was not conducive to wet wiping.

Each hallway contained a utility room with a wall-enclosed trash chute that led to the basement of the building. Some items were discovered in the utility closets. Boxes that were unopened were vacuumed and left in place. Other items were packaged for disposal. The utility areas did not seem to be impacted by WTC dust.

An elevator accessing each floor was located on the Cedar Street side of the building. It was not operational for the first two months of the project. Eventual repair of the elevator by others allowed access to the inner compartment. The elevator cab and the exterior top of the cab were vacuumed.

...

Basement . . . The basement of the building is comprised of separate rooms: a trash compactor room, a motor room associated with the elevator shaft, a common access area from the street, and a fire protection equipment room. The brick walls of the basement were encrusted with mud, indicating a high water level at some time in the building's history. These rooms were cleaned using commercial HEPA equipment. Loose debris related to stone and mortar deterioration was vacuumed from the walls and ledges of the base of the elevator shaft. Small rocks, paper, debris, and rodent carcasses were removed.

...

Cleaning of Building Exterior/Roof. Cleaning of the building exterior and the rooftop was accomplished and monitored by the NYCDEP. NYCDEP hired an asbestos abatement contractor to accomplish this task. Cleaning of the building exterior was initiated at approximately the same time that cleaning of the interior of the building began. NYCDEP subcontractors were required to vacuum and wash the building exterior twice over a two-day period before acceptable results were achieved.

...

Carpet Cleaning. . . Two methods were utilized to clean the carpets in the Chiropractor's Office and the Mattress Store: 1) Nilfisk. vacuum with HEPA filtration, and 2) wet vacuuming. Carpets were wet vacuumed in the Chiropractor's Office and in the Mattress Store, using standard carpet shampooing equipment available to the public at rental stores. The carpets were cleaned twice, sampled, and disposed as porous material. Initially, the carpets were cleaned running in the direction of the room from front to back (Liberty Street to Cedar Street). The carpets were then cleaned again, in a direction crossing the room from side to side.

...

[The sentences/paragraphs in this abstract are not necessarily in the same contiguous order as in the EPA study.]

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, http://epa.gov/wtc/confirmation_clean_study.htm]

EPA false claim that the procedures at 110 Liberty are the same as common cleaning procedures that a citizen could use

The summary section of EPA's 110 Liberty St. study claims that ordinary cleaning by tenants can reduce the levels of toxic WTC dust to safe levels. This is completely false on the face of it. No citizen has the ability to abate whole building inside and outside simultaneously like EPA did, including abatement all parts of any HVAC system, having no personal possessions present during abatement and testing, elevating and brushing the underside of appliances with specialized brushes while simultaneously vacuuming, sealing of entries and abatement areas before and after abatement, etc., etc., etc.

The study successfully demonstrated that standard cleaning practices are effective in removing the complex mixture of WTC dust, thereby reducing individual exposure to WTC-related contaminants. Therefore, EPA's recommendation continues to be that individuals concerned about the presence of WTC dust use HEPA vacuums and wet wiping to remove the dust from their dwellings. Depending on the amount of dust deposited, repeated cleanings may be necessary.

...

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, page 3, http://epa.gov/wtc/confirmation_clean_study.htm]

Safety precautions for 110 Liberty St. study compared to NYC DOH guidelines

The NYC DOH guidelines specifically stated that even a common drugstore dust mask, much less a HEPA respirator, was not necessary while cleaning an apartment or office containing the heaviest layers of dust.

On the other hand, the 110 Liberty St. study required that tenants be in full protective gear with an air supplied respirator to just visit their apartments to make decisions about personal possessions before EPA began its cleanup study. This was after 1 professional abatement by the landlord, followed by a preliminary abatement by the fire department just prior to that time. Tenants were not allowed to be present during EPA's abatement of the apartments, and in fact, the whole building was in lock-down during the abatement. Reporters were not even allowed to visit 110 Liberty St. for short periods of time, because they could not be outfitted with custom fit protective gear.

EPA took all of these precautions at 110 Liberty St. even though the dust inside the building was less than 1% asbestos:

Prior to commencement of cleaning operations, each tenant was contacted for the purpose of scheduling an appointment to determine the tenant's wishes relative to disposition of their belongings. At the appointment, residents were suited with hooded, powered air-purifying respirators (PAPR), which pull ambient air through a filter. The residents were advised of the applicable aspects of the Health and Safety Plan, including dust and respiratory hazards. (The Health and Safety Plan is discussed in Section 2.2 below.) The residents then accompanied EPA into the apartments to review contents and to discuss the planned disposition of personal property.

...

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, NY New York, NY, 5/03, EPA Region 2, http://epa.gov/wtc/confirmation_clean_study.htm]

The U.S. Environmental Protection Agency (EPA) today began sampling for contaminants in 110 Liberty Street, a still-unoccupied building close to the World Trade Center (WTC) site, in what will be a comprehensive test of the effectiveness of various cleanup techniques.

...

IMPORTANT NOTE TO EDITORS: Due to potential health and safety concerns, workers will be suited up in custom-sized protective gear. EPA cannot allow media access to the building. [emphasis in the original]

...

[EPA BEGINS WORK ON PILOT WTC DUST CLEANING STUDY, 6/19/02, <http://www.epa.gov/wtc/stories/061902.html>]

Prior to commencement of the study, bulk samples were collected from three units in the building. Samples were collected from units that contained excessive amounts of dust, in an attempt to characterize the asbestos concentration in dust from worst case locations in the building. Samples were collected from the Chiropractor's Office, the Mattress Store and residential Unit 5C. Analysis of the samples indicated that less than one percent asbestos was present. Therefore, NYC asbestos licensing and certification regulations did not apply to the project. The federal OSHA asbestos standard (29 CFR 1926.1101) did apply to the project. At EPA direction, WRS assigned a team of asbestos-trained personnel to the project. Two licensed supervisors and two licensed

workers were part of the operations team. All field operations personnel had completed all applicable training.

...

[Note: EPA left out the health and safety plan for the workers performing the cleaning operations at 110 Liberty St. from the version of the study made available on 6/4/03. There was not enough time to obtain this health and safety plan for review and discussion in this report.]

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, NY New York, NY, 5/03, EPA Region 2, p. 17, http://epa.gov/wtc/confirmation_clean_study.htm]

110 Liberty St. proves elaborate abatement does not reduce contaminants to EPA benchmarks – 2 and 3 abatements required, even with “minimal dust”

Despite the fact that EPA simultaneously abated all apartments, businesses, common areas, HVAC systems at 110 Liberty St., and the roof and facade, securing the building during abatement to prevent inadvertent recontamination, having a “best case” building without carpeting, and in all but one case without personal possessions present, prior abatements by the landlord and fire department, etc., many of the apartments needed to have 2 or 3 complete abatements to meet EPA's health benchmarks. This was true even for apartments with what EPA called “minimal dust” (no visible dust except under the baseboard heating units). The mattress store did not pass the air tests until after the 4th abatement, when the HVAC system was added on to the abatement routine.

Only 5 out of 13 apartments met health benchmarks after one abatement, and only 75% did after two abatements. Two apartments (2 out of 13, or 15%) required three abatements to meet EPA's criterion for safety. (See Table 12.0, page 111 of the EPA study.) There were 6 apartments classified as having only minimal accumulation of WTC dust. However, 66.66% (two thirds) of these minimally impacted apartments required two abatements to meet EPA's criteria for lead safety. (See table 13.0, page 112 of EPA Region 2 abatement study.)

The following table gives specific abatement information for each apartment in addition to the general procedures EPA used, quoted above from the EPA study.

EPA's 110 Liberty St. Cleaning Study. Procedures in addition to those described above, number abatements necessary to achieve EPA's benchmarks, and presence of WTC dust prior to abatement				
APARTMENT	WTC DUST LEVEL BEFORE EPA ABATEMENTS (earlier professional abatement by landlord)	NUMBER	PERSONAL POSSESSIONS OR FURNISHINGS PRESENT	EPA's ABATEMENT METHOD (IN ADDITION TO THE OVERALL BUILDING METHODS DESCRIBED EARLIER, AND THE EARLIER PROFESSIONAL ABATEMENT BY THE LANDLORD)
5C	significant	3	No, 1 couch. No carpet, hardwood floors.	An industrial HEPA-filtered vacuum for the 1 st 2 abatements. For 3 rd abatement, an industrial HEPA filtered vacuum and an air filtration device (AFD) Horizontal surface wet wiped with soap and water.
5A	minimal (no visible dust except baseboard heating units)	2	No, 1 couch. No carpet, hardwood floors.	An industrial HEPA filtered vacuum and an air filtration device (AFD) Horizontal surface wet wiped with soap and water.
3C	significant	3	No, 1 couch. No carpet, hardwood floors.	Craftsman. shop vacuum and a Eureka upright vacuum with no HEPA filter for 2 abatements. For 3 rd abatement, an industrial HEPA filtered vacuum and an air filtration device (AFD). Horizontal surface wet wiped with soap and water
3D	significant	2	no, 1 couch & chair. No carpet, hardwood floors.	Craftsman. shop vacuum and a Eureka upright vacuum with no HEPA filter for 2 abatements. Horizontal surface wet wiped with soap and water.
4D	significant	2	no, 1 chair & ottoman. No carpet, hardwood floors.	A Craftsman shop vacuum and Eureka upright vacuum with a HEPA filter for vacuuming the floors and other surfaces. Horizontal surface wet wiped with soap and water.
4C	significant	1	no, 1 couch. No carpet, hardwood floors.	Craftsman. shop vacuum and a Eureka upright vacuum with no HEPA filter. Horizontal surface wet wiped with soap and water
2B	minimal (no visible dust except baseboard heating units)	1	no, 1 couch. No carpet, hardwood floors.	An industrial HEPA-filtered vacuum. Horizontal surface wet wiped with soap and water..
2A	minimal (no visible dust except in baseboard heating units)	2	no, 1 couch & chair. No carpet, hardwood floors.	A Ridgid shop vacuum and Hoover. upright vacuum for vacuuming the floors and other surfaces. Horizontal surface wet wiped with soap and water
5D	significant	1	no, 1 couch. No carpet, hardwood floors.	An industrial HEPA filtered vacuum and an air filtration device (AFD). Horizontal surface wet wiped with soap and water.
3B	minimal (no visible dust except baseboard heating units)	2	Yes. No carpet, hardwood floors.	An industrial HEPA filtered vacuum and an air filtration device (AFD). Upholstered furniture cleaned with water extraction process. Horizontal and vertical surface wet wiped with soap and water. Ceiling vacuumed and other surfaces not wet wiped vacuumed 2 times. Personal items and furniture were in the unit cleaned. Paper and books HEPA vacuumed.
3A	minimal (no visible dust except baseboard heating units)	1	yes, carpet	A Craftsman shop vacuum and a Eureka upright vacuum with HEPA filter. An air filtration device (AFD) was used during the abatement process. Horizontal and vertical surface wet wiped with soap and water.
4A	minimal (no visible dust except baseboard heating units)	2	no, 1 couch. No carpet, hardwood floors.	A Craftsman shop vacuum and Eureka upright vacuum with a HEPA filter for vacuuming the floors and other surfaces. Horizontal surface wet wiped with soap and water.
4B	minimal (no visible dust except baseboard heating units)	2	no. No carpet, hardwood floors. No soft materials like couches.	A Ridgid shop vacuum and Hoover upright vacuum with a HEPA filter for vacuuming the floors and other surfaces. An air filtration device (AFD) was used during the abatement process. Horizontal surface wet wiped with soap and water.

Apt. 5C, abatement of an apartment with “significant” WTC dust

Apartment 5C is located on the fifth floor. It is a 968 sq. ft. loft with three separate bedrooms facing the WTC. The apartment has hardwood floors. Windows were blown in. There was significant accumulation of dust in the dwelling. All of the tenant's personal items were removed prior to abatement. The windows were sealed and the bathroom fan vent was also sealed. There was no HVAC system supplying this apartment. Thus, this apartment presented a best-case scenario for any air testing afterwards, since the major reservoirs for asbestos and other airborne contaminants were removed: *i.e.*, no carpet, sealed windows, no personal possessions, and any vents sealed off.

Abatement Methods: In addition to the procedures used throughout the building described earlier in this section, this apartment was abated the first 2 times using an industrial HEPA-filtered vacuum for vacuuming the floors and other surfaces. All horizontal surfaces were wet wiped with soapy water. The apartment failed testing even after 2 abatements.

For the 3rd abatement, An air filtration device (AFD) was added. An AFD is a local exhaust system with HEPA filtration that is capable of creating and maintaining a negative pressure differential between the outside and the inside of the work area. The AFD functions as a stand-alone piece of equipment in a room. The AFD was used as an air-polishing device, to capture dust particles that became airborne as a result of disturbances caused by the abatement activities.

Asbestos: After the 1st abatement, 3 air samples were analyzed using both PCM and PCMe. One air sample exceeded the NYC DOH criterion level of 0.01 f/cc, the approximate equivalent of the AHERA clearance level of 70 s/mm². This air sample showed asbestos levels of 0.015 f/cc. In other words, even after a rigorous professional abatement by EPA as described above, an air test showed asbestos levels exceeding the lenient NYC DOH standards, and far exceeding EPA's criteria of 0.009 S/cc PCMe.

After the 1st abatement, air was also tested to see if it met EPA's criteria for asbestos in air that might protect against an excess cancer risk of 1 in 10,000. This is the ten-to-the-minus four, or 10⁻⁴ risk level. This level is 0.0009 S/cc “PCMe” PCM-equivalents. The laboratory was unable to provide any results, because the filter was overloaded and asbestos fibers could not be seen.

After the 2nd abatement, EPA tried to perform 3 different types of air tests by the PCM, TEM AHERA, and PCMe methods. None of the asbestos air tests could be read by the analysis, because all of the filters were overloaded. .

After the 3rd abatement, the PCMe results indicated that two samples, collected under EPA's aggressive sampling methodology, were above the primary clearance criterion of 0.0009 S/cc with results of 0.0015 S/cc and 0.0016 S/cc.

EPA chose to ignore the results from the aggressive air testing showing asbestos levels over EPA's criteria, and not perform any additional abatement in Apt. 5C. The aggressive air sampling method uses a leaf blower to stir up any surface dusts. The aggressive air sampling method is part of the asbestos in schools regulations. At least EPA did not claim that Apt. 5C passed EPA's set criteria for apartment abatement after the WTC disaster. EPA still admitted that this apartment failed for asbestos in air. The following is a direct quote from the EPA study:

Cleaning Results With the exception of asbestos, this apartment [5C] met the clearance criteria listed in Table 1.0 for each compound after being cleaned three times.

Wipe and micro vacuum results for asbestos: Prior to any abatements, both wipe and micro vacuum samples showed that there was asbestos on/in hard and porous surfaces. After abatement, the results for two of the three micro vacuum samples indicate that asbestos was present at levels similar to those observed before abatement. The third micro vacuum sample was reported as being below the detection limit.

Dioxin: Before Abatement Samples Three pre-cleaning wipe samples were collected and analyzed for dioxin. The results indicate that dioxin was present; however, the TEQ concentration for each sample was below the primary clearance criterion of 4 ng/m².

Lead: Before Abatement Samples Three micro vacuum samples and three wipe samples were collected. Lead was detected in all three micro vacuum samples at concentrations above (approximately four to six times) EPA's criterion of 25 µg/ft². Two of the three wipe samples had detectable concentrations of lead above the primary clearance criterion of 25 µg/ft², while the third was below the primary clearance criterion.

After the 1st abatement, two air samples were below the primary clearance criterion of 1.0 µg/m³. However, they were above the background clearance criterion of 0.1 µg/m³ for lead in air. EPA changed its clearance level for lead in air midway through its study. Previously, it was set for established background levels of lead in air (0.1 µg/m³). EPA probably found this was a difficult cleanup level to achieve, and changed it to 1.0 µg/m³, which is 10 times higher.

Fiberglass (man-made vitreous fiber, or MMVF): Post 1st abatement air samples Three air samples and five wipe samples were collected after the 1st abatement. The results indicate that fiberglass was present in all three, with two samples being above EPA's criterion of 10 S/L. The third was below the primary clearance criterion. Post 2nd Abatement Five air samples were collected after the 3rd abatement. The results indicate that the two of the five samples were above EPA's clearance criterion. Only after the 3rd abatement were fiberglass air concentrations reduced below EPA's criterion.

Before any abatement, wipe samples showed that fiberglass was present. After the 1st abatement, five wipe samples indicated that fiberglass was still present at concentrations similar to or higher

than the pre-abatement samples.

Polynuclear aromatic hydrocarbons (PAH's): Before abatement, 1 out of 3 wipe samples had 4 PAH compounds detected. The calculated toxicity equivalency factor (TEF) was 303.5 $\mu\text{g}/\text{m}^2$. This was above EPA's clearance criterion of 300 $\mu\text{g}/\text{m}^2$. After the 1st abatement, the PAH concentrations were below EPA's clearance criterion.

Apt. 5A, a “minimally” impacted apartment

EPA itself described this apartment as “minimally impacted.” This apartment was only able to meet EPA's clearance criteria after being abated twice.

This apartment is on the fifth floor. It is a 1,404 sq. ft. loft facing Cedar Street with one bedroom. The apartment has hardwood floors and no carpet. One window had been blown in, but had been boarded up with plywood by the landlord. The apartment was professionally abated by the landlord along with all other apartments during the months of October through November, 2001. However, the removal of debris from Ground Zero had generated additional dust which had infiltrated the building prior to the EPA cleaning study. The fire department cleaned the apartment just prior to EPA's study.

The dwelling presented minimal accumulation of dust (no visible dust), except for under the baseboard-heating units. The windows were sealed and the bathroom fan vent was also sealed. There was no HVAC system supplying this apartment. Thus, this apartment presented a best-case scenario for any air testing afterwards, since the major reservoirs for asbestos and other airborne contaminants were removed: *i.e.*, no carpet, sealed windows, no personal possessions, and any vents sealed off.

Abatement Methods In addition to the whole-building inside and outside abatement procedures described earlier, this apartment was abated using an industrial HEPA-filtered vacuum. In addition, an air filtration device (AFD) was used during abatement. An AFD is a local exhaust system with HEPA filtration that is capable of creating and maintaining a negative pressure differential between the outside and the inside of the work area. The AFD functions as a stand-alone piece of equipment in a room. The AFD was used as an air-polishing device, to capture dust particles that became airborne as a result of disturbances caused by the abatement activities. In addition, all horizontal surfaces were wet wiped with soapy water.

Asbestos: Before Abatement Samples Seven micro vacuum and four wipe samples were collected for analysis of asbestos. These samples indicate that asbestos was present in the apartment prior to abatement. Chrysotile was detected in six of the seven micro vacuum samples

and all four of the wipe samples.

After the 1st abatement, three air samples, seven micro vacuum samples, and five wipe samples were collected. Three air samples were analyzed using EPA's special benchmark for asbestos in air after the WTC collapse. This benchmark is designed to be protective for an excess cancer risk of 1 in 10,000, assuming 35 years of exposure. The EPA study refers to this particular air testing method as the "PCMe" test, which stands for phase contrast microscopy equivalents. After the 1st abatement, the air samples were "at or below the primary criterion of 0.0009 S/cc" according to EPA.

At this point in time, we do not know what EPA meant by "at the criterion of 0.0009 S/cc" because Table 11.1 of the EPA report has deleted all the air asbestos results for Apt. 5A. Furthermore, the other table which also should have included the data, Table 11.2 for Apt. 5A also is blank where it should have given the asbestos air test data for Apt. 5A. The word "at" could mean slightly exceeding the EPA criterion. Furthermore, we do not know whether 1 or 2 of the 3 samples were "at" the EPA criterion. There was not enough time to obtain the relevant information from EPA for inclusion in this report.

Of great interest is the fact that EPA found that after the 1st abatement, 7 micro vacuum samples for asbestos "varied and were present at levels higher and lower than before cleaning." In other words, the asbestos levels on porous surfaces were higher in some cases after EPA's rigorous full asbestos abatement. As discussed later in this report, EPA should have used its ultrasonification extraction method, and was criticized before the 110 Liberty Street study for using the microvacuum sampling method instead of EPA's ultrasonification method.

For several of the other apartments at 110 Liberty, the microvacuum sample results for asbestos were higher than before abatement, or the same as before abatement. All of the microvacuum sampling results were missing from the EPA study, and there was not enough time to get them for inclusion in this report.

Lead: Before abatement, all 3 wipe samples had detectable concentrations of lead, two of which were above EPA's primary clearance criterion of 25 µg/ft². After EPA's 1st abatement, 2 out of 4 wipe samples exceeded the primary clearance criterion for lead. After EPA's 2nd abatement, lead wipe samples were below EPA's level.

Fiberglass (man-made vitreous fiber, MMVF): Before EPA's abatement, 3 wipe samples were collected. MMVF was detected in all 3 of the samples. Post 1st Abatement Samples Three air samples and five wipe samples were collected after the 1st abatement. After the 1st abatement, MMVF was found in air samples (no air samples were taken prior to the 1st abatement). The results were below EPA's clearance criterion of 10 S/L. The results of the five wipe samples indicate that MMVF continued to be present in all of five of the samples after the 1st abatement.

Simultaneous abatement of HVAC system necessary, 110 Liberty St. study proves

There was an HVAC system for the stores in the building, but not for the apartments. The mattress store was rigorously abated three times by EPA, but still failed testing. It was only after the whole central heating and ventilation system (HVAC) was abated that EPA was able to lower asbestos levels in air to meet EPA's WTC criterion.

Mattress store, before abatement

In the mattress store, prior to any abatements, even though the dust contained less than 1% asbestos, the air levels were higher than 0.01 f/cc PCM, which is the light microscope regulatory clearance level under AHERA.²⁰ This level is also the NYC DOH clearance level. The NYC DEP had instructed landlords that there was no problem if the dust itself contained less than 1% asbestos, and that they only needed to test the dust, not the air, since the NYC DEP and EPA had tested the air outside and found it to be safe. See Section E.

This level of 0.01 f/cc PCM is more than 10 times higher than the level EPA set for the cleanup of WTC dusts in buildings (the PCMe level of 0.0009 S/cc). EPA was not able to determine the PCMe level for ½ of the samples, because the filters were overloaded with particulates and could not be read by the analyst.

Four air, seven micro vacuum, and three wipe samples were collected for asbestos. The air samples were analyzed for PCM and PCMe. The PCM results indicate that two of the samples were above and two of the samples were below the secondary numeric criterion of 0.01 f/cc. The PCMe results indicate that two of the samples could not be analyzed due to overloading of particulate material. The remaining two samples were below the detection limit and below the primary clearance criterion of 0.0009 S/cc. All seven of the micro vacuum samples and all three of the wipe samples detected chrysotile.

Mattress store, results after 1st failed abatement

For the 1st abatement, a professional quality HEPA vacuum was used for the carpet, walls, and all other surfaces. An air filtration device (AFD) was used at the same time as the HEPA vacuuming. An AFD is a local exhaust system with HEPA filtration that is capable of creating and maintaining a negative pressure differential between the outside and the inside of the work area. The AFD functions as a stand-alone piece of equipment in a room. The AFD was used as an air-polishing device, to capture dust particles that became airborne as a result of disturbances caused by the abatement activities.

The air and surfaces were tested for asbestos after this 1st abatement. EPA was unable to determine whether its WTC criteria for air was met, because the filters were overloaded again in

the PCMe test. In addition, wipe samples of smooth surfaces demonstrated that asbestos dusts were higher than before EPA did its 1st abatement.

Three air samples, seven micro vacuum samples and four wipe samples were collected for asbestos. The air samples were analyzed for PCM, TEM AHERA, and PCMe. The PCM results indicate that all three samples were below the secondary numeric criterion of 0.01 f/cc. The TEM AHERA results indicate that two of the samples could not be analyzed due to overloading of particulate material. The remaining sample was below the secondary numeric criterion of 0.0022 S/cc. The PCMe results indicate that two of the samples could not be analyzed due to overloading of particulate material. The remaining sample was below the primary clearance criterion of 0.0009 S/cc.

The results of the seven micro vacuum samples indicate that asbestos was present at concentrations lower than those observed before cleaning. The results of the wipe samples indicate that asbestos was present in all four samples at higher concentrations than those observed before cleaning.

[EPA calls this the "Post 1st cleaning Test 4A results"]

Mattress store, results after 2nd failed abatement

For the 2nd abatement, EPA repeated the HEPA vacuuming with the simultaneous use of an AFD. This time, however, EPA added wet wiping for all walls and horizontal surfaces.

As seen below, the asbestos concentrations by the PCM test were still over 0.01 f/cc PCM. And again, the filters were overloaded with so much particulate that EPA was unable to determine whether the sample was over the 0.0009 S/cc PCMe criteria, or even the AHERA TEM level of 70 s/mm². The asbestos wipe samples also showed that asbestos was present at levels higher than before any abatement.

Three air samples and four wipe samples were collected for asbestos. The three air samples were analyzed using PCM, TEM AHERA, and PCMe. The PCM results indicate that two samples could not be analyzed due to overloading of particulate material and one sample was above the secondary numeric criterion of 0.01 f/cc. The TEM AHERA and PCMe analyses could not be analyzed due to overloading of particulate matter.

Asbestos was present in three of the four wipe samples at higher concentrations than those observed before cleaning

Mattress store, results after 3rd failed abatement

For the 3rd abatement, EPA again repeated the HEPA vacuuming, AFD, and wet wiping in the mattress store, as well as wet wiping. However, this time EPA added a hot water wet extraction process with carpet shampoo for the carpet.

Even after this 3rd abatement, the air tests failed EPA's criteria for asbestos (0.009 S/cc PCMe).

Five air and seven micro vacuum samples were collected. Five air samples were analyzed using PCM, TEM AHERA, and PCMe. The PCM results indicate that all five samples were below the secondary numeric criterion of 0.01 f/cc. The TEM AHERA results indicate that all five samples were below the secondary numeric criterion of 0.022 S/cc. The PCMe results indicate that all five samples were above the primary clearance criterion of 0.0009 S/cc. *[The EPA study omitted the actual results for the air testing from its tables. There was not enough time to obtain this information from EPA for inclusion in this report.]*

The results of the seven micro vacuum samples indicate that asbestos was present in concentrations above the detection level in four of the seven samples. However, post-cleanup sample concentrations were lower than those observed before cleaning and after Test 4A cleaning *[1st cleaning]*. *[EPA did not repeat the wipe test for asbestos, which had showed higher levels of asbestos after both the 1st and 2nd cleanings than before any cleanings.] [EPA calls this the "Post 1st cleaning Test 4C results"]*

Mattress store, results of 4th abatement which finally included the HVAC system

It was only after EPA repeated all of the abatements and added on the abatement of the heating, ventilation, and air conditioning system that EPA was able to achieve its asbestos criterion level.

EPA study shows WTC air will fail 10⁻⁴ risk level, but not AHERA level

The 110 Liberty St. study shows that the AHERA level of 70 s/mm² for asbestos in air is easier to achieve than EPA's WTC criterion of 0.0009 f/cc PCMe (the 10⁻⁴ risk level for a 30 year exposure). There have been claims that the asbestos from the WTC was so finely pulverized that there would not be any significant fraction of fibers longer than 5 µm, and exposures to WTC asbestos are harmless. The EPA 110 Liberty St. study disproves this theory.

PCMe is "phase contrast microscopy equivalents," an air test that uses an electron microscope (TEM, or transmission electron microscopy), but ignores any asbestos fibers shorter than 5 micrometers (5 µm, which is the same as 5 microns). EPA current policy is that any fibers shorter than 5 µm are not carcinogenic, because they are cleared from the lung. (See the Section U which addresses this theory.)

The AHERA level of 70 s/mm² is the same as 0.0022 s/cc, if it is assumed that 1200 liters of air are sampled. This includes all fibers, including those shorter than 5 µm.

The following excerpts from the study show that air levels were either "at" or above the EPA criterion of 0.0009 S/cc PCMe, but below the AHERA TEM level of 0.0022 s/cc.

Unit 2A This unit is located on the second floor. It is a 1,335 sq. ft. loft with one bedroom facing Cedar Street. The unit has hardwood floors. The unit presented minimal dust accumulation in the dwelling with the exception of the baseboard-heating units. The windows were not blown in. All personal items were disposed except for a couch and chairs.

...

Post 2nd Cleaning Samples . . . The TEM AHERA results were all below the secondary numeric criterion of 0.022 S/cc; [the equivalent of 70 s/mm², the AHERA level] two of the six samples were below the detection limit. The PCMe results were at or below the primary clearance criterion of 0.0009 S/cc . . .

...

Unit 4C This unit is located on the fourth floor. It is a 655 sq. ft. open loft that faces the WTC site. The windows were blown in and there was significant dust accumulation in the dwelling. The unit has hardwood floors and no carpet. All personal possessions to be retained by the tenant were vacuumed and bagged.

Post 1st Cleaning Samples . . . The TEM AHERA results were above the detection limit but were below the secondary numeric criterion of 0.022 S/cc. Two of the three air samples analyzed using PCMe were below the primary clearance criterion of 0.0009 S/cc. The third air sample detected chrysotile and was present at the primary clearance criterion of 0.0009 S/cc.

...

Unit 4D This unit is on the fourth floor. It is a 968 sq. ft. open loft facing the WTC site. The unit had windows blown in and presented a significant accumulation of dust. The dwelling has hardwood floors with no carpet. All personal possessions to be retained by the tenant were vacuumed and bagged.

Post 1st Cleaning Samples . . . The TEM AHERA results indicate that all three samples were below the secondary numeric criterion of 0.022 S/cc. The PCMe results indicate that two of the three air samples were below the primary clearance criterion of 0.0009 S/cc. The third sample detected chrysotile and was at the primary clearance criterion of 0.0009 S/cc.

...

Unit 5C This unit is located on the fifth floor. It is a 968 sq. ft. loft with three separate bedrooms facing the WTC. The unit has hardwood floors. Windows were blown in. There was significant accumulation of dust in the dwelling. All of the tenant's personal items were removed prior to cleaning. . . . The results for two of the three micro vacuum samples indicate that asbestos was present at levels similar to those observed before cleaning. The third micro vacuum sample was reported as being below the detection limit.

...

Post 3rd Cleaning . . . The TEM AHERA results had chrysotile detected above the detection limit; however, all four results were below the secondary numeric criterion of 0.022 S/cc. . . . The remaining two samples, collected under an aggressive sampling methodology, were [1 ½ times EPA's] clearance criterion of 0.0009 S/cc with results of 0.0015 S/cc and 0.0016 S/cc. The results obtained from the samples collected with the modified-aggressive sampling were used as evidence of meeting the primary clearance criterion.

...

Chiropractor's Office This is a 716 sq. ft. office space with four examination rooms facing the World Trade Center site. All front windows were blown in. Significant amounts of dust were present on all horizontal and vertical surfaces. Floor areas were covered

with wall-to-wall carpeting. The suspended ceiling was covered with fibrous tiles. There was a two-foot high void space above the ceiling. The space above the suspended ceiling contained the HVAC system and wood floor joist system for the third floor apartments. This area contained WTC-related and non-WTC-related dust. The space was extremely difficult to clean due to the presence of electrical wires, recessed lighting fixtures, sprinkler systems, and the dry, friable nature of the wood support system. Ceiling tiles, flexible ventilation ducts and office equipment were disposed of prior to cleaning.

...

Post 1st Cleaning Samples (Test 4C) . . . The TEM AHERA results indicate that three of the five samples could not be analyzed due to overloading of the filters with particulate material. The remaining two samples were below the secondary numeric criterion of 0.022 S/cc. The PCMe results indicate that three of the five air samples analyzed could not be analyzed due to overloading of particulate matter. The remaining two PCMe results indicate that one sample was below the primary clearance criterion and one sample exceeded the primary clearance criterion of 0.0009 S/cc at 0.0033 S/cc.

...

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, http://epa.gov/wtc/confirmation_clean_study.htm]

Amount asbestos/fiberglass on surfaces not related to thickness of dust layer

EPA's cleaning study at 110 Liberty St. demonstrates clearly that the amount of visible dust on surfaces does not necessarily correlate with the total amount of asbestos or fiberglass on the surface. However, there does appear to be a stronger correlation between the total amount of lead on the surface with the amount of dust present.

The following tables from the EPA study²¹ shows the ranking of the amount of asbestos, lead, and fiberglass in surface dusts in the 13 apartments studied, before any abatement by EPA. You can see that many of what EPA itself classified as "minimally impacted" apartments, which had no visible dust except under the baseboard heating units, had higher concentrations of asbestos and fiberglass than the apartments with "significant" dust accumulations. This fact totally disproves EPA's claims that only thick layers of dust that could be measured with a ruler required professional abatement.

On the other hand, apartments at 110 Liberty St. with heavier visible dust layers generally also had higher lead concentrations in surface dusts. A logical explanation is that the lead component of the dust is heavier and less likely to become resuspended. The particle size of the lead component may also be larger. However, asbestos and fiberglass are lighter and more aerodynamically stable. The 110 Liberty St. address was boarded up and shut for many months. The asbestos and fiberglass, but not the lead, could have become resuspended and settled in other parts of the building. An alternative explanation could be that the lead component of the dust was deposited at one point in time with the major accumulations of dust mass, while the asbestos and fiberglass entered the building at later dates from the outside.

Regardless of the explanation, this EPA data does demonstrate that there is not a 1 to 1 correlation with the amount of visible WTC dust and the amount of asbestos and fiberglass. Thus, it is highly imprudent to assume that there are no hazards or lesser hazards just because there is less visible dust, or that professional abatement or EPA's more stringent Scope B cleanup should only apply where there is visible WTC dust.

The summary section of EPA's 110 Liberty study claims that there is a good correlation of visible dust and all contaminants. This is a false conclusion and not proven by EPA's own data.

Ranking by Asbestos Wipe Results					
"minimally impacted" (no visible dust except under baseboard heaters) apartments are in boldface type					
Apt . #	Rank	Asbestos Wipe	Lead Wipe	Lead Microvac	Fiberglass Wipe
5A	1	65,290	732	2	799
3D	2	60,623	81	20	601
5C	3	35,021	129	177	687
3C	4	34,030	268	72	477
2B	5	28,092	40	3	4,731
2A	6	16,607	34	6	787
4C	7	14,242	88	75	477
5D	8	9,651	17	38	441
4D	9	8,861	52	61	830
4B	10	7,911	25	n/a	501
3A	11	2,962	19	5	515
3B	12	2,566	9	5	1,259
4A	13	2,368	12	5	401

Ranking by Fiberglass Wipe Results					
"minimally impacted" (no visible dust except under baseboard heaters) apartments are in boldface type					
Apt . #	Rank	Asbestos Wipe	Lead Wipe	Lead Microvac	Fiberglass Wipe
2B	1	28,092	40	3	4,731
3B	2	2,566	9	5	1,259
4D	3	8,861	52	61	830
5A	4	65,290	732	2	799
2A	5	16,607	34	6	787
5C	6	35,021	129	177	687
3D	7	60,623	81	20	601
3A	8	2,962	19	5	515
4B	9	7,911	25	n/a	501
3C	10	34,030	268	72	477
4C	11	14,242	88	75	477
5D	12	9,651	17	38	441
4A	13	2,368	12	5	401

Ranking by Lead Wipe Result					
"minimally impacted" (no visible dust except under baseboard heaters) apartments are in boldface type					
Apt . #	Rank	Asbestos Wipe	Lead Wipe	Lead Microvac	Fiberglass Wipe
5A	1	65,290	732	2	799
3C	2	34,030	268	72	477
5C	3	35,021	129	177	687
4C	4	14,242	88	75	477
3D	5	60,623	81	20	601
4D	6	8,861	52	61	830
2B	7	28,092	40	3	4,731
2A	8	16,607	34	6	787
4B	9	7,911	25	n/a	501
3A	10	2,962	19	5	515
5D	11	9,651	17	38	441
4A	12	2,368	12	5	401
3B	13	2,566	9	5	1,259

Ranking by Lead Microvac Result					
"minimally impacted" (no visible dust except under baseboard heaters) apartments are in boldface type					
Apt . #	Rank	Asbestos Wipe	Lead Wipe	Lead Microvac	Fiberglass Wipe
5C	1	35,021	129	177	687
4C	2	14,242	88	75	477
3C	3	34,030	268	72	477
4D	4	8,861	52	61	830
5D	5	9,651	17	38	441
3D	6	60,623	81	20	601
2A	7	16,607	34	6	787
3A	8	2,962	19	5	515
3B	9	2,566	9	5	1,259
4A	10	2,368	12	5	401
2B	11	28,092	40	3	4,731
5A	12	65,290	732	2	799
4B		7,911	25	N/A	501

Asbestos not an indicator of lead – 110 Liberty St. study demonstrates fact

Before abatement, only 23% of apartments had safe levels of lead (only 3 out of 13 apartments had safe levels). Most of the apartments (7 out of 13) did not even have visible WTC dust, except around the heating baseboards.

Asbestos testing was not a good enough indicator of whether hazardous lead levels had been abated. 18% of the apartments which still had hazardous levels of lead after one EPA abatement passed the asbestos test, but not the lead test. In other words, if EPA had relied only on asbestos testing to determine whether lead was still present at hazardous levels, then a significant number (18%) of apartments that had high lead would have gone unnoticed. The EPA 110 Liberty St. study concluded the following, which is totally false and unsupported by the data:

The study found that conducting asbestos in air sampling after cleaning could be used as a surrogate method for determining if future cleaning was needed.

...

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, NY New York, NY, 5/03, EPA Region 2, p. 114, http://epa.gov/wtc/confirmation_clean_study.htm]

Undoubtedly, EPA put this knowing false claim into the conclusion section of its 110 Liberty St. study because the EPA voluntary cleanup program, already in progress, was only testing for asbestos. The 110 Liberty St. results came after the EPA cleanup program was set up with its intentions to only test for asbestos had been announced to the public. EPA had a vested interest in justifying the asbestos-only testing in EPA's cleanup program.

Failure to Warn

EPA had the results of the 110 Liberty St. study by the third week in October, 2002. (See page 17 of EPA study.) They had all of the air tests and dust test results, because they needed this information to determine whether the abatement was complete. They knew that even apartments containing minimal dust was resulting in hazardous conditions after one abatement, and they knew that the dust itself contained less than 1% asbestos.

They knew that their extraordinary abatement measures, including taking appliances out from the wall, elevating them and using specialized brushes while simultaneously HEPA vacuuming, abating the roof, facade, common areas twice, abating the HVAC systems and all units at the same time, sealing off units after abatement to prevent recontamination, removal of furniture and personal belongings prior to abatement and testing, etc., was not always successful in bringing asbestos, lead, and fiberglass levels down to even EPA's lenient benchmark levels. They knew

they were having to clean the majority of units 2 or 3 times to achieve their benchmarks.

But they did nothing with this information. They did not issue a press release alerting the public saying that homes and businesses in NYC that had only been cleaned with the NYC DOH do-it-yourself guidelines would not be clean enough, and needed additional abatement. They did not say that their new study demonstrated that any prior cleanings by individual tenants on single units, instead of on a whole building basis, was very unlikely to have been successful. Instead, they issued press releases during this period saying that EPA's voluntary cleanup program was only for psychological reasons, to soothe the "jittery nerves" of citizens. As a result, a very small percentage of eligible residents signed up for EPA's free cleanup program, or coordinated simultaneous whole-building cleanups.

EPA was silent about the 110 Liberty St. study, and let the December 2002 deadline slip away for sign up for free cleanup program. At the time, citizen groups were actively lobbying for an extension of the time limit. At a NYC council hearing on 12/17/02, EPA's Kathleen Callahan, Acting Deputy Regional Administrator, testified that EPA would not extend the deadline for signing up for the cleanup program, saying "citizens could use their own HEPA vacuums to clean it up themselves." At this time, EPA knew full well the results of its 110 Liberty St. study showed that even the most extraordinary professional abatements procedures could not dependably clean apartments to meet even EPA's lenient criteria.

The summary section of EPA's 110 Liberty St. study also constitutes a failure to warn, because it is false and misleading, misrepresenting the actual results of the study. The 110 Liberty St. study shows the amount of dust that can be seen visually does not necessarily correlate with the hazards. The EPA summary stated:

The observation of WTC dust is good indicator that WTC contaminants may be present and that the amount of WTC dust correlates with the level of contamination.

Even after 3 abatements (which only started after initial abatements by the landlord and then the fire department), EPA was unable to reduce contaminants below EPA's lenient health criteria. The following is EPA's claim that the abatements worked in all cases, followed by a contradictory statement admitting that at least one apartment never passed EPA's criteria. One apartment could not pass EPA's air test for asbestos using aggressive sampling even after 3 abatements.

The use of a standard cleaning method of vacuuming and wet wiping significantly reduced levels of WTC related contamination with each cleaning event and was successful in reducing concentrations to levels below health based benchmarks.

In some cases, multiple cleaning sessions (2 or 3) were necessary to reduce contamination. The methods were highly effective in reducing all COPCs below health based benchmarks.

...

Based on post-cleaning data, an additional three residential units and one common area

exceeded a healthbased benchmark for either asbestos, lead, MMVF, or alpha-quartz, or a combination of these compounds.

EPA's summary section claimed that asbestos testing was a good indicator of all other contaminants. The study results contradict this claim. Out of 13 apartments, 2 failed testing for lead, but not asbestos. Also, a hallway failed for airborne quartz, but not asbestos.

Asbestos in air is a good indicator of whether additional cleaning is needed. Based on the compounds and testing methods chosen, the data suggests that using asbestos air samples as an indicator for additional cleaning is the most sensitive of the testing methods, as it resulted in the largest percentage of additional cleanings.

Ground Zero Task Force study also demonstrates “minimal WTC dust layers” responsible for high airborne asbestos

The 110 Liberty St. study showed that apartments with minimal dust layers resulted in the failure of air tests even after 2 or 3 aggressive professional abatements. Furthermore, none of the dust was ever over 1% at 110 Liberty St.

Another study commissioned by the Ground Zero Task Force of Elected Officials documented very high, hazardous levels of asbestos in air in an apartments that only had very thin, minimal layer of dust.²² This apartment was 5 blocks north of Ground Zero on Warren St. The NYC DOH stated that its do-it-yourself cleanup guidelines did not even apply to addresses north of Warren St., because the WTC dust supposedly had not reached that far. A photograph of the dust layer is shown in the study. It is so thin that you can still see the grain of the wood on a table, and read what is written on a piece of paper.

Despite this minimal dust level, air concentrations of asbestos were still extremely high, higher than EPA ever reported in any of its outdoor air measurements. The air in the apartment had these highly hazardous levels even when the air was measured under passive conditions which is not allowed when performing the AHERA test. For the apartment with the heavier dust layer, the air levels of asbestos were 90 times the AHERA clearance level of 70 s/mm².

The following are press and other accounts of the findings of this study:

11/20/01

Meanwhile, a group of elected officials released a privately conducted air quality study that found extremely high levels of asbestos in two buildings near Ground Zero in mid-September.

...

The group cited a study of dust and air samples taken Sept. 18, a week after the Trade Center attack, at a seven-story apartment building at 45 Warren St. four blocks north of Ground Zero and a 30-story apartment building at 250 South End Ave. in Battery

Park City, just southwest of Ground Zero.

One of the experts who conducted the study was John Kominsky, a chemical engineer based in Cincinnati. Kominsky said the levels of asbestos found in the two buildings far exceeded the maximum level the Environmental Protection Agency deems permissible in schools that have undergone asbestos remediation.

That standard is 70 "structures" fiber, bundle or fine material per square millimeter.

The levels found at 45 Warren St. ranged from 279 to 376 structures per square millimeter. At 250 South End Ave., the levels ranged from 6,277 to 10,620 structures per square millimeter.

Kominsky said those levels would cause "significant health risks" if there was long-term exposure. He advised that anyone cleaning up those buildings should know the "proper techniques" for handling asbestos.

...

[Safety Guidelines Set For WTC Site Workers Dems seeking cleanup czar, New York Daily News, 11/20/01, By GREG GITTRICH and FRANK LOMBARDI]

1/13/02

Civilian scientists and physicians hired by unions, tenant groups, contractors and New York political leaders found just the opposite. Taking hundreds of samples, many inside apartments, offices and condos, these experts used the newest electron microscope technology and fiber counting protocols. They found far more asbestos fibers than did government investigators. These private experts - all regularly used by the government as consultants - found levels in the dwellings that alarmed many assessing the health risk New Yorkers face.

"These eminent asbestos researchers brought state-of-the-art methods to lower Manhattan and the significance of what they found with the new technology is dramatically different than what EPA and New York State reported," said Cate Jenkins, a senior EPA chemist in the agency's hazardous waste division.

"For every asbestos fiber EPA detected, the new methods used by the outside experts found nine," Jenkins said. "This is too important a difference to be ignored if you really care about the health of the public."

Jenkins, a 22-year veteran of the EPA, talked about the asbestos levels that researchers Eric Chatfield and John Kominsky found in apartments and condos near the collapse that had not been cleaned or cleaned improperly.

...

[Asbestos Risks Near Ground Zero May Be Far Greater Than Government Reports, By Andrew Schneider, ST. LOUIS POST-DISPATCH, 1/13/02. Updated by the St. Louis Dispatch on its anniversary date, 1/13/03, under a new title, "World trade center attack asbestos health threat" and can be found at www.stltoday.com]

12/19/02

Walter Mugdan, Counsel for EPA's Region 2, stated that the NYC DOH Recommendations should be followed in situations with minimal, small amounts of WTC dust.²³ An apartment with just such minimal, small amount of WTC dusts was the subject of the Ground Zero Task Force study . . . A color photograph of a dark table is included in this study, showing what would be considered "small amounts" and "minimal" dusts by most people.²⁴

. . .

<i>[Excerpt from Table 2]</i>	<i>[concentration of settled dust on surfaces]</i>	<i>[level of asbestos in air in units of both structures per milliliter and structures per square millimeter. Air measured under passive condition, no fans or leaf blower.]</i>
HIGH EXPOSURE BUILDING, 250 South End Ave. Heavy visible dust layer, could still read addresses on envelopes on table and see the lines on a yellow legal pad on the table. Windows had been blown out some places. Dust level from living room high boy side table, living room air level measured under passive conditions. [
Passive conditions, found by testing	640,000 s/cm ²	2.56 s/mL [equivalent to 6277 s/mm ²] <i>[this is 90 times the AHERA level of 70 s/mm²]</i>
LOW EXPOSURE BUILDING, 45 Warren St., dust layer visible on dark table, grain of wood still visible. 5 blocks from Ground Zero, building faced north. Dust level from living room table, living room air level measured under passive conditions		
Passive conditions, found by testing	29,000 s/cm ²	0.12 s/mL [equivalent to 376 s/mm ²] <i>[this is over 5 times the AHERA level of 70 s/mm²]</i>

. . . [Jenkins' 12/19/01 memo]

EPA misrepresents findings of GZTF study of indoor air, claiming it showed "consistent" results with EPA tests of outdoor air

In testimony, EPA falsely claimed that results the study commissioned by the Ground Zero Elected Official Task Force (GZTF)²⁵ were "fundamentally consistent with EPA's findings." In fact, EPA had only measured asbestos in outdoor air, where it was diluted. EPA did not find levels exceeding 70 s/mm², the AHERA clearance level. However, the GZTF study measured air indoors and found the levels were over 5 to 90 times the 70 s/mm² AHERA level. No reasonable person could state that the findings of the GZTF were "fundamentally consistent" with the EPA findings. The claim by EPA that they were constitutes concealing the findings of the GZTF study and their implications from the public.

11/26/01

As you know, individual groups and organizations, including the Ground Zero Elected Official Task Force, have undertaken their own studies of environmental conditions in

and around the World Trade Center site. Reports summarizing these studies, such as the October 12 report prepared for the Task Force, show results that are fundamentally consistent with EPA's findings. Furthermore, the recommendations offered to the public as a result of these independent studies are also consistent with those of EPA.

...

[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S. Environmental Protection Agency, Before the New York State Assembly, 11/26/01] ²⁶

Demolition of Deutsche Bank, other buildings – abatement not always possible

It is not always possible to remove asbestos with the techniques used by asbestos abatement firms. At the Libby, Montana Superfund site, at least one building had to be demolished and rebuilt because it asbestos could not be removed otherwise. Public School 90 in NYC has been boarded up and abandoned for years because of asbestos contamination, but not abated.²⁷

The planned demolition of the Deutsche Bank building, a 44 story building near Ground Zero at 130 Liberty St. is yet another example of the impossibility in some cases to clean contaminants such as asbestos from buildings. The ineffectual do-it-yourself cleanup guidelines of the NYC DOH, as recommended by EPA, certainly would not work on this building. Even the rigorous procedures EPA used in the 110 Liberty St. study would not have worked. This is because they already tried even more rigorous procedures to get rid of the mold.

Mold is not the reason that the Deutsche Bank building is coming down. A large amount of effort was spent to remove the mold – walls and ceilings were torn down, and carpets were replaced. These stringent measures to try to get rid of the mold are more rigorous than the procedures used during EPA's 110 Liberty St. study. The NYC DOH declared in March of 2003 year that the building was free of any mold. We would have to doubt the competence of the NYC DOH if we still believed that mold was a problem.

The 110 Liberty St. building is only about 300 feet from the Deutsche Bank building. It had its windows blown out by the blast, and thus may have accumulated a relatively larger amount of inside WTC dust than the 40 story Deutsche Bank skyscraper. The Deutsche Bank only had a 24 story gash on the front, but the windows remained intact on other sides of the building.

Structural integrity is also not the reason for the razing of the Deutsche Bank building. Even though a gash was made in the building by the falling towers, the building was determined to be structurally sound, according to press accounts as well as The WTC Report.²⁸

But asbestos and other contaminants that could not be removed resulted in a decision to demolish the building. The building was built around 1971. No spray-on asbestos fireproofing was used in the building. This means that any asbestos would have come from the outside, namely WTC dust.

The news stories below explain:

6/21/03

The Deutsche Bank building, the last skyscraper still standing at the lip of Ground Zero, looks headed for demolition, nearly two years after the September 11, 2001 terrorist attacks, sources said.

...

A straightforward implosion of the structure has been ruled out, because of all the asbestos and contaminants that have made the building unusable.

...

[Last building at 'Ground Zero' to go, 6/21/03, South Africa Sunday Times, AFP, <http://www.sundaytimes.co.za/zones/sundaytimes/newsst/newsst1056177743.asp>]

6/20/03

The battered and disfigured Deutsche Bank building in Lower Manhattan, among the last remaining buildings damaged in the Sept. 11 terrorist attack whose fate has not been decided, has been deemed beyond repair and is expected to be taken down beginning next month, according to people involved in negotiations on its future.

...

The building must be disassembled more than torn down, covered in an airtight tarp to contain the asbestos and other contaminants that have made the building unusable. As a result, the cost of the work has been estimated at more than \$100 million, according to people involved in planning the project. Insurance payments to Deutsche Bank are expected to cover most of the cost.

...

Although steel falling from the south tower of the trade center ripped a 24-story gash in its northern facade, the building remained structurally sound. Its sprinkler system was triggered, however, and the combination of standing water, contaminants from the trade center, sealed windows and little direct sunlight spawned a robust strain of mold throughout much of the building.

After an intense cleaning, the city health department declared the building free of mold earlier this year. The dismantling of the building will still require engineers to pay close attention to environmental hazards, accounting for most of the costs of taking the building down. Raising scaffolding around the building to support the tarp enclosing the project will cost more than \$10 million, according to a real estate executive familiar with the project. The removal of asbestos and other contaminants is expected to cost more than \$70 million, while taking apart the structure will run at least \$25 million.

...

[Last Days for a Survivor of Sept. 11, 6/20/03, By EDWARD WYATT and CHARLES V. BAGLI, NY Times]

4/3/03

Deutsche Bank has cleared its building at 130 Liberty St. of mold, which some Downtowners feared posed a health hazard, the city's Health Department said last month.

Chris D'Andrea, a scientist at the agency, told Community Board 1 last month that in February Health Department officials and Deutsche Bank representatives toured several floors that had been damaged by mold. "The floors they took us to had obviously been remediated," he said. "Ceiling tiles had been removed, wallboards had been cut down and carpeting had been removed."

D'Andrea returned on March 5 to inspect every floor, and the only mold he found was in a refrigerator in a kitchenette. "I wouldn't think the building posed a health problem as far as mold is concerned," he said.

...

[*Tribeca Tribune, Online News, 4/30/03,*
http://www.tribecatrib.com/newsapr03/deutsche_bank.htm]

5/8/02

The bank is concerned enough about the mold and asbestos contamination in nearby buildings that it has allowed few employees to retrieve items from the offices, sources said. Those who have gone into the tower say they have had to undergo safety training and don a protective suit and respirator. "You need permission from a senior level," said a bank official. "You have to go through all the safety steps because they believe it's not safe."

Deutsche Bank officials have been tight-lipped about the tower's fate.

...

[*Mold May Topple Bldg: Dangerous Fungus Infesting Ground Zero Skyscraper, By Ralph R. Ortega and Greg Gittrich, 5/8/02, NY Daily News*]

Progress of EPA's voluntary cleanup

Under EPA's voluntary cleanup program, where much less rigorous methods are used in comparison to the EPA study at 110 Liberty St., abatement is not going well.

On EPA's web site, aggregate air test results are posted at http://www.epa.gov/wtc/factsheets/clean_test_results.htm . For the week ending 6/19/03, EPA is claiming that 5.1% of apartments overall failed the air tests after EPA's cleaning. This includes those with overloaded filters, which means there were so many particulates on the test filter that the laboratory could not distinguish the asbestos fibers.

The claim that EPA only has about a 5% cleaning failure may represent the results after several abatement efforts in the same apartment. It certainly could not represent a success rate after only one try of EPA's abatement procedures. This is because the abatements under EPA's voluntary program usually were not coordinated whole building abatements like the 110 Liberty St. study, which means no abatement of common areas, HVAC systems, or exteriors. Also, personal belongings would have been present in these apartments abated by EPA, unlike the Liberty St.

study. Furthermore, the abatements done in these apartments did not use the rigorous methods used at 110 Liberty St. At 110 Liberty St., even before EPA got there, a professional abatement had been performed, and then the fire department came in again to clean up dusts prior to EPA's arrival..

At 110 Liberty St., where 7 out of 13 apartments only had minimal dust, and the dust was less than 1% asbestos, 30% of the apartments failed EPA's air tests after the 1st abatement.

The validity of the air testing data in EPA's voluntary cleanup program is highly suspect, since it appears to have a lower failure rate than EPA found during the 110 Liberty St. study, a much more rigorous abatement. The laboratory would not be at fault. Instead, it is such a simple matter to block the portals completely or partially of an air testing device so that air is not pulled through the test filter. Alternatively, the pumps can be set so that not much air is pulled through.

Stories of EPA cleanup at one building also cast doubt on EPA success rate

There has been a series of errors and possible misrepresentation of data at one EPA cleanup site, IPN plaza near the pier where debris was stored and transported before being carried by barge to the Staten Island landfill. After three failed abatement attempts, EPA reported that the filters were still overloaded in a common area. EPA's Ben Barry told residents that there would be no fourth abatement, that EPA had exercised due diligence, and that was that, sorry, folks. I was consulted at this point in time. The press got involved.

Then, amazingly, EPA claimed that they had made a mistake and were only looking at the old data. The air test actually hadn't failed after the third abatement. They had made a mistake, and were looking at the air test for the second abatement, not the third.

This is not credible because there was so much scrutiny and discussion about the overloaded filter after the third attempt at abatement. At same. EPA's Ben Barry was also telling residents not to worry about asbestos, because it would all be trapped by the new carpeting. See the following two press accounts:

5/6/03

Lori Mogol and Richard Zimbler watched from their balcony at Independence Plaza North as ground zero was cleaned ahead of schedule. But almost a year after the last of the debris was hauled away, the couple's home has still has not been cleared of toxins that likely resulted from the collapse of the World Trade Center.

In late February, elevated levels of asbestos were detected in the couple's apartment after it was cleaned and tested by Environmental Protection Agency contractors. In mid-March, the agency sent them a letter they found to be confusing and technical, informing them of the excess asbestos and advising, "You will be contacted by an E.P.A. representative who will discuss these results with you and help you to decide upon a

follow up course of action.”

Six weeks later, Mogol and Zimble said they had received no further communication from the E.P.A. Along with their psychic wounds from the Sept. 11, 2001 terror attack, the asbestos in their apartment serves as a constant reminder of the events of that day. “We haven’t even gotten beyond the physical cleanup, because there are chemicals in here,” Zimble said. “So how can we go on to recovery?”

Zimble has experienced congestion and other respiratory problems since Sept. 11, 2001, although Mogol has not. In addition to witnessing the events of the day, the couple has a close friend who lost her husband in the trade center attack.

Zimble and Mogol are not alone in their frustration with the E.P.A.’s voluntary asbestos testing and cleanup program, a response to the World Trade Center disaster that began last August in residences south of Canal, Pike, and Allen Sts. Some of their neighbors, and the building management at I.P.N., have also found themselves waiting for months for answers about the safety of the three-building complex in Tribeca, especially 310 Greenwich St., the southern-most of the three, where Zimble and Mogol live in an apartment that faces the trade center site.

E.P.A. tests taken after the couple’s apartment was cleaned by ATC Associates, one of the agency’s contractors, revealed asbestos levels in their dining room of .0021 fibers per cubic centimeter, more than double the E.P.A.’s risk-based clearance level of .0009 fibers per cubic centimeter. In keeping with the program’s protocol for asbestos, no tests were taken prior to the cleanup, so it cannot be determined what the asbestos levels might have been before E.P.A. contractors spent a day vacuuming and wiping the apartment.

...

Mary Mears, an E.P.A. spokesperson, said that the agency’s coordinator for I.P.N. tried calling Zimble and Mogol three or four times to follow up on the letter but was unable to reach them. The couple believes it is unlikely that they missed the E.P.A. calls, as Mogol develops Web sites from a home office and an answering machine takes messages when she leaves the apartment during business hours.

...

Diane Lapson, the head of the environmental committee, estimated that about half of I.P.N. tenants initially registered for the E.P.A. program, but said she did not know how many decided to continue with the process.

A tenant of 310 Greenwich St. interviewed outside the building said that he, too, received a letter from the E.P.A. after his apartment was cleaned, informing him that asbestos levels there exceeded the agency’s benchmark. The tenant, a 39-year-old who works for the city and declined to give his name, said he got the letter in early March but never received any follow-up call from the E.P.A. that explained the results or suggested further action.

...

When a residence does not pass the E.P.A. risk-based clearance level, then it is re-cleaned, Mears said. The four cleaning contractors the E.P.A. has engaged for its Lower Manhattan program are also responsible for scheduling appointments, Mears said.

...

The E.P.A. developed the risk-based asbestos standard of .0009 fibers per cubic centimeter specifically for the agency’s Lower Manhattan cleaning and testing program, Mears said. A person exposed to that level of asbestos continuously for 30 years has a

one in 10,000 risk of developing asbestos-related cancer, according to E.P.A. toxicologist Dr. Mark Maddaloni. Since the levels found in Mogol and Zimble's apartment were about double those of the standard, their asbestos-related cancer risk would rise to two in 10,000, Maddaloni said.

More than any immediate health concerns, Zimble and Mogol say they are upset by the way the E.P.A. has treated them.

"This is what maddens me, just the absolute lack of accountability," Zimble said. "To me, one of the biggest problems of the E.P.A. is they're still thinking of themselves as an enforcer. They haven't seemed to make the leap like every other federal agency that they're first responders." Others say the E.P.A. is doing the best that it can with a problem of unprecedented scope and a program that falls outside its usual duties.

"I think what the E.P.A. is doing is what they're supposed to do," said Steven Cohen, the director of a graduate program in environmental science and policy at the Earth Institute of Columbia University. "The question on follow through is whether the people who received the letter did follow through. It doesn't seem like it's that complicated."

...

The process did not go as smoothly for Zimble and Mogol. A set of technical charts accompanied the E.P.A. cover letter that they received informing them of their asbestos results. Their dining room asbestos level of .0021 fibers per cubic meter was not mentioned in the cover letter, which simply said that their apartment's asbestos levels exceed the E.P.A. standard, and instead the data was noted on charts that Maddaloni said were "admittedly not that readable."

Maddaloni and other experts have helped residents who call the agency decipher their test results. The E.P.A.'s letter to Zimble and Mogol included a phone number to call with any questions. But some say that the charts should be more clearly presented, eliminating the need for further assistance.

"The average tenant has no idea what these mean they see numbers all over the place," said Deborah Dolan, the property manager at I.P.N., who said that through experience, she has become more practiced at reading lab results. Dolan said she has been trying since last fall to learn the results of the E.P.A.'s testing and cleaning of the common areas at I.P.N. "The whole thing is just ridiculous," Dolan said. "Everything is a secret for some reason."

Dolan said that I.P.N. underwent a series of asbestos tests in the 1980s that came out clear, increasing the likelihood that any asbestos found in I.P.N. could have come from the trade center collapse. The buildings of I.P.N. were built right around the time when New York City stopped using asbestos in construction, which was in 1973, according to a spokesperson for the city's Department of Environmental Protection.

The E.P.A. has not yet released the I.P.N. common area test results because contractors are still re-cleaning parts of the complex, said Ben Barry, a community involvement coordinator for the E.P.A. Barry said he could not confirm whether the re-cleaning was due to elevated asbestos levels or filter problems that prevented an initial reading, but he said that mechanical difficulty was generally more often the cause for a re-cleaning.

"We usually just try to give the final results because a progress report wouldn't do a good job of telling residents the status of a building," Barry said. Barry declined to give an

estimate of when the agency would be done testing and re-cleaning at I.P.N., but said that once the common area test results were compiled, a copy would be sent to the I.P.N. tenants' association.

Some residents do not want to wait any longer, saying that even bad news would be better than uncertainty. "We have a lot of fears, because we're not hearing the truth of the situation," Lapson said.

Lapson and others worry about the possibility of re-contaminating apartments if common areas found to have elevated asbestos are re-cleaned after apartments have already been scoured.

Barry said cross-contamination risks were minimal since the asbestos levels are low to begin with and the complex's new carpeting would trap any harmful fibers.

Mogol and Zimblar said they sometimes feel the city has forgotten those who are still hurting from the terror attacks of Sept 11. A clean, asbestos-free apartment would be a good place to begin the healing process, they said, but it won't bring back those who were lost. "All this cleanup is a metaphor for move on and forget," Mogol said. "Then everything will be all right. But it isn't."

...

[Asbestos found in I.P.N., after E.P.A. cleanup, 5/6-12/03, Elizabeth O'Brien, Downtown Express,, http://www.downtownexpress.com/DE_WEB_02/asbestosfound.html]

5/20/26

The stairwells of 310 Greenwich St. received a clean bill of health from the Environmental Protection Agency last week, the outcome of the third round of tests they underwent as part of the agency's Lower Manhattan cleanup. The first two times the stairwells were cleaned and tested for asbestos beginning in January, 2003, overloaded filters prevented scientists from analyzing some of the test results, according to E.P.A spokesperson Mary Mears.

...

News that the stairwells cleared surprised the property manager at Independence Plaza North, the three-building Tribeca complex that includes 310 Greenwich St. Deborah Dolan, the manager, said an E.P.A. worker told her last Tuesday that the agency couldn't get a reading for some of the samples on the third try, either.

On Friday, Mears confirmed that there had been a mistake: agency workers had looked at the results of the second test when they told Dolan that there was an overloaded filter on the third try. "Unfortunately, we pulled out the old data," Mears said.

...

More troubling than last week's episode, Silverman said, was that the common area test results are only surfacing now, more than five months after the E.P.A. began cleaning at I.P.N. Tenants said that the agency assured them before the program began that common areas would be cleared before they started on the apartments.

...

Responding to residents' fears of recontamination, Ben Barry, an E.P.A. community involvement coordinator, told Downtown Express two weeks ago that asbestos levels at I.P.N. were likely very low to begin with, but if there were any asbestos fibers left after

the cleaning, they would be trapped by the new carpeting put down by the management of the three-building Tribeca complex.

But Barry's attempt to reassure the public was disputed by other E.P.A. scientists as not being based on established scientific evidence.

"There are no scientific studies that show there's any kind of encapsulation process," said Dr. Cate Jenkins, a veteran E.P.A. scientist who works in the hazardous waste identification division of the agency's Washington, D.C. headquarters, using a term that refers to the entrapment of asbestos fibers in materials such as carpeting.

Dr. Mark Maddaloni, a New York-based E.P.A. toxicologist, also noted that the relationship between carpeting and asbestos requires further study, saying of the potential risk, "That's poorly understood."

Prof. Arthur Langer, an environmental scientist at Brooklyn College, said that while Barry's remarks might have been correct that the risk to I.P.N. tenants was small, the community outreach coordinator should have been more responsive. "This person from the E.P.A., I'm sure he's trying his best, but these people have been traumatized, you need to listen and address their concerns," Langer said. "These folks were in a war zone, you don't tell them it's all right, it's all in the carpet."

...

[E.P.A. says I.P.N. stairwells are safe, 5/20-26/03, By Elizabeth O'Brien, Downtown Express, http://www.downtownexpress.com/de_04/epasays.html]

H: “FIRST RESPONDERS FOR PUBLIC WARNING” –

EPA IG QUESTIONNAIRE MUST ASK WHO MOTIVATED PUBLIC TO TAKE PRECAUTIONS (OBVIOUSLY NOT EPA)

“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?

...

“Did people receive enough information about air quality? Did people return to their homes without adequate information regarding health risks . . . Plan to address these issues in survey of 5,000 NYC residents. Survey poses 43 questions about communications received by the public and actions taken by the public. Anecdotal evidence and first person interview (researchers, others who observed practices first hand) indicate (a) website useless to many until too late – no electricity, no phone, no computer, etc. (b) some missed subtleties of EPA’s intended message (outdoor air only; long term only; outside ground zero only), and (c) may not have been effective in consistently getting public to take desired precautions before returning.” [1/27/03 EPA IG report]

The EPA IG report itself is creating a large misconception by the following statement:

. . . may not have been effective in consistently getting public to take desired precaution before returning. . . . [EPA IG 1/27/03]

In light of the written record, there is no evidence that EPA ever desired that citizens take any reasonable precautions. There is no evidence that anything EPA said or did was the cause of citizens taking precautions. If there were inconsistencies in the public taking precautions, then the fact that some did was due to warnings from others outside of EPA, certainly not from EPA. The only subtleties that may have been missed were EPA’s willful concealments of hazards and necessary precautions.

EPA IG after-the-fact questionnaire may be an attempt to obfuscate record

For the EPA Office of the Inspector General (EPA IG) to announce that it will use a survey to determine what type of information the public had on hazards during those critical weeks and months after the disaster is highly questionable. When the public did get information on how to

protect themselves, it came from experts who took the risk to speak out against the EPA message of “no hazards.” The EPA IG may well be using the questionnaire to confuse the issue at this late date, by the mechanism of asking if people took certain types of precautions, and if they did, attributing the precautionary actions to EPA’s warnings and information. In other words, the EPA IG may be intending to design the questionnaire as a way to prove that the public protected itself because of actions taken by EPA.

A questionnaire almost two years after the event, when the written record is already complete on what EPA and other authorities told the public, is suspect for that reason alone.

Questionnaire needs to ask who warned the public – otherwise it is invalid

The EPA IG stated that its “[s]urvey poses 43 questions about . . . actions taken by the public.” This will result in highly biased results unless the IG also asks who specifically warned the public about taking each particular action.

This is the way it could work: The questionnaire could ask open-ended questions like whether citizens had their apartments professionally cleaned, whether they discarded soft items like carpets and upholstered furniture, or whether citizens relocated until their residences/businesses were professionally cleaned. Then, all the EPA IG would have to do is interpret the responses this way:

More than 50% of citizens had their spaces professionally cleaned and discarded soft items, and relocated until this cleaning was completed. This shows that EPA was effective in communicating hazards and the precautions that were required.

That is why the questionnaire needs to ask specifically who warned the public to take these actions. EPA never advised citizens to have their spaces professionally cleaned. EPA only advised using the NYC Department of Health do-it-yourself guidelines, which stated that even dust masks were unnecessary, much less a HEPA respirator. (See Section E on EPA’s advice on cleaning residences and businesses.)

As another example, the IG questionnaire could ask an open-ended question like this: “What information did you receive from the press on the hazards.” People filling out the questionnaire would say that the press warned them. The IG could then put their own spin on this, saying that EPA must have been effective in communicating with the public, because the public said that they were warned by EPA through the press.

That is why the IG questionnaire needs to ask specifically who warned the public about hazards or the necessary precautions, and whether it was EPA or some other individuals or organizations that motivated the public to take precautions.

Documented mistrust shows public unlikely to have relied on EPA for advice

The public quickly learned to distrust the EPA and NYC misinformation about hazards from Ground Zero. They took the advice of others.

The following are press stories documenting citizen distrust of EPA. EPA spokesperson Bonnie Bellow is quoted as saying that she learned first hand that EPA lacked credibility about its statements after the WTC collapse. There also is a poll, where 70% of New Yorkers said that they did not trust EPA.

11/21/01

Government agencies monitoring the air quality near Ground Zero have lost much of their credibility with the public, Environmental Protection Agency officials and public health experts said yesterday.

...

Whether it's a general post-Watergate mistrust of government agencies or the belief that the city is engaged in spin control to keep businesses alive, the argument that the air is safe is not registering with the public — particularly those who have felt irritation from smoke and dust near Ground Zero, panelists said.

...

EPA spokeswoman Bonnie Bellow said she learned firsthand what type of credibility problem the government has with the chilly reception she received at her daughter's alma mater, Stuyvesant High School, near the World Trade Center site.

Bellow said she expected she would have the inside track toward easing fears about air quality because only last year she was a Stuyvesant parent. "That was completely overridden by the fact that I worked for the government," she said.

"People still have doubts about air quality," said John Cahill, senior policy adviser to Gov. Pataki. He noted that local, state and federal test results have shown no immediate danger to people downtown.

One way to improve the credibility of public health agencies is to have their experts admit more readily that they don't know what the long-term health implications are, doctors said. That's largely because there have been no long-term studies to use for comparison.

"Risk communication is more than spin," said Dr. Phil Landrigan, chairman of community medicine at Mount Sinai Medical Center. "If you think it's spin, then you've lost the battle already."

Under Pressure to Spin?

Panelists said there is a perception in the community that city, state and federal governments are pressuring their agencies to put a good spin on information in the effort to rebuild the area . . .

...

[Public Distrusts Gov't Air Tests, By JOE WILLIAMS, NY Daily News, 11/21/01]

3/10/02

Six months after terrorists toppled the twin towers, killing 2,838 people and plunging the nation into war, 68% of New Yorkers feel the city is as safe or safer than any other place in America. But 56% also admit that at some point after Sept. 11 they were racked by depression, sleeplessness, anxiety or nightmares. Fully 59% of all New Yorkers including 67% of those living or working downtown say they suffered financial setbacks after the terror attacks.

And 70% said they do not believe the Environmental Protection Agency or other government agencies' reports that the air quality around Ground Zero is safe.

These were among the most striking findings of an exclusive Daily News/NY1 poll of 505 adults in New York City, conducted March 5 by Blum and Weprin Associates. The margin of error was plus or minus 4.5 percentage points . . .

. . .

[N.Y.'ers Say City Safe as Anywhere, Poll finds many took financial hit, By BRIAN KATES, NY Daily News, 3/10/02]

3/10/02

Among the findings of a NY1 and Daily News poll on issues related to the September 11 terrorist attacks, the vast majority of New Yorkers do not believe the air is safe in and around the World Trade Center site. A whopping 70 percent of those surveyed said they do not believe the Environmental Protection Agency and other government agencies that say the air quality near the World Trade Center site is safe. Twenty-three percent believe the air is safe, and 8 percent weren't sure.

"This is the question where we see New Yorkers of all types," said pollster Julie Weprin of Blum and Weprin Associates," in clear agreement where they do not believe reports by the EPA and other government agencies that the air down near ground zero is safe to breathe."

. . .

[New Yorkers Don't Believe Downtown Air Is Safe, Poll Finds, New York 1 (TV), 3/10/02]

1/13/02

"We didn't see ourselves as the primary source for information on what the health implications were. We're not a health agency," she said, adding that these are national issues that EPA headquarters should be addressing.

But headquarters has repeatedly declined to discuss these policy issues, even though before Sept. 11, the EPA was in turmoil over how to handle several asbestos problems throughout the nation.

Granger who has studied the importance of risk communication, said the ball was dropped. *[Hugh Granger, HP Environmental, who took samples of WTC asbestos within weeks of 9// see Section H on the true "first responders for public information"]*

"We are talking about the very lives of these people and those they love," he said. "Because of the misleading or completely inaccurate government information and guidance, people don't know where to turn or whom to trust."

...

[NY officials underestimate danger, Reporter Andrew Schneider: St. Louis Post-Dispatch on Sunday, January 13, 2002. Updated by the St. Louis Dispatch on its anniversary date, 1/13/03, under a new title, "World trade center attack asbestos health threat" and can be found at www.stltoday.com]

1/18/02

"EPA is greatly relieved to learn that there appears to be no significant levels of asbestos in the air in New York City," said Administrator Christie Whitman in a Sept. 13 message repeated many times.

But now, amid growing scientific evidence of high asbestos levels in homes and other potentially serious air quality problems related to the attacks, many New Yorkers believe the EPA misled them and was perhaps too eager to promote the return to business as usual in lower Manhattan.

...

While there is no hard scientific evidence that New Yorkers are in danger from contamination, many observers say federal officials failed to properly communicate the level of medical risk to the city.

"All along, the EPA and other departments have been assuring people in New York City that things were fine, but things were not fine," said Dr. Stephen Levin, medical director of Mount Sinai Hospital's Center for Occupational and Environmental Medicine. "There was a great desire to resume business as usual here, and I do mean business, because there's a great push to commercially redevelop the [World Trade Center] site."

...

[Some See N.Y. Air as a Hidden Menace: Many believe EPA cited safety too quickly. Pollutants indoors a key worry. By Josh Getlin, LOS ANGELES TIMES, 1/18/02]

9/9/02

Many residents have been mistrustful of health officials because they feel they didn't warn them enough of potential hazards early on or take necessary steps to protect them from dust mixed with hazardous materials such as asbestos and heavy metals.

...

[Dusting off Manhattan: A year after 9/11, worries about toxic dust plague residents, 9/9/02, By Francesca Lyman MSNBC, <http://www.msnbc.com/news/803400.asp>]

The "First Responders for Public Warning" during September to October, 2001

The following are those who risked countering EPA and NYC claims of safety during September and October after the disaster, the critical time when citizens were returning to their homes and

businesses, cleaning up the dust with no protection whatsoever, not even drug store dust masks, because of the unsafe advice from EPA and NYC officials. One week after the disaster, the New York Stock exchange reopened. By October 5, it was reported that 12,000 of the 20,000 displaced residents were back in their homes in lower Manhattan.²⁹ The other residents below Canal St., about 340,000 people,³⁰ had never been formally “displaced” and had typically remained in their residences.

Those who spoke out included scientists, physicians, industrial hygienists, environmental activists, elected officials and journalists. Thus, the public was slowly being made aware of problems, but in opposition to the false information from the EPA and NYC. The public had no access to the experts except through the press. They did not need scientists or a medical doctors to sit in an ivory tower, knowing the answers but not speaking out.

If these “first responders for public warning” had not found a public voice, citizens would have believed, and still believe to this very day EPA’s original claims that there were no hazards. They would have returned to their homes and businesses, cleaning up the toxic fallout themselves, using the NYC DOH guidelines and probably less, as instructed to do so by EPA.

This review is limited to those who responded during those critical two months following the disaster. Others continued the investigation, challenging the official statements of EPA and NYC authorities. An excellent account of the struggle by journalists to cover this story may be found in the January/February 2003 issue of the American Journalism Review, posted online.³¹

Dr. Philip Landrigan, Mount Sinai School of Medicine

Dr. Philip J. Landrigan, Chairman of the Department of Community and Preventive Medicine at the Mount Sinai School of Medicine in New York City, was the first to publically oppose the claims of both EPA and NYC officials. Dr. Landrigan is a renowned researcher on the human health effects of asbestos.

On 9/13/01, the following story appeared in the NY Daily News. The Daily News also was the first newspaper to publish any statements opposing the official line by EPA and NYC officials. In this story, Dr. Landrigan’s statements were juxtaposed with those of Mayor Giuliani and Dr. Neal Cohen, the NYC Health Commissioner. Note that “another environmental expert” is quoted in the story as agreeing with Dr. Landrigan, but that this person would not give his/her name, probably out of fear of retaliation.

9/13/01

A prominent expert on asbestos warned yesterday that prolonged exposure to the rubble and dust of the collapsed World Trade Center towers could pose a "real" health hazard.

Dr. Philip Landrigan of Mount Sinai Medical Center said he was concerned about the

workers clearing away the debris and rubble of what used to be the city's tallest landmark. He said prolonged exposure over weeks and months, without masks equipped with respirators, would increase the risk of lung cancer and a deadly form of cancer of the lung linings called malignant mesothelioma.

"You won't see any immediate problems," he said. "It will take 25 to 30 years to develop."

Mayor Giuliani and Dr. Neal Cohen, the city's health commissioner, said yesterday the air quality is being monitored, but no cause for concern has been detected. "The air is safe as far as we can tell, with respect to chemical and biological agents," Giuliani said.

Cohen added that city, state and federal environmental agencies are "looking at air asbestos" and that "at this point, we don't have any level of concern."

Landrigan, chairman of Mount Sinai's department of community and preventive medicine, said asbestos was used in the early 1970s in building some of the lower floors of the World Trade Center. It was mixed with water and cement into a slurry that was sprayed onto steel beams for fireproofing, he said. Controversy over asbestos stopped it from being used on higher floors, he said.

Another environmental expert, who asked not to be identified, agreed with Landrigan and said a substantial amount of asbestos was probably released by the collapse of the towers.

...

[SITE DUST CALLED HARMFUL, New York Daily News, 9/13/01, FRANK LOMBARDI]

Dr. Landrigan wrote an editorial on the consequences of the WTC collapse which appeared in the November 2001 issue of *Environmental Health Perspectives*, a publication of the National Institute of Environmental Health Sciences, calling for a nationally registry of exposed persons, and cautioning about the hazards of exposure despite the fact that OSHA and EPA air testing was showing low levels of asbestos:

11/01

Air samples obtained by the U.S. Environmental Protection Agency (U.S. EPA) and the Occupational Safety and Health Administration (OSHA) in the weeks since the attacks have shown that 8-hr time-weighted average (TWA) levels of airborne asbestos fibers are generally below OSHA standards (2). However, bulk samples of dust at the site show concentrations of asbestos ranging as high as 20%. This material is unevenly distributed at the site, but the potential for exposure is constant. Whenever workers pick up a steel beam or overturn a piece of rubble, the threat exists that a puff of asbestos can be thrown into the air and then inhaled. The long-term health risks of those exposures include lung cancer and malignant mesothelioma.

...

[C]oncern arises from the fact that many of those at risk of exposure are children. Several factors have the effect of increasing children's potential risk (3). Children live closer to the ground than adults and thus are more likely to inhale any materials stirred up from dust. Children breathe more air per kilogram of body weight per day. Also, children have more years of future life in which to develop mesothelioma or other delayed diseases that may result from exposures to asbestos or to other toxic materials.

Almost no data exist on the possible long-term consequences of low-level asbestos exposure in early childhood. Cases of mesothelioma have, however, been reported in the grown children of asbestos workers (4), among nonworking women in the asbestos-mining townships of Quebec (5), and among long-term residents of a community near an asbestos plant in Italy (6). The need exists therefore to take aggressive steps to minimize pediatric exposure and also to create a registry of children of all ages who have been potentially exposed to dust.

. . .

Children are also at risk of exposure to toxic products of combustion that may have been generated during the explosions and fires. These materials include benzene, dioxins, furans, and polycyclic aromatic hydrocarbons. It may be advisable to obtain samples of venous blood from the children deemed to have been at highest exposure and then to analyze those samples for whichever toxic products of combustion are identified in environmental samples . . . Toxicity in utero is another possible dimension of the disaster.

. . .

[Landrigan, P. J. (Nov. 2001) EHP 109, A514]

In another press article in Newsweek on 10/5/01, Dr. Landrigan is quoted about the concern for the ultra-small asbestos particles found in WTC fallout. Dr. Landrigan is quoted in many publications during this critical time period.

10/5/01

THE STUDY, BY THE Virginia firm HP Environmental . . . “This stuff was just crushed, just pulverized,” says lead author Hugh Granger. “As it turns out, when we now measure and look for these very small fibers in the air and buildings, we find them, and we find them in uniquely elevated concentrations.”

“I find this very troublesome,” says Dr. Philip Landrigan, director of environmental and occupational medicine at Mount Sinai School of Medicine in Manhattan and a leading expert on asbestos toxicity. “The smaller the particle, the more easily it can be aerosolized. And the easier job that it has penetrating right down into the very depths of the lungs.”

. . .

The health implications of these findings are sure to be disputed. It is generally accepted that short-term exposure is not enough to cause the worst asbestos-related diseases, including asbestosis (chronic lung scarring), lung cancer, or mesothelioma, a rare cancer of the lung lining. In addition, experts say, it is the size and shape of asbestos fibers not any chemical compound found in them that causes disease. Their long, pine-needle shape allows them to lodge in lung pockets, causing scarring that eventually destroys the tissue. The crushed fibers Granger and his team found have this same needle-shape.

But there is some dispute about whether the smaller fibers are more or less dangerous. A study of workers in South Carolina who were exposed to broken and fragmented asbestos fibers, perhaps like those at the World Trade Center, showed that “gram for gram, the risk for cancer was many times greater than any other asbestos exposure circumstance ever seen,” says Landrigan. But other experts contend just the opposite, what researchers call “the Stanton hypothesis,” which posits that shorter fibers are less irritating and more easily coughed out of lungs, says Max Costa, chairman of

environmental medicine at New York University School of Medicine. . . .

. . .

*[Is Ground Zero Safe? New study suggests more asbestos at disaster site than previously revealed, 10/5/01, By David France, NEWSWEEK ,
<http://www.msnbc.com/news/638853.asp>]*

Dr. Landrigan continues to research the health effects on the community from the WTC disaster and communicate with the public on the hazards.

Monona Rossol, ACTS, industrial hygienist

On September 17, 2001, Monona Rossol appeared on WNYC, Leonard Lopate's morning program in an interview followed by taking calls from listeners about asbestos in WTC dust inside buildings. Rossol is an industrial hygienist, and President of Arts, Crafts, and Theater Safety, a few blocks north of Canal St. in NYC.³² She then appeared on MSNBC advising on the proper selection and use of respirators during the WTC cleanup and recovery operation.

She assisted the NY Environmental Law and Justice Project (NYELJP) in testing dust samples for asbestos and other toxic materials on behalf of the Patrolman's Benevolent Association, and found the results contradicted EPA and NYC official claims of no asbestos contamination east of Broadway.

She prepared a press release, which was then co-signed by the NYELJP, urging residents not to clean up apartments with no respiratory protection until they tested and were certain there was no asbestos problem:

9/22/01

DOWNWIND FROM DISASTER

. . .

Concern for the health of all those engaged in rescue and security operations, as well as those who live and work in lower Manhattan, has prompted the NYELJP and ACTS to conduct their own sampling of dust in and around the World Trade Center Disaster site.

The brave workers on the WTC pile have expressed concern about the dangers of breathing dust and smoke. Workers are not currently provided enough information to make an informed decision about the health risks of the dust and smoke.

. . .

Although people living and working in the New York City area breathe less dust and smoke than the workers at the site, the public faces similar hazards. In addition, the public includes individuals who are more vulnerable to the smoke, such as heart patients, asthmatics, and children. We sent our dust samples taken from the WTC site area to ATC Associates of New York for independent analysis. The first four of our samples (Batch No.2962 analysis date 9/19/01) indicate that the hazards posed by the dust are significant. We urge the Environmental Protection Agency and Federal, State and local health agencies to release their data on the following substances.

FIBERGLASS. The most distressing finding is that three of the four samples contain fiberglass at levels between 10 and 15%.

...

ASBESTOS. Analyses of our dust samples showed that one in four samples tested contained 2.1% asbestos, which is more than double the 1% level at which a material is legally designated as hazardous, and is subject to special abatement and removal procedures. These results were consistent with those reported by EPA, with reported levels as high as 3.3% asbestos in some samples.

DIOXINS and PCBs. The fires at the disaster site are consuming a mixture of combustibles. Wood, paper, and every conceivable type of plastic from computers, vinyl-coated wiring and cable, urethane foam upholstery, vinyl plastic floor tile, and synthetic fiber carpets, are burning. PCB-containing oils from old fluorescent light ballasts may also be burning. It is well-known that fires involving such materials are sources of highly toxic combustion by-products- including dioxins, PCBs, furans, and other highly toxic and cancer-causing substances.

Even backyard refuse burning is banned in many places because the fires were shown to be a major source of environmental dioxins and other toxins.

EPA press releases imply that the smoke from this huge fire does not contain these toxic chemicals. Clearly, we are not getting complete information.

...

Perhaps indifferently and misleadingly, the New York City Dept. of Health has issued an advisory which states "...the general public's risk for any short or long-term adverse health affects are very low, and no significant health risks [are posed] to occupants in the affected area."

...

[NYELJP and ACTS joint press release, 9/22/01]

Her October and November, 2001 newsletters, ACTS Facts, advised that testing be done before any apartment cleaning, opposing the advice from the EPA and the NYC Department of Health.

10/01

I am shocked and angered by the advice given by the US Environmental Protection Agency (EPA, the Occupational Safety and Health Administration (OSHA), the New York State and [city departments] . . .

...

The tests performed by federal, state, and city agencies on the dusts lying on the ground and other surfaces are incomplete and thus cannot be used to determine the hazards to anyone involved in cleaning up these dusts. The primary substance tested by these agencies was asbestos. But there are other important contaminants, such as fiberglass, fine particulates . . . PCB's and dioxins.

[T]he agencies reported levels . . . as high as 4.49% asbestos . . . There were over 30 locations in lower Manhattan where concentrations were 1% or higher, including at locations five to seven blocks away from Ground Zero.

...

The agency's tests did not find hazardous airborne asbestos in street air . . . But these air monitoring results are misleading because they do not indicate what the air levels are

inside buildings, schools, and homes in the area. The dust in outdoor air samples is diluted with wind from non-contaminated areas. Indoors, the dust is contained. Disturbing indoor dust during cleaning and other activities can result in higher levels.

...

The New York [City] Department of Health's website . . . provides advice that is typical of the major agencies. The NYC DOH says:

...

.Based on the asbestos test results received thus far, there are no significant health risks to occupants in the affected area or to the general public.

...

This statement is false. As I stated above: there were over 30 locations in lower Manhattan where asbestos levels were 1% or above, including at locations 5 to 7 blocks away from Ground Zero.

...

[Officials Give Bad Guidance: Fail to Fully Test Dust in Trade Center Disaster, 10/1/01, ACTS FACTS, Monona Rossol, www.caseweb.com/ACTS]

Rossol has continued to work, write, educate, and speak on WTC environmental issues. She lobbied Congress for a uniform cleanup, reviewed and commented on EPA draft documents, participated in negotiations and meetings with EPA on the cleanup, etc.

NY Environmental Law and Justice Project

The New York Environmental Law and Justice Project's (NYELJP) Joel Kupferman, Esq. worked with a wide range of emergency workers, police officers, fire fighters, union representatives, office workers and residents in the early days after 9/11. He, along with Rossol from ACTS, were among the first to independently test WTC dust.

9/28/01

On Sept. 19, eight days after the downtown disaster, Joel Kupferman, director of the project, took 10 dust and debris samples from various locations in and around the ravaged area and sent them to two laboratories to be analyzed. One of the labs, ATC Associates of New York, has been used often by the Board of Education to test for asbestos in city schools. The other was Virginia based Environmental and Toxicology International.

The tests showed that in four of the 10 samples, asbestos fibers comprised 2% to 5% of the lab specimens. . . . The amount of fiberglass in the samples was even greater than the asbestos some as high as 80% of the debris collected. Although not as dangerous as asbestos, fiberglass has been classified as a "possible carcinogen" by the International Agency for Research in Cancer. It also can trigger severe itching and rashes.

...

[NY Daily News, 9/28/01, Health Hazards in air worry trace center workers. by Juan Gonzales]

The NYELJP was one of the first to set up a comprehensive web site to inform citizens of the hazards of WTC fallout, posting not only their own data, but also the first full set of data released by EPA and NYC officials, obtained by the NYELJP through Freedom of Information Act Requests. This site may be found at www.NYenviroLAW.org.

NYELJP also was the first to test and find WTC contamination north of Canal Street. They also were the first to test WTC-contaminated carpet for asbestos using EPA's ultrasonification extraction method, also finding WTC dust in a building north of where EPA claimed there was contamination, finding high levels.

5/2/02

A seven-story co-op building half a mile north of Ground Zero was recently found to be contaminated with high levels of asbestos.

The building, at 150 Franklin St. in Tribeca, has housed a family-run child care center for years, and neither the child care center nor other tenants in the building evacuated their homes following the Sept. 11 attack on the World Trade Center.

Like many people who live downtown, the building's tenants simply cleaned up the dust in their apartments and tried to return to normal. Not until mid-April seven months after the collapse of the twin towers did the building's co-op board discover the high asbestos levels.

...

Stratton, whose wife operates the Treehouse toddler center out of the couple's apartment, insisted that "the children have not been exposed to anything," because no asbestos was found inside the toddler center. The building's elevator, like many in the former warehouse buildings that dot Tribeca, has an iron gate instead of a solid door, and its shaft has windows that face the street. Since several of the shaft's windows were broken on Sept. 11, dust from the trade center collapse may have easily penetrated the elevator area, Stratton conceded.

At the time, according to Stratton, the co-op board believed the assurances from EPA and city officials that air quality downtown was safe, so it did not conduct extensive testing within the building. One of the co-op tenants, however, said she was worried about environmental hazards.

...

The one tenant was worried enough that by mid-April she asked Joel Kupferman of the New York Environmental Law and Justice Project to come to 150 Franklin and collect dust samples. Kupferman sent three samples to a laboratory. The lab results showed levels of 1.2%, 1.4% and 1.8% asbestos [by using TEM electron microscopy]. He immediately notified the EPA and the city's Department of Environmental Protection, and those agencies analyzed new samples on April 18.

The DEP, using a crude analytical method called polarized light microscopy, detected no asbestos. But EPA scientists, using a more sophisticated method called transmission electron microscopy, found even higher levels, from 2% to 5% asbestos. "We recommended that it be professionally cleaned," said EPA spokesperson Mary Mears. . . . [Asbestos Fallout Is Found In Co-op Near WTC Site, Juan Gonzales, 5/2/02, NY Daily News]

The NYELJP has continued its strong advocacy for residents, firefighters, police officers, and the rights to a cleanup for citizens beyond EPA's arbitrary boundary of Canal St. Other environmental groups, particularly the major ones, were remarkably silent in the months following the disaster.

8/25/02

Firefighters are rushing to emergencies around the city in trucks still carrying remnants of toxic World Trade Center dust and debris nearly a year after the Sept. 11 attacks, The Post has learned. Of the 122 firetrucks involved in rescue and recovery efforts at Ground Zero, 93 have yet to be totally cleared of asbestos, Fiberglass, lead and other contaminants, FDNY officials have confirmed and lab reports show. But those trucks went back into use months ago. Working firefighters continue to find debris fragments and spoonfuls of dust behind seat cushions, in hose compartments and in air conditioning units of their rigs - some of it potentially toxic.

Debris scooped from three professionally cleaned rigs was tested by a watchdog group, the New York Environmental Law and Justice Project, and found to have unsafe levels of asbestos and Fiberglass, reports obtained by The Post show. In the six months following Sept. 11, 332 firefighters required more than four weeks of leave for "significant" respiratory problems, according to FDNY records. About 60 percent of those remain on light duty or sick leave, or have retired.

Some firefighters point out that health concerns prompted the city to condemn 890 privately owned cars and 91 FDNY vehicles that were parked near the trade center and deemed impossible to safely clean of all dust and contaminants. The firefighters say they had expected similar strict standards to be applied to the cleaning of those dusted firetrucks put back into city service.

...

[FIRE HEROES' TRUCKS STILL TAINTED BY WTC DUST, By AL GUART, 8/25/02, NY Post]

New York Committee for Occupational Safety and Health and Labor Unions

The New York Committee for Occupational Safety and Health (NYCOSH) played a leading role advising fire, rescue, and construction workers at Ground Zero that conditions were not safe, and that HEPA respirators were needed. This was despite the OSHA assurances that there were little air exposure hazards, based on the flawed EPA air tests which were unreadable and useless for the more heavily contaminated air samples. NYCOSH industrial hygienist staff spoke out to the press, issued fact sheets, and set up comprehensive web pages at www.NYCOSH.org to get the message out:

9/19/01

The New York Committee for Occupational Safety and Health (NYCOSH), a coalition of 200 local unions and individual health and safety experts, issued guidelines to thousands of its members yesterday on how to protect themselves during the clean-up, which could

take a year or more.

"It virtually goes without saying that the smoke has toxic ingredients," said Jonathan Bennett, the coalition's public affairs director. "You have toxic gases versus particulate matter (like soot and asbestos). Particulate respirators don't protect people from carbon monoxide, for example."

Recommendations in the eight-page NYCOSH fact sheet include proper use of non-disposable respirators with frequent filter changes, goggles, and skin protection. Workers are urged to change clothes before going home. [

...

*[Unknown Health Dangers Presented by 'Toxic Stew', INTERPRESS SERVICE
September 19, 200, http://www.thepioneer.com/international/sept22_toxic.htm]*

10/3/01

"It's okay legally, but it's not necessarily okay medically because there's no known safe level of exposure to asbestos," said David Newman, an industrial hygienist for the New York Committee for Occupational Safety and Health. The committee has been conducting independent tests on behalf of union members working near Ground Zero.

And asbestos is not the only hazard, he said.

"Even in the absence of toxic components, the dust poses respiratory hazards, particularly to people with pre-existing respiratory conditions such as asthma or bronchitis," Newman said.

...

*[Air Near Ground Zero Is Rated Safe by Feds, By Paul H.B. Shin, NY Daily News,
October 3, 2001]*

10/28/01

Seven weeks after the terrorist attacks on the World Trade Center about 400,000 tons of rubble and steel have been removed, but the site still smolders and there is some concern about the dioxins, PCBs, benzene, sulfur dioxide and lead emitted at the 16-acre site.

"We're highly critical and highly concerned, there's a lack of safety protective equipment and while some major concerns have been addressed there is a long way to go," David Newman, an industrial hygienist with the New York Committee for Occupational and Safety Health, told United Press International. "These heroes should not be subject to disease or accidents."

...

*[WTC's toxic exposure a worry, By Alex Cukan UNITED PRESS INTERNATIONAL,
10/28/0, <http://www.upi.com/view.cfm?StoryID=28102001-030950-8046r>]*

On 1/14/02, NYCOSH in conjunction with the Center for the Biology of Natural Systems at Queens College and the Latin American Workers' Project opened a mobile medical monitoring

unit for WTC cleanup workers.

1/14/02

The project was initiated in response to concerns about day laborers and other workers performing clean-up tasks. Clean-up workers are particularly vulnerable to hazards arising from contact with toxic substances in the debris at Ground Zero, according to NYCOSH Director Joel Shufro. "Many day laborers are Spanish-speaking immigrants with little health and safety training," he said. "The medical unit goes straight to the problem area, offering the basic medical and educational resources the clean-up crews need."

"We are aiming to help the most neglected, least protected workers, who might otherwise receive no medical care for occupational health problems. As they cleaned, they stirred up and inhaled injurious dusts. We want to identify their illnesses and provide them with properly fitting respirators to protect themselves in the future," said Steven Markowitz, MD, an occupational medicine physician who is directing the medical team from the City University of New York.

...

[NYCOSH/CBNS joint press release, WTC Medical Monitoring for Building Cleanup Workers, <http://cbns.qc.edu>, www.NYCOSH.org]

NYCOSH continues to play a leading role in protecting workers contending with WTC fallout exposure and medical problems.

Other unions were also active in the immediate days after 9/11, urging workers to wear proper respiratory protection, despite the OSHA and EPA. For example, the National Hazmat Operating Engineers National Hazmat Program distributed a flyer³³ on the asbestos hazards.

9/01

The EPA has reported airborne asbestos results in NY that are all below the current OSHA standard, although asbestos fibers were detected in some samples. For comparison, the concentrations found in historical workplaces that produced disease were usually hundreds of times greater than the current OSHA standard.

Do I need to take precautions? Yes! Not enough air samples have been taken to say anything definite about the possible exposures. Also, some debris may have much more asbestos in it than others. Finally, the direction and strength of the wind is important.

What should I do to protect myself? Protect your lungs by wearing a respirator. Many rescue personnel have been wearing paper respirators. No paper respirators are approved for use with asbestos. Respirators with one strap are not acceptable either. Permanent, half-face respirators with disposable cartridges are acceptable, if NIOSH-approved. The cartridges must be marked as P100 to assure adequate protection.

Wearing a disposable suit over your clothes will prevent taking the asbestos-containing dust home. Tyvek® is the most widely used material for suits in the asbestos abatement industry. In this present situation, Tyvek® suits without booties should be worn.

HP Environmental group of scientists

HP Environmental lead a team of scientists who took samples around 9/21/01 from several interior and exterior locations at and up to 3 blocks away from Ground Zero. These scientists and industrial hygienists included: Hugh Granger, Ph.D., CIH and Piotr Chmielinski, CIH of HP Environmental; Tom McKee, Ph.D. of Scientific Laboratories; Jim Millette, Ph.D. of MVA, Inc.; and George Pineda, CIH of ET Environmental. Their study has been submitted for publication.³⁴

When EPA did its air tests for asbestos in those early days, the filters they collected the asbestos samples on were clogged with so much soot and other particulates that the laboratory analyst could not see the asbestos fibers. The asbestos fibers were covered up by the other particulates. EPA chose to just discard these samples and not try to read them. Thus, EPA only reported air tests for asbestos from the filters that had lower concentrations of total particulates, and thereby lower concentrations of asbestos. This gave highly biased results on the low side, since the filters which were overloaded would also have higher asbestos concentrations.

HP Environmental used a more sophisticated version of EPA's own test methods to get around the problem of the filters being overloaded and unreadable. They used the indirect transfer method, EPA level 2. The particulates were transferred from the filter and separated so that the asbestos fibers could be seen. News accounts of the better EPA method used by HP Environmental follow:

10/5/01

The study, by the Virginia firm HP Environmental, found that the force of the explosions apparently shattered the asbestos into fibers so small that they evade the EPA's ordinary testing methods. The EPA tests for asbestos particles greater than a half micron in size, a spokeswoman says. But the study concluded that there is such an overwhelming concentration of those ultras-small particles that many are being missed by standard microscopy techniques. "This stuff was just crushed, just pulverized," says lead author Hugh Granger. "As it turns out, when we now measure and look for these very small fibers in the air and buildings, we find them, and we find them in uniquely elevated concentrations."

...

[Newsweek, MSNBC, 10/5/01, Is Ground Zero Safe? New study suggests more asbestos at disaster site than previously revealed, by David France]

10/9/01

The collapse of the twin towers pulverized much of the asbestos into such microscopic particles that many fibers were not large enough to be caught in tests done by government safety monitors, says a team of scientists from HP Environmental, Inc., a Virginia-based company that oversaw toxicology analyses at the World Trade Center after the 1993 attack. The firm spent 15 days last month studying health hazards faced by cleanup crews working for a real estate company that owns two office buildings north of Ground Zero.

"In the beginning we were getting clean results, or no [asbestos]," said Piotr Chmielinski, one of the scientists who worked on the study. "until we discovered that a lot of dust and other particulates in our samples were obscuring the tiny asbestos fibers in the background."

...

The team took 11 air samples on different floors of two buildings that were up to 3 blocks from the Trade Center site. Using the cheaper and less exact method, only two of those samples revealed asbestos levels higher than federal permissible exposure limits.

...

[Asbestos Higher in Newer Test, 10/9/01, by Juan Gonzalez, NY Daily News]

10/22/01

Panic buttons were pressed last week when a company called HP Environmental reported higher asbestos levels than the EPA, which had declared most of Battery Park City safe. Turns out HP had included tiny asbestos particles, which the EPA and many doctors don't consider dangerous. Others, like Philip Landrigan of the Mount Sinai School of Medicine, say just the opposite: "It's been substantiated by 30 or 40 years of research that the smaller fibers are the ones that can penetrate most deeply into the lungs."

So, who to believe? HP showed its results to downtown neighbors, but the Board of Ed chose to reopen Stuyvesant High School anyway. "I'm very concerned," says Stuyvesant parents' association president Marilena Christodoulou. "We're insisting on daily monitoring -- not just for asbestos but for lead and fiberglass."

[Note that Stuyvesant High School was later found to have extremely high levels of asbestos long after children resumed classes there.]

...

*[The Air Down There, 10/22/01, NY Magazine, By Robert Kolker,
<http://www.newyorkmetro.com/nymetro/news/sept11/features/5291/>]*

12/3/01

Study by HP Environmental uses more sensitive test methods, finds higher asbestos than EPA, and smaller particle sizes

...

As an example, when HP Environmental tested air in two buildings that were up to 3 blocks from Ground Zero, only 2 of 11 samples showed asbestos above the limit using the EPA method, but the more sensitive method by HP Environmental showed 7 of 11 samples had hazardous levels.

The complete study was posted on the American Industrial Hygiene Association (AIHA) website for a total of 5 hours on 9/3/01 before it was removed. The AIHA has not admitted its removal was motivated by the fact that it conflicted with Governor Whitman's press release of the same day claiming no hazardous exposures to asbestos except at Ground Zero. . . . [Jenkins, 12/3/01 memorandum. See App. 3 of this report]

Center for the Biology of Natural Systems, Queens College, Paul Bartlett, Ph.D.

Although New York has a high concentration of colleges and universities, very few professors or research staff opposed EPA during the two months after the disaster. This may reflect the extreme importance of the federal research dollar. At the Center for the Biology of Natural Systems (CBNS), Queens College, Flushing, NY Barry Commoner, Ph.D. and Paul Bartlett, did go on record. Commoner spoke about the hazards of asbestos and the problem of the WTC dusts becoming stirred up in a 9/28/01 NY Daily News article.

In particular, Bartlett, a PCB expert, went on record alerting the public to EPA's own test results. It had taken a Freedom of Information Act request to obtain them. In Juan Gonzales' landmark article of 10/26/01, Bartlett contributed the following

10/26/01

Toxic chemicals and metals are being released into the environment around lower Manhattan by the collapse of the World Trade Center towers and by the fires still burning at Ground Zero, according to internal government reports obtained by the Daily News.

Dioxins, PCBs, benzene, lead and chromium are among the toxic substances detected in the air and soil around the WTC site by Environmental Protection Agency equipment sometimes at levels far exceeding federal levels, the documents show.

EPA monitoring devices also have found considerable contaminants in the Hudson River in the water and in the sediment especially after it rains.

Six weeks after the WTC attack, benzene a colorless liquid that evaporates quickly and can cause leukemia, bone marrow damage and other diseases in long-term exposure continues to be released into the air in plumes from the still-burning fires at relatively high levels.

The federal Occupational Safety and Health Administration's permissible exposure limits for workers handling benzene over an eight-hour day is 1 part per million.

But the EPA documents reveal that the standard has been exceeded by considerable margins.

On Oct. 2, for example, benzene levels from three spots around Ground Zero were measured at 42, 31 and 16 times higher than the OSHA standard. On Oct. 12, one reading measured 21 times higher.

The highest benzene level was recorded Oct. 11 58 times higher than OSHA's permissible exposure limit.

The documents obtained by The News detail the presence of many hazardous substances many of them odorless in levels above or approaching EPA or OSHA safety standards.

"Yes, they are high," said EPA spokeswoman Mary Mears, when asked to comment on the hazardous-substance readings contained in her agency's documents. "But you get a

little distance from the plume and they go dramatically down." When questioned, though, Mears conceded that shifting winds sometimes blow the plume directly at workers at the site.

...

The effects of exposure to any hazardous substance depend on dose, duration, how the person is exposed, personal traits and habits, and whether other chemicals are present, according to the Agency for Toxic Substances and Disease Registry, a branch of the Department of Health and Human Services. In many instances, government scientists believe, short-term exposure is not a real concern, though other experts believe small amounts of certain carcinogenic substances eventually can cause serious disease.

The EPA documents, which include hundreds of pages of daily monitoring reports, were obtained under a Freedom of Information Act request by the New York Environmental Law and Justice Project and made available to The News.

...

"What I've seen of the data is troubling," said Paul Bartlett, an expert on PCBs and dioxins at the Queens College Center for the Biology of Natural Systems. He added that in his opinion, whatever monitoring the EPA has conducted has been inadequate.

"Their detection limits are aimed at threshold levels for occupational exposure," Bartlett said. "They aren't treating this as a disaster, so they're not asking what extent and how far are people being exposed or who is possibly being affected by the releases of chemicals. They're just checking what emissions are exceeding regulations."

"[I'm most concerned about the soup effect of all these toxic chemicals," said Monona Rossol, an industrial hygienist who works with the Environmental Law and Justice Project. "No one's worrying about the combination of these things on the workers."

"When we are finding these readings that have some significant level to them, they are primarily within the work area," said EPA spokeswoman Mary Helen Cervantes. "As for the cumulative impact of these chemicals, that is an area of science and study and research that we really have not developed methodologies to do that kind of assessment."

"I don't know how the government defines a Superfund site," Bartlett said. "But I'd certainly treat Ground Zero like one."

...

[A Toxic Nightmare At Disaster Site, Air, water, soil contaminated, by Juan Gonzales, NY Daily News, 10/26/01]

This article, coming from a scientist putting into context the EPA's own results, evoked an immediate inquiry from Senator Clinton to Administrator Whitman:

10/26/01

I was deeply alarmed by a report in today's New York Daily News that Environmental Protection Agency's own monitoring at, and around, Ground Zero has shown levels of benzene, lead, and sulfur dioxide in air samples that significantly exceed EPA and OSHA standards. The Daily News also reports that EPA has found high levels of dioxin, PCBs and metals in water being discharged into the Hudson River from the site. This is in addition to previous concerns regarding high levels of asbestos in air and dust

samples at, and around, Ground Zero.

...

Understandably, many are deeply concerned about potential health risks associated with poor air quality at, and around, Ground Zero and I share this concern. It is my worry that poor air quality, in addition to any immediate health impacts, may have devastating long-term health effects, particularly for those that are spending a great deal of time in the area. . . . While I understand that the most serious air pollution is concentrated directly at the site, I believe that local residents and parents with children who attend school in the area also deserve not only timely and accurate information about local air quality but also adequate protection from any potential health risks.

...

[letter from Senator Clinton to Administrator Whitman, 10/26/01]

The 10/26/01 article by Juan Gonzales in the NY Daily News was the turning point for citizens, who finally realized that EPA was not credible in its blandishments that there were no health risks. EPA immediately went on the defensive, attempting to rebut this news story in testimony before the New York City Council Environmental Protection Committee on 11/1/01, and then before the New York State Assembly on 11/26/01, claiming that even if standards had been exceeded, the OSHA and EPA standards were set at levels many times higher than related to health risks:

11/1/01

I'm sure that many of you saw the Daily News headlines last Friday heralding a "Toxic Zone" at ground zero. While the data in the story were accurate, the interpretation of the data and the context was not.

EPA and Occupational Safety and Health Administration standards are set many times below the level at which you would expect health impacts. Our results tell us that these chemicals are present at ground zero at levels that sometimes exceed a federal standard.

...

[Statement of Kathleen Callahan, Acting Deputy Regional Administrator, Region 2, Before the New York City Council Environmental Protection Committee, 11/1/01, <http://www.epa.gov/region02/news/speeches/011101k.htm>]

11/26/01

I'm sure that many of you saw a recent newspaper headline heralding a "Toxic Zone" at ground zero. While the data in the story were accurate, the interpretation of the data and the context was not.

The story focused on a small number of sampling results with the highest contaminant readings. The story failed to report, however, that EPA has taken thousands of samples that do not exceed federal standards or guidelines. In addition, the sampling results highlighted in the article are snapshots of the levels of certain chemicals associated with burning — such as benzene, dioxin and sulfur dioxide — at a moment in time. They were taken right in the plume on the debris pile, at ground level. EPA and Occupational Safety and Health Administration standards are set many times below the level at which you would expect health impacts.

...

[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S. Environmental Protection Agency, Before the New York State Assembly, 11/26/01] ³⁵

Bartlett continued assisting citizens, including working with the NYCOSH mobile health unit testing and counseling workers cleaning up the rubble at Ground Zero, as well as offering testimony on behalf of concerned parents at contaminated schools. During the early months after 9/11. Bartlett maintained a comprehensive informational web site which citizens could access for information. He assisted local NYC citizens and scientists in determining the best test methods for a wide range of WTC-related toxics and their hazardous levels of concern.

Local Elected NYC Officials

Several local New York City elected officials recognized early on that there was some problem with the EPA and NYC messages that there were no hazards. In particular, NYC Councilmember Kathryn Freed helped set up quality independent testing of two different apartment buildings. One was 3 blocks southwest from Ground Zero, facing it. The other was 4 blocks north, with windows primarily facing north, away from Ground Zero. Freed was unable to get any cooperation from the NYC DEP in gaining access to these apartments, and had to “sneak the scientists in” on 9/18/01 to collect samples.³⁶

The “Ground Zero Elected Officials Task Force” (GZTF) was formed on 9/15/01, chaired by Representative Nadler, and including Manhattan Borough President Virginia Fields, NYS Assembly Speaker Sheldon Silver, NYS Senator Martin Connor, NYS Senator Tom Duane, NYS Assemblymember Deborah Glick, NYC Councilmember Kathryn Freed, NYC Councilmember Margarita Lopez, NYC Councilmember (elect) Alan Gerson, NYC Community Board 1 Chairperson Madelyn Wils. The purpose was to “fill the gaps” left by the federal and local response.³⁷

The GZTF held a press conference on November 19 to announce the results of the independent tests on the 2 apartments where Freed had gained access. The following is a story in the NY Daily News:

11/20/01

The group cited a study of dust and air samples taken Sept. 18, a week after the Trade Center attack, at a seven-story apartment building at 45 Warren St. four blocks north of Ground Zero and a 30-story apartment building at 250 South End Ave. in Battery Park City, just southwest of Ground Zero.

One of the experts who conducted the study was John Kominsky, a chemical engineer based in Cincinnati. Kominsky said the levels of asbestos found in the two buildings far exceeded the maximum level the Environmental Protection Agency deems permissible in schools that have undergone asbestos remediation.

That standard is 70 "structures" fiber, bundle or fine material per square millimeter.

The levels found at 45 Warren St. ranged from 279 to 376 structures per square millimeter. At 250 South End Ave., the levels ranged from 6,277 to 10,620 structures per square millimeter.

Kominsky said those levels would cause "significant health risks" if there was long-term exposure. He advised that anyone cleaning up those buildings should know the "proper techniques" for handling asbestos.

...

[Safety Guidelines Set For WTC Site Workers, Dems seeking cleanup czar, New York Daily News, 11/20/01, By GREG GITTRICH and FRANK LOMBARDI]

In particular, U.S. Representative Jerrold Nadler with his staff became strong advocates for a government-paid cleanup of all indoor spaces of New York City affected by WTC fallout. Nadler has continued to this day in his fight, issuing numerous statements, providing testimony, sponsoring hearings, and preparing a comprehensive white paper documenting the problems from WTC contamination. Nadler held a press conference on 2/10/03 addressing concerns over the failure of EPA to address WTC contamination of workplaces:

2/11/03

Conditions in workplaces and other indoor spaces near the site of the destruction of the World Trade Center are still being neglected nearly a year and a half after the disaster, Rep. Jerrold Nadler (D-N.Y.) said Feb. 10.

...

Presenting data obtained under a freedom-of-information request by the New York Environmental Law & Justice Project, Nadler said the city had received indoor environmental quality reports from only 218 out of 1,900 downtown buildings below Canal Street.

Even those replies to a Feb. 12, 2002, city request to landlords included many incomplete or inadequate reports, and DEP "has not issued a single citation" for failure to respond to the request, Nadler said. In one instance, he reported, a landlord's reply consisted of simply reporting that the building's windows had been closed during the disaster and there had been "a minimum" of dust infiltration.

...

[BNA, Daily Environment Report, 2/11/03, Nadler Says Workplaces Neglected In World Trade Center Dust Cleanup.]

Senator Clinton played a key role by calling for EPA oversight hearings on 12/4/01. Earlier, on 10/26/01, the same day that the story in the NY Daily News appeared (Toxic Zone, by Juan Gonzales), she wrote to EPA Administrator Whitman demanding an explanation. See above. The hearings she initiated resulted in EPA forming an indoor air task force. This was the first time EPA or any other governmental agency agreed to take indoor air measurements, where confined spaces drastically increase airborne concentrations of hazardous WTC constituents:

12/4/01

Senator Hillary Rodham Clinton (NY) called on the Committee to hold a hearing early next year to examine possible environmental health problems at and around Ground Zero in lower Manhattan. Environmental Protection Agency (EPA) Administrator Christine Todd Whitman was testifying before the EPW Committee.

At today's hearing, Senator Clinton remarked, with regard to conditions around Ground Zero, "Kids are going to school, the air is being tested, but there's a lot of what we're now calling 'World Trade Center cough,' and respiratory and asthma problems. Mr. Chairman, I think this will be a good matter to hold a hearing about when we get back after the holidays, so we can try to figure out what we should be doing and how we can provide good information to the businesses and families located in the area."

. . .

[Press release, Senator Clinton Calls For Senate Hearing On Environmental, Health Concerns At Ground Zero, Senator Reiterates Concern About Potential Long-Term Health Risks . . . , 12/4/01, <http://clinton.senate.gov/news/2001/12/2001C05A41.html>]

Senator Clinton has continued with her strong advocacy on behalf of the living victims of the WTC, fighting for better health monitoring and treatment of firefighters and other rescue workers, and the cleanup of firehouses, fire trucks, and other environments of the first responders still contaminated with WTC fallout.

New York Daily News and selected other press

The New York Daily News took a lead role in alerting citizens of the hazards, countering EPA and NYC claims. On September 13, 2001, they published an article extensively quoting Dr. Landrigan of the Mt. Sinai School of Medicine on asbestos hazards, contrasting his statements with those of Mayor Giuliani and the NYC Health Commissioner. See the above discussion on Dr. Landrigan for the complete text. The efforts of one journalist working with the Daily News, Juan Gonzales, is discussed later discussion in this section.

The NY Daily News has continued to support aggressive journalism on the issue throughout, including a recent report on the EPA IG 1/27/03 report:

3/18/03

The Environmental Protection Agency failed to gather sufficient evidence before declaring the air around Ground Zero "safe to breathe" in the days after the collapse of the twin towers, federal documents reveal.

The EPA inspector general's office found that the agency based its conclusion on a cancer risk level 100 times greater than the traditional standard used to determine acceptable public exposure to toxic contaminants.

The confidential documents, obtained by the Daily News, also say the EPA did not address short-term health concerns - and had no data on more than half of the pollutants that scientists believe were thrown into the air by the towers' collapse.

EPA spokeswoman Mary Mears said yesterday it would be inappropriate to answer questions about "a few pages of an internal work document from an independent office." But Mears added: "We did not then believe and we do not now believe, given the data that we've collected, that there is risk of long-term health problems to the general public."

The inspector general's probe is ongoing and the findings could change. But the documents, dated Jan. 27, summarize some of the preliminary conclusions. The goal of the probe is to determine whether the EPA adequately told the public about health risks near Ground Zero.

After the Sept. 11 attacks, EPA chief Christie Whitman told the public that the blizzard of ash and debris settling around the city was not contaminating the air.

...

[EPA ripped on its 9/11 all clear, By GREG GITTRICH, New York Daily News, 3/18/03]

While Greg Gittrich of the NY Daily News covered this important story for its readership, the other NYC newspapers did not cover it at all, such as the New York Times and the Wall Street Journal. This is despite the fact that the story was covered by the Sacramento Bee (a major story), syndicated by the Reuters News Service, and heard on National Public Radio, as well as appearing in the trade publication Inside EPA.³⁸

Throughout the period after 9/11, the New York Times has avoided providing space to those opposing the EPA and NYC DOH/DEP claims about safety. An excellent review article about the press coverage of hazards to citizens from WTC contaminants is given below:

The same day Daily News readers were greeted by the "Toxic Nightmare" column, New York Times readers saw this story: "Air quality in Lower Manhattan has gradually improved since the early days.... But at certain times, under certain conditions--usually for brief periods--the bad air still returns.... [M]ost people need not worry."

...

Gonzalez has his own assessment of the competition's coverage. "The Times was and has continued to be total apologists for the EPA on just about everything."

...

In the end, readers must have wondered if the two newspapers were covering the same event.

...

Ask the reporters who have followed the health issue for their predictions on how the story will end, and the responses are as diverse as the coverage.

"I think it's going to fade away," predicts the Times' Andrew Revkin *[New York Times health reporter]*.

...

[Stranahan, S. (Jan./Feb., 2003) Air of Uncertainty. American Journalism Review. http://216.167.28.193/article_printable.asp?id=2746]

Other NYC news organizations provided aggressive coverage to WTC health matters in the early days, such as the NY Post, Newsday, the Village Voice, NY Magazine, and undoubtedly others. Television and radio also provided voice in part to opposing views, that of scientists and health professionals countering EPA claims. Documenting their contributions is more difficult. The press became more aware of the problem as the months progressed, and produced in-depth coverage. Many of these stories are quoted throughout this report.

Juan Gonzales, journalist

Juan Gonzales, writing for the NY Daily News, was responsible for the ground breaking story on 10/26/01 that was the turning point in the public's perception of hazardous exposure problems to ordinary citizens from WTC fallout. This story, Toxic Zone, was quoted earlier in this section. Gonzales went on to break many important stories relating to WTC toxic contaminants. He understands the technical issues, and could cut through the double talk designed by EPA to discredit its critics. His stories are quoted throughout this report.

Unlike other journalists, he shared documents and other information with other advocates and scientists working on the issue, putting the overall progress of the WTC cleanup above considerations personal efficiency or fear that his own exclusive future publication use of this material might be compromised.

Gonzales is co-host of the program *Democracy Now*, which also covered the environmental impact of the WTC collapse. He wrote the book *Fallout, the Environmental Consequences of the World Trade Center Collapse*, which uncovers the lies and deceptions by public officials who have continued to needlessly expose citizens to WTC toxins. His book details the problems he and other journalist had in even getting stories to press that were critical of the government's pronouncements that there were no health hazards in lower Manhattan or the surrounding boroughs.

Other "First Responders for Public Warning"

There were other "First Responders for Public Warning" who themselves (including their families) were not exposed to WTC fallout, but were horrified by the false and misleading message of EPA and NYC officials, but who were not directly heard in these important early days after 9/11.

Many were thwarted in their efforts to gain a public hearing. One story came from an industrial hygienist, who had contacted and was working with a reporter from a television station. He was scheduled to appear in an interview that included a medical doctor. When he appeared at the television studio, he was told that the reporter was no longer with them, and that there would be no interview.

Others could not speak out directly for legitimate reasons. These individuals instead chose to work behind the scenes, providing technical guidance and review of documents for those who were publically visible. Without their sacrifice of time (some were on call 24-hours per day), the people who were visible simply would not have had the necessary background to adequately inform the public. We thank you here.

Not last or least are the laboratories in both New York City and around the country who mobilized in an Herculean effort to test samples for citizens as well as governmental agencies. These labs did all possible to accommodate citizen requests, advise them on sampling techniques, etc. For them, it was the war zone long after people in the rest of NYC and the country turned their attention to other things. The labs operated 24 hours per day. When it became obvious that the laboratories should be offering EPA's ultrasonification extraction test for carpeting and other soft materials, they quickly made this test more universally available, offering reasonable prices, later dropping their price by more than a half.

EPA and NYC pressure on press, suppression of dissenting opinions

EPA has spoken openly about opposing those who spoke out against their official word. There are many stories from individuals, such as department heads being put on the line by EPA for statements by their researchers (the government holds the purse strings of many grants). The following is a quotation of EPA's Bonnie Bellow, who instead of simply writing a letter to the editor of a newspaper, attempted to wield government power directly by complaining to the editor:

As they had with Gonzalez's column, EPA officials criticized Schneider's stories, saying he misrepresented the data and sensationalized the health implications. "I was disturbed and frustrated," says spokeswoman Bonnie Bellow, who complained to Schneider's editors.

...

[Susan Q. Stranahan (January/February 2003) *Air of Uncertainty*, *American Journalism Review*, http://216.167.28.193/article_printable.asp?id=2746]

If government officials hoped to minimize fears that lower Manhattan was no longer a safe place to live or work, they had plenty of help from New York's media. Virtually the only local source of investigative coverage on environmental hazards has been Juan Gonzalez, a columnist for the New York Daily News. On October 26, he made the front page with "A Toxic Nightmare at a Disaster Site," which detailed the EPA tests' findings of notable quantities of hazardous benzene, as well as dioxin levels discharged from a sewer pipe into the Hudson River that were more than five times higher than any previously recorded in New York Harbor.

That day, the mayor and EPA officials held a joint press conference to refute the story;


spokespeople claimed that "spikes" in toxin levels did not indicate potential health hazards. Giuliani's views were more than incidental to the Daily News, whose executive editor, Michael Goodwin, is married to a Giuliani appointee and whose editorial-page editor, Richard J. Schwartz, previously worked in City Hall, where he authored Giuliani's welfare policies. One late-September editorial was adamant that officials in charge of rebuilding at the site should minimize environmental reviews and any other "red tape" obstructing redevelopment.

. . .

*[Toxic haste, Staten Island Advance, Alyssa Katz, 2/25/02,
<http://www.americanprospect.com/print/V13/4/katz-a.html>]*

I: THE COVERUP – THEORIES AND MOTIVATIONS

“At our late December meeting with the (then) Chief of Staff, she acknowledged that the content of the WTC press releases was heavily influence by the Council on Environmental Quality (CEQ). In her view, the ultimate responsibility for content of press releases resided with the former Public Information Officer (now with DOI), who denies such authority. Have asked signed copy of interview write-up with Chief of Staff. . . . Working with OI, e-mails (from 9-11-01 to 12/31/01) for former EPA Public Information Officer have been pulled and will be reviewed: paper copies of selected e-mails indicate CEO dictated the content of early press releases – 100 percent of what CEO added was added: 100 percent of what CEO deleted was deleted.” [1/27/03 EPA IG report]



This section addresses theories why EPA and New York City officials concealed information on the hazards of WTC fallout, gave dangerous advice to the public on how to protect themselves, and later all but admitted their failure to warn the public by telling falsehoods about what they had said and advised citizens in the past. This constitutes a coverup.

The EPA IG report of 1/27/03 made a preliminary attempt to identify who was controlling statements by EPA and Administrator Whitman. In footnotes, the following information was given:

Current Work Plans

At our late December meeting with the (then) Chief of Staff, she acknowledged that the content of the WTC press releases was heavily influence by the Council on Environmental Quality (CEQ). In her view, the ultimate responsibility for content of press releases resided with the former Public Information Officer (now with DOI), who denies such authority. Have asked signed copy of interview write-up with Chief of Staff.

. . .

Working with OI, e-mails (from 9-11-01 to 12/31/01) for former EPA Public Information Officer have been pulled and will be reviewed: paper copies of selected e-mails indicate CEO dictated the content of early press releases 100 percent of what CEO added was added: 100 percent of what CEO deleted was deleted. Once all e-mails have been analyzed, we plan to follow up one more time with the White House Counsel's Office for an interview with Sam Thornstrum (CEQ); we have had multiple calls with the White House Counsel in an attempt to interview CEQ on this issue.

. . .

[EPA IG report, 1/27/03]

Council on Environmental Quality role

The EPA IG report states that the White House Council on Environmental Quality (CEQ) controlled what EPA said (and is saying) about hazards to citizens from the WTC hazard. But this does little to elucidate the motivations behind the systematic denials of hazards, exposure of citizens, and failure to clean up and test for toxic substances. Who was behind the CEQ? Were there other actors involved not controlled by the CEQ?

The following is a description of the function of the CEQ from the White House web site:

The Council on Environmental Quality coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives. The Council's Chair, James L. Connaughton who was appointed by the President with the advice and consent of the Senate, serves as the principal environmental policy adviser to the President. In addition, CEQ reports annually to the President on the state of the environment; oversees federal agency implementation of the environmental impact assessment process; and acts as a referee when agencies disagree over the adequacy of such assessments.

Congress established CEQ within the Executive Office of the President as part of the National Environmental Policy Act of 1969 (NEPA). Additional responsibilities were provided by the Environmental Quality Improvement Act of 1970

In enacting NEPA, Congress recognized that nearly all federal activities affect the environment in some way and mandated that before federal agencies make decisions, they must consider the effects of their actions on the quality of the human environment. NEPA assigns CEQ the task of ensuring that federal agencies meet their obligations under the Act. The challenge of harmonizing our economic, environmental and social aspirations has put NEPA at the forefront of our nation's efforts to protect the environment.

...

[<http://www.whitehouse.gov/ceq/>]

The CEQ would have a clear statutory mandate to coordinate and mediate environmental matters not involving the EPA in a non-disaster situation. However, after the declaration of disaster, the Federal Response Plan (FRP) was invoked, and FEMA and EPA had responsibility for this function. FEMA, in consultation with EPA, found that it was necessary to activate Emergency Support Function 10 (ESF #10), which designates EPA as the chair and coordinator of all environmental matters in the WTC disaster.

EPA already had the clear responsibility of coordinating all environmental disaster matters as part of the FEMA team. There is explicit language in the FRP itself as well as the EPA regulations defining EPA's role as chair and coordinator of all federal, state, and local environmental efforts in disasters involving hazardous substances, as discussed in Section V of this report. Many years prior to 9/11/01, EPA prepared and published numerous action plans for coordinating and

directing all environmental responses to terrorism, including bombings and weapons of mass destruction.

The CEQ is not one of the federal entities that is included in the FRP, and is not even included in the new Office of Homeland Security. The CEQ has never engaged in any such activities. From this we can conclude that the CEQ should not have had any contact with EPA whatsoever over the WTC disaster. To do so constituted acting outside of the statutory mandate of the CEQ, a violation of the Administrative Procedures Act.

White House interference theory

Any decisions to protect NYC citizens to a greater extent from asbestos exposures from WTC fallout would have major ramifications in future EPA decisions to protect citizens from asbestos. Furthermore, any decisions by EPA requiring more stringent cleanup or test methods would also affect litigation against the asbestos industry.

Although members of the current administration may have ties to the asbestos industry,³⁹ there is no available evidence directly linking them to interference in the WTC cleanup. Interference by the CEQ, described above, and as referenced in the EPA IG report of 1/27/03, can be interpreted as interference from the White House, since the CEQ is part of the White House.

There is evidence that such intervention by the White House in EPA matters has occurred in the past. Like the CEQ, the Office of Management and Budget (OMB) is also under the White House. The following by Pulitzer Prize winning journalist Andrew Schneider tells the story:

The Environmental Protection Agency was on the verge of warning millions of Americans that their attics and walls might contain asbestos-contaminated insulation. But, at the last minute, the White House intervened, and the warning has never been issued. The agency's refusal to share its knowledge of what is believed to be a widespread health risk has been criticized by a former EPA administrator under two Republican presidents, a Democratic U.S. senator and physicians and scientists who have treated victims of the contamination.

The announcement to warn the public was expected in April. It was to accompany a declaration by the EPA of a public health emergency in Libby, Mont. In that town near the Canadian border, ore from a vermiculite mine was contaminated with an extremely lethal asbestos fiber called tremolite that has killed or sickened thousands of miners and their families.

...

In a meeting in mid-March, EPA Administrator Christie Todd Whitman and Marianne Horinko, head of the Superfund program, met with Paul Peronard, the EPA coordinator of the Libby cleanup and his team of health specialists. Whitman and Horinko asked tough questions, and apparently got the answers they needed. They agreed they had to move ahead on a declaration, said a participant in the meeting.

By early April, the declaration was ready to go. News releases had been written and rewritten. Lists of governors to call and politicians to notify had been compiled. Internal e-mail shows that discussions had even been held on whether Whitman would go to Libby for the announcement.

...

Interviews and documents show that just days before the EPA was set to make the declaration, the plan was thwarted by the White House Office of Management and Budget, which had been told of the proposal months earlier. Both the budget office and the EPA acknowledge that the White House agency was actively involved, but neither agency would discuss how or why. The EPA's chief spokesman Joe Martyak said, "Contact OMB for the details." Budget office spokesperson Amy Call said, "These questions will have to be addressed to the EPA."

...

Both agencies refused Freedom of Information Act requests for documents to and from the White House Office of Management and Budget. The budget office was created in 1970 to evaluate all budget, policy, legislative, regulatory, procurement and management issues on behalf of the president.

Office interfered before

Former EPA administrator William Ruckelshaus, who worked for Presidents Richard Nixon and Ronald Reagan, called the decision not to notify homeowners of the dangers posed by Zonolite insulation "the wrong thing to do." "When the government comes across this kind of information and doesn't tell people about it, I just think it's wrong, unconscionable, not to do that," he said. "Your first obligation is to tell the people living in these homes of the possible danger. They need the information so they can decide what actions are best for their family. What right does the government have to conceal these dangers? It just doesn't make sense."

But, he added, pressure on the EPA from the budget office or the White House is not unprecedented. Ruckelshaus, who became the EPA's first administrator when the agency was created by Nixon in 1970, said he never was called by the president directly to discuss agency decisions. He said the same held true when he was called back to lead the EPA by Reagan after Anne Gorsuch Burford's scandal-plagued tenure.

Calls from a White House staff member or the Office of Management and Budget were another matter. "The pressure could come from industry pressuring OMB or if someone could find a friendly ear in the White House to get them to intervene," Ruckelshaus said. "These issues like asbestos are so technical, often so convoluted, that industry's best chance to stop us or modify what we wanted to do would come from OMB."

The question about what to do about Zonolite insulation was not the only asbestos-related issue in which the White House intervened. In January, in an internal EPA report on problems with the agency's much-criticized response to the terrorist attacks in New York City, a section on "lessons learned" said there was a need to release public health and emergency information without having it reviewed and delayed by the White House.

It was the White House budget office's Office of Information and Regulatory Affairs that derailed the Libby declaration *[of a health emergency that would initiate the removal of Zonolite insulation from attics in Libby, Montana]*.

...

Whitman, Horinko and some members of their top staff were said to have been outraged

at the White House intervention.

"It was like a gut shot," said one of those senior staffers involved in the decision. "It wasn't that they ordered us not to make the declaration, they just really, really strongly suggested against it. Really strongly. There was no choice left."

She and other staff members said Whitman was personally interested in Libby and the national problems spawned by its asbestos-tainted ore. The EPA's inspector general had reported that the agency hadn't taken action more than two decades earlier when it had proof that the people of Libby and those using asbestos-tainted Zonolite products were in danger. Whitman went to Libby in early September 2001 and promised the people it would never happen again.

"We want everyone who comes in contact with vermiculite from homeowners to handymen to have the information to protect themselves and their families," Whitman promised.

Suits, bankruptcies grow

Political pragmatists in the agency knew the administration was angered that a flood of lawsuits had caused more than a dozen major corporations including W.R. Grace to file for bankruptcy protection. The suits sought billions of dollars on behalf of people injured or killed from exposure to asbestos in their products or workplaces.

Republicans on Capitol Hill crafted legislation expected to be introduced next month to stem the flow of these suits.

Nevertheless, Whitman told her people to move forward with the emergency declaration. Those in the EPA who respect their boss fear that Whitman may quit. She has taken heat for other White House decisions such as a controversial decision on levels of arsenic in drinking water, easing regulations to allow 50-year-old power plants to operate without implementing modern pollution controls and a dozen other actions which environmentalists say favor industry over health.

...

[White House budget office thwarts EPA warning on asbestos-laced insulation, BY ANDREW SCHNEIDER, St. Louis Post-Dispatch, 12/27/2002, <http://www.stltoday.com/stltoday/news/stories.nsf/news/4C6A12EDD4DB434486256CAF00051BD1?OpenDocument&highlight=2%2Casbestos&headline=White+House+budget+office+thwarts+EPA+warning+on+asbestos-laced+insulation>]

As a footnote to this story, EPA finally was allowed to issue the Zonolite attic insulation warning. That warning was issued on May 20, 2003.⁴⁰ On the same day, Governor Whitman met with President Bush at the White House and gave him her letter of resignation as administrator of EPA.⁴¹ Her resignation was effective June 27, 2003.

Stock Market theory of coverup

A common theory for the coverup of hazards from WTC fallout was that it was important to get the Stock Market up and running as soon as possible after the attack. This would be either for the purpose of not allowing terrorist to know the degree of environmental damage they could inflict by something as simple as a building implosion, or just to protect the financial interests of the corporate elite.

There are numerous press statements by EPA and other officials coupling statements about the safety and lack of hazards after the attack along with assurances that the Stock Market could reopen as scheduled. The Stock Market did reopen on 9/18/01, after a fast and dirty cursory cleanup. However, the problem with the Stock Market theory is that EPA and NYC officials continued their obfuscations of the facts long after the Stock Market reopened on 9/18/01.

Whitman's Citicorp stock ownership theory of coverup

The former EPA hazardous waste ombudsman, Robert Martin, and his former chief investigator Hugh Kaufman leveled charges that Administrator Whitman was responsible for a WTC hazard coverup because Whitman owned stock in Citicorp. These allegations came during a bitter court battle in which Martin was attempting to prevent his job from being transferred to EPA's Office of the Inspector General.

The finding in the EPA IG 1/27/03 report about the CEQ's involvement in Whitman's press releases dispels this Citicorp theory. Whitman's statements about the WTC appear to have been controlled and/or written by the White House's Council on Environmental Quality (if not others as well).

There are other problems with the Citicorp theory. Even before the WTC collapse, Kaufman and Martin made the same Citicorp conflict-of-interest allegations against Whitman for her decisions in a Superfund site in Colorado. In addition, they raised the same Citicorp stock ownership conflict-of-interest charges against the NYC Board of Education Chancellor.

With more details later, the following summarizes the Kaufman/Martin Citicorp theory:

- a. In press accounts, Kaufman and Martin claimed Whitman had conflicts of interest by her alleged relieving some financial liability for the owners of the Shattuck Superfund Site, a former radioactive extraction facility in Colorado. This was because Shattuck was owned by Citicorp. However, the parties, including Shattuck and EPA, had reached an agreement in principle in December 2000, before Whitman came to EPA.

- b. On 10/10/01, Kaufman and Martin criticized the December, 2000 final remedy for the Marjol Battery Superfund Site, located in Throop, Pennsylvania, because of Whitman's Citicorp-conflicts of interest.
- c. After the WTC collapse, Kaufman and Martin accused Whitman of conflicts of interest in saying that the air was safe, since the World Trade Towers were insured by Travelers Insurance, a subsidiary of Citicorp.
- d. Kaufman and Martin also accused the NYC Board of Education Chancellor of conflicts of interest for reopening the schools too soon after the WTC collapse, because he also owned Citicorp stock.

Press coverage of Citicorp stock ownership theory of coverup

7/16/02

Independent federal investigators concluded there is no basis for an ombudsman's claims that Environmental Protection Agency Administrator Christie Whitman had a conflict of interest in three large-scale cleanups, including the World Trade Center.

The report by the EPA inspector general's office, a copy of which was obtained late Tuesday by The Associated Press, concludes "the allegations were not substantiated, criminal prosecution was declined, and thus, no further investigation is warranted in this matter."

Investigators from the EPA and the Justice Department spent seven months looking into claims by former EPA ombudsman Robert Martin and his senior aide, Hugh Kaufman, that Whitman had a personal financial interest influencing decisions at the cleanup in New York and two Superfund toxic waste sites, Shattuck Chemical Co. in Denver and Marjol Battery and Equipment Co. in Throop, Pa.

Martin and Kaufman had alleged that Whitman crafted deals benefitting Citigroup, which had a financial interest in the cleanup projects. Whitman's husband, John, worked for Citigroup and had stock holdings in the company.

...

[EPA Inspector General Finds No Improper Dealings by Whitman in World Trade Center, Superfund Cleanups, JOHN HEILPRIN, Associated Press Writer, Tuesday, July 16, 2002, Associated Press]

3/11/02

Kaufman said Whitman falsely assured New Yorkers that the air around the World Trade Center was safe in the days after the structures were leveled by the Sept. 11 attacks. That, he said, saved Travelers Insurance, owned by Citigroup, millions of dollars. And he said Whitman tried to dissolve the EPA national ombudsman's office, where he works, so it wouldn't interfere with a court settlement with Citigroup about Shattuck.

In both cases, Kaufman said, Whitman was motivated by her family financial ties to Citigroup Inc., which were first reported last year by The Denver Post. Whitman's husband, John, worked for Citigroup from 1972 to 1987, and still has company stock valued at as much as \$250,000. He is now managing partner of Sycamore Ventures, a venture capital firm spun off from and backed by Citigroup.

"If Mrs. Whitman successfully dissolves the national ombudsman position, Citigroup could save hundreds of millions of dollars," Kaufman wrote in a letter to the Justice Department.

...

EPA officials said Whitman had no involvement in Shattuck decisions since the settlement was all but finalized while she was still the governor of New Jersey.

...

[EPA leader's rulings on Citigroup probed, By Mike Soraghan, Denver Post Washington Bureau, Monday, March 11, 2002]

3/9/02

The Environmental Protection Agency will investigate whether its highest official was influenced by personal business interests when she declared the air in lower Manhattan safe to breathe soon after the World Trade Center disaster. The EPA Office of the Inspector General will try to determine whether EPA Administrator Christine Todd Whitman's statements that the air was safe constitute a conflict of interest, since she has considerable financial ties to the insurance industry, which compensates companies for absent workers. The investigation was prompted by allegations from the EPA Ombudsman's office. Chief Investigator Hugh B. Kaufman maintains that Whitman acted improperly in not recusing herself from determinations about the possible health consequences of breathing the air in lower Manhattan after Sept. 11.

By declaring the air safe in the days and weeks after the terrorist attacks, he alleges, she significantly reduced insurance industry liability. She and her husband were in a position to benefit personally from such a limit on insurance company liability.

...

This is not the first time the office of the Ombudsman has accused Whitman of improperly using her office to benefit the insurance companies in which she and her husband, John Whitman, reportedly hold \$100,000 to \$250,000 in stock. According to an article in Salon.com, Mr. Whitman worked for Citigroup from 1972 to 1987, and now is a managing partner in Sycamore Ventures, a venture capital firm that has its origins in Citicorp Ventures, Ltd. Citigroup is a primary investor in Sycamore Ventures. The article outlines EPA Ombudsman Robert J. Martin's charges that Whitman sought to punish Martin after he challenged a cleanup settlement with Citigroup that severely limited Citigroup's liability for the property, which it owned.

...

[EPA to investigate air quality ruling following WTC disaster At issue is whether Christine Todd Whitman was influenced by personal business interests when she declared the air was safe to breathe, 3/9/02, By DIANA YATES and HEIDI SINGER, Staten Island Advance]

1/16/02

The Environmental Protection Agency's ombudsman, Robert Martin, and his chief investigator, Hugh Kaufman, are trying to sell a very scary story these days. They are, with some success, attempting to convince news outlets that a four-cornered conspiracy exists to harm the nation's environment. According to Martin and Kaufman, there is a sinister connection between the following facts:

EPA Director Christie Todd Whitman has proposed moving the ombudsman functions to the Office of Inspector General. Whitman's husband owns stock in Citigroup, a major banking and financial firm. Citigroup has negotiated a \$7.2 million settlement with the EPA to pay part of the cost of the second Shattuck Chemical Co. Superfund cleanup in Denver.

The second cleanup, the shipment of low-level radioactive wastes out of state, will actually cost considerably more than \$7.2 million.

What this means, therefore, is that Whitman made a sweetheart deal with Citigroup to maximize the investments of her husband. This preposterous story has already appeared in a number of media outlets, including the Washington Times and salon.com.

The problem with this yarn is that it ignores a number of very important facts in order to fluff up the reputations of both Martin and Kaufman.

Here are a few of those facts: The proposed reorganization of the ombudsman's office predates Whitman. Carol Browner, the former director, and her Superfund director, Tim Fields, had both found fault with Martin and Kaufman. Fields, in fact, directly accused Martin of unprofessional behavior. Regionalization of the ombudsman's office was advocated in the Clinton administration.

The settlement that included the \$7.2 million payment by Citigroup was actually negotiated in the latter part of 2000. Not only was that before Whitman was even selected to be EPA director, it was before George W. Bush was even declared president-elect. It is inconceivable that a stock holding by Whitman's husband in Citigroup could have been a factor in the outcome. What was a factor was that Citigroup interest in the property was recent, and a question exists on whether or not it is liable for any costs of the new remedy. Shattuck Chemical had paid something like \$30 million to finance the first EPA remedy, and there is no basis in the federal law to go back and require it to pay the same or an even larger amount for a second remedy, specifically the out-of-state transport of the same wastes.

Martin and Kaufman know quite well when the settlement was completed, but for reasons that have to do with their current self-interest, they continue to insist that there is something fishy about the stock holdings of Whitman's husband and Whitman's own desire to relocate the ombudsman's functions.

...

[Al Knight, The EPA farce rolls on, By Al Knight, Denver Post Columnist, Wednesday, 1/16/02]

3/6/02

A federal environmental official said New York City school chancellor Harold Levy cited conflict of interest accusations, and said he should not have been involved in the decisions to re-open ground zero schools.

The reason, according to Hugh Kaufman who is a veteran staffer with the Environmental Protection Agency, is that Levy's former employer, Citigroup owns Travelers' Web site Insurance, and the company has lost about \$500 million tied to insurance claims related to Sept. 11. Kaufman asserts that Traveler's would benefit from the perception that things were back to normal in lower Manhattan, and that the re-opening of the schools contributes to that perception.

"He owns stock in Citigroup, and Citigroup has a financial interest in having everyone think everything is safe and getting people down into that area," Kaufman said. Levy took the chancellor's job in January of 2000. But according to his financial disclosure statement, he has a minimum of \$770,000 dollars of investments Citigroup -- and perhaps as much as \$2.3 million dollars.

Levy would not appear on camera but issued a statement that said: "To remove all doubt, I have asked my counsel to refer the matter to the city's conflicts of interest board, and will be guided by its decision."

The chancellor insists his decision to return children to their schools was based on advice he received from the department of health, and other experts. Based on that advice, Levy concluded there were no serious health risks.

Levy also said he had no knowledge of any policies underwritten by any insurance company at the World Trade Center. An ethics expert says the accusation does not make sense. "I think it's a silly accusation," said Steven Cohen, an ethics expert from Columbia University. "I don't think the chancellor would in any way put children in danger because of a conflict of interest."

Other officials at the EPA claim Levy is the victim of a bureaucratic power struggle the agency is having with Kaufman and the ombudsman's office, which acts as an internal watchdog.

...

[Was Levy Motivated By Money? Official Believes NYC School Chancellor Opened Up Lower, Manhattan Schools Too Early, 3/6/02, www.wnbc.com]

EPA IG investigation of alleged Whitman conflicts of interest

There was another EPA IG investigation specifically addressing the accusations of Kaufman and Martin. The report from this investigation, quoted below, states that Governor Whitman held many investments in addition to Citicorp, and did not know about Citicorp, nor participate substantially in the decisions in question.

Former EPA Ombudsman ROBERT MARTIN and EPA employee HUGH KAUFMAN alleged, on or about January 14, 2002, in published news media accounts, that

Administrator WHITMAN had improperly participated in decisions affecting her personal financial interests arising from her husband's stock holdings in CITIGROUP Inc. (CITIGROUP). Specifically, with respect to the SHATTUCK Superfund Site and the MARJOL Superfund Site, MARTIN and KAUFMAN alleged, in substance, that Administrator WHITMAN participated in either remedy-selection decisions or settlement negotiation decisions that affected the liability of CITIGROUP. For the WTC Site, they alleged Administrator WHITMAN made misleading statements about the results of air monitoring tests conducted at the WTC Site and that such statements accrued to the benefit of TRAVELERS INSURANCE CORPORATION, a company owned by CITIGROUP, which allegedly faces liability relating to the terrorist attack on the WTC.

...

WOLGAST stated that she, ROBERT FABRICANT, EPA General Counsel, and WERNICK talked about preparing a recusal for the Administrator for CITIGROUP after the Denver Post article [regarding the Administrator's alleged conflict of interest with the SHATTUCK Superfund Site and CITIGROUP] was released. However, they determined that there was no need to prepare a recusal because FABRICANT verified that the Administrator had not participated in matters involving CITIGROUP or SHATTUCK, and he advised the Administrator not to participate in any matter involving CITIGROUP or SHATTUCK. WOLGAST stated that she consulted with NORMAN SMITH, Office of Government Ethics (OGE) and they (OGC and OGE) agreed not to do an entity-by-entity recusal because the Administrator had a large number of investments and a recusal had already been prepared for companies that had significant dealings with EPA. (Exhibit 2)

...

She identified those companies that she knew about at the time. WOLGAST stated that as of January 2001, she did not know about CITIGROUP. (Exhibit 3)

...

On March 18, 2002, CHRISTINE TODD WHITMAN, EPA Administrator, was interviewed and stated that she became aware of her alleged conflict of interest from press reports. Administrator WHITMAN stated that she does not have a financial conflict of interest pertaining to CITIGROUP or any other company. She stated that she has divested all financial interests except her husband's business. The Administrator stated that she does not get involved in anything that would constitute a conflict of interest and she has recused herself from all such matters. Administrator WHITMAN stated that she was not informed about the settlement negotiations or the final resolutions of the SHATTUCK Superfund Site. However, JACK MCGRAW, Acting Regional Administrator, Region 8, briefed her about SHATTUCK, but only to the extent that it was identified to her as a Superfund site. She was also advised by the Ombudsman's office of some issues concerning SHATTUCK. Administrator WHITMAN stated that she has not participated in or taken any action pertaining to SHATTUCK; she had no involvement in the resolution of the site; she does not remember receiving any details or briefing papers regarding SHATTUCK prior to her visit to the regional office; and she did not direct anyone to take any action pertaining to SHATTUCK. (Exhibit 18)

...

*[OFFICE OF THE INSPECTOR GENERAL OFFICE OF INVESTIGATIONS REPORT OF INVESTIGATION CONCERNING CHRISTINE TODD WHITMAN Administrator for the U.S. Environmental Protection Agency Case Number: 2002-0003
http://www.epa.gov/oigearth/ereading_room/ROIUNREDACTED.pdf]*

Citicorp stock ownership common

As a personal observation, Citicorp is very large; they had \$88.4 billion in earnings for the year 2001, and around 300,000 employees. Ownership of stock is probably very common in many diversified portfolios a person may not be aware that they own it. Any government employee who invests in the Thrift Savings Plan and specifies the “C Fund” (which is very common) also owns Citicorp stock.

J: AIR TESTING AND STANDARDS FOR ASBESTOS

“Did people receive enough information about air quality? . . . some missed subtleties of EPA’s intended message . . .

“The AHERA ‘standard’ used to conclude that asbestos levels were safe is not a health-based standard. AHERA standard based on minimum detection limit that used old filters (70 structures/mm²);⁴² new filters capable of achieving lower detection limits of approx. 15 s/cc.” [1/27/03 EPA IG report]

AHERA clearance test not a safe level or benchmark – EPA IG report correct

The following statement was in the EPA IG report of 1/27/03:

The AHERA “standard” used to conclude that asbestos levels were safe is not a health-based standard. AHERA standard based on minimum detection limit that used old filters (70 structures/cc);⁴³ new filters capable of achieving lower detection limits of approx. 15 s/cc. . . . [1/27/03 EPA IG report]

EPA’s Office of Research and Development made the same statement in their 10/02 draft risk assessment for the WTC:

The principal benchmark used in this assessment for evaluation of asbestos in air data from the WTC site is the Asbestos Hazard Emergency Response Action (AHERA) standard of 70 S/mm². . . . It should be noted that this standard is not health based, but rather technology based. It is also noted that the technology has improved since 1987, such that current filters often have much less than 17.5 S/mm², sometimes close to 0 S/mm². Therefore, 70 S/mm² would be much higher than blanks and represents more than just a statistical elevation above background. above. Finally it is noted that while the AHERA standard was originally intended as an indoor ‘clearance’ standard, it is being used to evaluate outdoor exposures in this assessment.

. . .

[Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster, External Review Draft, 10/02, National Center for Environmental Assessment, Office of Research and Development, EPA, Publication Nos. NCEA - W - 1395, or EPA/600/P-2/002A, <http://www.epa.gov/ncea> or http://oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=36387]

EPA and NYC claims that AHERA 70 s/mm² level is a health standard

The following are official statements both by EPA and the NYC Departments of Environmental Protection and Health claiming that the AHERA level of 70 structures per square millimeter (70

s/mm²) is a safety standard, a health benchmark, and a level at which no long term health effects will occur:

10/1/01 [approximate date]

Benchmarks, Standards and Guidelines Established to Protect Public Health

Since September 11, the U.S. Environmental Protection Agency (EPA) and other federal agencies have been taking samples of the air, dust, water, river sediments and drinking water from the World Trade Center site and surrounding areas in Manhattan, Brooklyn, Staten Island and New Jersey. EPA and other agencies have analyzed these samples for the presence of pollutants that might pose a health risk to response workers and the public. The samples are evaluated against a variety of benchmarks, standards and guidelines established to protect public health under various conditions. EPA considers 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 EPA is using to evaluate environmental conditions in the aftermath of the World Trade Center disaster.

ASBESTOS . . . In the Air

In evaluating data from the World Trade Center and the surrounding areas, EPA is using a protective standard under AHERA, the Asbestos Hazard Emergency Response Act, to evaluate the risk from asbestos in the outdoor and indoor air. This is a very stringent standard that is used to determine whether children may re-enter a school building after asbestos has been removed or abated. It is based on assumptions of long-term exposure. EPA has chosen to use this standard, because it is the most stringent and protective, even though it is unlikely that the public will be exposed to asbestos from the World Trade Center site for extended periods of time.

. . .

[EPA website responding to WTC disaster, guidance on standards, approximate date 1-1/1/01, <http://www.epa.gov/epahome/wtc/activities.htm>]

10/3/01

Asbestos Monitoring Data Ambient Air Samples:

OSHA has analyzed 67 air samples in the area where crews are actively working on the World Trade Center Site. None of these samples exceeded OSHA's permissible exposure limit of 0.1 f/cc as an 8-hour time-weighted average. EPA has collected and analyzed a total of 442 air samples for asbestos from its 16 fixed air monitoring stations, which are located in the area surrounding the World Trade Center site.

Only 27 were above 70 structures per millimeter squared, the AHERA standard, which is based upon assumptions of long-term exposure. ("AHERA" is the Asbestos Hazard Emergency Response Act, which is used to determine whether children may re-enter a school building after an asbestos removal or abatement.)

. . .

[10/03/2001 EPA AND OSHA WEB SITES PROVIDE ENVIRONMENTAL MONITORING

*DATA FROM WORLD TRADE CENTER AND SURROUNDING AREAS, EPA
headquarters press release, 10/3/01, www.epa.gov]*

11/1/01

The standards or tolerance levels that are being used are very conservative. For example, for asbestos, we are using the standard that is used for indoor air quality for reentry into a school after asbestos removal, which is the most stringent standard, as the tolerance level or standard for outdoor air quality in the residential areas. . . . Moreover, these standards have been designed to include many safety factors so that acceptable levels of exposure are far below the levels at which health effects are expected to occur.

*[Jessica Leighton, Ph.D., Assistant Commissioner, Environmental Risk Assessment,
NYC DOH, Before the NYC Committee on Environmental Protection, 11/1/01]*

11/26/01

Now I'd like to turn to some of our other findings. We have found asbestos in some of our air and dust samples at ground zero and the surrounding area. Some of the dust samples show levels above the one percent used to indicate that a material is asbestos-containing. To date, out of more than 2,000 air samples taken at about 20 fixed air monitoring stations in and around the site, only about 30 have had levels of asbestos that exceed the Asbestos Hazard Emergency Response Act of AHERA standard, we use to determine if children can re-enter a school building after asbestos has been removed or abated. It is a stringent and protective standard. With one exception on October 9, the last time we recorded a level above the school re-entry standard was September 30.

. . .

*[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S.
Environmental Protection Agency, Before the New York State Assembly, 11/26/01] ⁴⁴*

9/18/01

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 . . . I am glad to reassure the people of New York and Washington, D.C. that their air is safe to breathe and their water is safe to drink". . . 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.

. . .

*[Headquarters Press Release, Washington, DC For Release 09/18/2001 WHITMAN
DETAILS ONGOING AGENCY HEFFORTS TO MONITOR DISASTER SITES,
CONTRIBUTE TO CLEANUP EFFORTS, www.epa.gov]*

9/21/01

EPA has been very aggressive in monitoring for potential environmental problems in the

aftermath of the World Trade Center attack, and I am very pleased by what we've discovered. New Yorkers and New Jersians need not be concerned about environmental issues as they return to their homes and workplaces. Only seven samples taken at or near ground zero have had marginally higher levels of asbestos that exceed EPA's level of concern for long-term exposure [AHERA level].

...

[Headquarters Press Release, Washington, DC, 09/21/2001, EPA DISASTER RESPONSE UPDATE NYC MONITORING EFFORTS CONTINUE TO SHOW SAFE DRINKING WATER, AIR, www.epa.gov]

10/3/01

[N]o evidence of any significant public health hazard to residents, visitors or workers beyond the immediate World Trade Center area.

...

EPA has collected and analyzed a total of 442 air samples for asbestos from its 16 fixed air monitoring stations, which are located in the area surrounding the World Trade Center site. Only 27 were above 70 structures per millimeter squared, the AHERA standard, which is based upon assumptions of long-term exposure. ("AHERA" is the Asbestos Hazard Emergency Response Act, which is used to determine whether children may re-enter a school building after an asbestos removal or abatement.)

...

[Headquarters Press Release, Washington, DC, For Release 10/03/2001, EPA AND OSHA WEB SITES PROVIDE ENVIRONMENTAL MONITORING DATA FROM WORLD TRADE CENTER AND SURROUNDING AREAS, www.epa.gov]

11/1/01

[T]he vast majority of our tests find levels of these contaminants that pose no significant long-term health risks to residents, business employees and visitors beyond ground zero. And despite recent press accounts which suggest otherwise, these findings have not changed.

...

To date, out of more than 1300 air samples taken at about 20 fixed air monitoring stations in and around the site, only 30 have had levels of asbestos that exceed the Asbestos Hazard Emergency Response Act or AHERA standard, we use to determine if children can re-enter a school building after asbestos has been removed or abated. It is a stringent and protective standard. With one exception on October 9, the last time we recorded a level above the school re-entry standard was September 30.

...

[Statement of Kathleen Callahan, Acting Deputy Regional Administrator, Region 2, Before the New York City Council Environmental Protection Committee, 11/1/01, <http://www.epa.gov/region02/news/speeches/011101k.htm>]

2/11/02

TEM results are compared to the clearance/re-occupancy standard for indoor air in schools after an asbestos abatement project. This standard is 70 structures of asbestos

per square millimeter. The standard was established pursuant to the federal "Asbestos Hazard and Emergency Response Act", usually known as AHERA.

...

[Testimony of Thomas R. Firenden, M.D., M.P.H., Commissioner, New York City Department of Health and Joel A. Miele Sr., P.E., Commissioner, New York City Department of Environmental Protection before the U.S. Senate Committee on Environment and Public Works, Subcommittee on Clean Air, Wetlands, and Climate Change, 2/11/02, <http://www.ci.nyc.ny.us/html/doh/html/public/testi/testiair.html>]

5/31/02

Analysis of the majority of samples from monitoring sites at or around Ground Zero has not shown detectable levels of asbestos or has found levels well below the standard that EPA is applying – one that is normally used to determine whether children may re-enter a school building after asbestos has been removed or abated. No lower Manhattan samples have been above this level since April 2, when a sample taken from the worker wash tent at which workers remove dust from their boots and clothing slightly exceeded the standard. Since September 11, only 21 out of nearly 9500 samples taken have exceeded the school-based standard *[AHERA standard]*.

...

[EPA SHIFTS FOCUS TO INDOOR AIR, 5/31/02, <http://www.epa.gov/region02/news/2002/02052.htm>]

Earlier press coverage/documentation, AHERA 70 s/mm² level unsafe, not benchmark

The following are excerpts of press stories and memoranda I prepared documenting that the AHERA TEM clearance level is not a safety standard, but only a detection limit. I called attention to this fact as early as 12/19/01, in a memorandum which was widely distributed to EPA officials, including those responsible for the WTC cleanup. These memoranda also received press coverage, and thus EPA officials would have been made aware by that route as well. In addition, my memoranda were posted on several web sites, two of which are listed in Appendix 3 of this report.

2/12/02

Cate Jenkins, a research chemist at the US Environmental Protection Agency, has accused New York City's Health Department of "giving the public a false sense of security" by grossly exaggerating the amount of airborne asbestos that can be considered safe. She made the charge in an internal memo dated Sunday.

...

At a congressional hearing in Lower Manhattan yesterday on air quality around the site, several doctors reported a high incidence of serious respiratory ailments suffered not only by firefighters, rescue crew members, and cleanup workers, but also by office workers several blocks downwind.

...

Jane M. Kenny, EPA's regional administrator, defended the agency. "We used the most

extensive testing ever," she said. "There was a lot of confusion about what exactly was safe, and was not. ... The people in public service were doing the best they could."

...

[Concerns intensify on ground zero dust By Fred Kaplan, Boston Globe, 2/12/2002]

3/21/02

Jenkins also charges the EPA misused the 70-fiber federal test. It is meant to clear public schools for reentry after an asbestos cleanup, but it was applied to outdoor air tests collected under very different test conditions.

"We didn't have a standard in air for a collapse of this type," Mears said. "The 70 fibers is a conservative estimate our risk assessors used."

...

[A Red Flag on Air Tests at WTC, By Juan Gonzalez, Daily News, 3/21/02]

12/19/01

After the disaster, the federal EPA declared that it was applying the most stringent standard, namely the 70 asbestos structures per millimeter of air in the Asbestos Hazard Emergency Response Act (AHERA). This "70" level is the lowest level that can be detected in air using the AHERA test method, because of the background level of asbestos in the filter through which the air is drawn. In other words, the level EPA stated that it required was NO detectable asbestos, not 1% or lower. . . . *[Jenkins, 12/19/01]*

...

The "70 structures or less" AHERA clearance standard for air

In the World Trade Center disaster, EPA has said that it is using the level of 70 or fewer asbestos structures/square millimeter standard required by the Asbestos Hazard Emergency Response Act (AHERA). This 70 or fewer structures does not correspond to any level found to be related to health effects. Instead, it is the equivalent to detecting 4 structures in 10 TEM grid openings in a filter through which air has been drawn.

...

The filters used to collect the asbestos in air are always contaminated with low levels of asbestos. The fibers found as background on the filter were present without any air being drawn through the filter. Thus, this 70 structures/square millimeter corresponds roughly to a general laboratory method background level of 0.02 structures/milliliter. . . . *[Jenkins, 12/19/02]*

1/11/02

EPA is using this AHERA TEM clearance test and claiming that if it shows 70 or fewer asbestos structures per square millimeter, then the air is safe.

...

This statement by EPA is false and a gross misrepresentation of the AHERA regulations which do not in any way claim that a simple air test alone showing 70 or fewer structures per square millimeter can be used directly to determine if air is safe. . . . The first, and fatal problem in using the AHERA TEM test is that it is quite insensitive. It cannot detect

airborne asbestos at levels that are shown to cause excessive cancers. . . . EPA is conducting the AHERA TEM clearance test under passive conditions when the dusts are not being disturbed. . . . any activities which stir up dusts will result in vastly higher airborne asbestos concentrations.

. . .

By even performing the AHERA TEM clearance test in lieu of professional asbestos abatement, EPA is violating the AHERA regulations. This is because the AHERA TEM clearance test is only allowed in conjunction with a whole range of asbestos abatement procedures that go on prior to even taking the test. It was designed to catch only gross contamination problems caused by some worker on the asbestos abatement project, such as emptying one bag of asbestos contaminated material into another inside a room that had previously been carefully abated. . . . [Jenkins, 1/11/02]

2/10/02

The reason that the EPA designed the AHERA TEM clearance test, requiring first certified asbestos abatement procedures followed by a leaf blower, and then a fan, followed by air testing to the 0.01 f/mL (PCM) level (equivalent to 0.02 s/mL or 70 structures per square millimeter) was to save costs and time. EPA found that using a leaf blower increased asbestos concentrations in air by thousands of times. One study showed that using a leaf blower increased airborne asbestos concentrations over 100 times that caused by even vigorous broom cleaning. And vigorous broom cleaning has been demonstrated to increase asbestos levels hundreds or thousands of times over that of passive conditions which do not disturb dusts. Testing at the low levels that are actually those of health concern, 0.000004 f/mL, can often take 24 or more hours, which was found to be impractical for asbestos abatement contractors.

Even if testing is done at the low levels associated with asbestos health effects (0.000004 f/mL), there must be human activities or simulated human activities in the same room at the same time of the testing. When testing airborne asbestos levels inside homes in Libby, Montana, the Superfund site, EPA had both stationary air monitors and monitors worn by residents going about their normal daily activities. See the attached risk assessment for the Libby site for a description. Another study showed that asbestos concentrations in air can be undetectable or below 0.005 f/mL when there are no activities in the room to stir up dusts, but as high as 0.09 to 54 f/mL when activities such as vacuuming, broom sweeping, gym activities, etc. are going on in the room to disturb the dusts.

. . .

The EPA standard for asbestos in indoor and outdoor air is found in its Integrated Risk Management Information System (IRIS), attached, and other public documents. It is the policy and goal of EPA to protect at the 1 in a million cancer risk level (10^{-6} risk level), the point of departure. In all cases, action by EPA is triggered by any risk greater than 1 in 10,000. The EPA air standards for asbestos in inside and outside air at the different risk levels are given in the table below:

CANCER RISK LEVEL		AIR CONCENTRATION OF ASBESTOS fibers per milliliter (f/mL), "PLM" fraction of fibers over 5 micrometers long
number of cancers	risk level	
1 in 1,000,000	10^{-6} (= E-6)	0.000004 f/mL (= 4E-6 f/mL)

1 in 100,000	10^{-5} (= E-5)	0.00004 f/mL (= 4E-5 f/mL)
1 in 10,000	10^{-4} (= E-4)	0.0004 f/mL (= 4E-4 f/mL)

...

It is particularly important to test asbestos at the 10^{-6} risk level, because other carcinogens and possible carcinogens are potentially present in WTC fallout, including fiberglass, dioxins, PCB's, and heavy metals. If several are present, the carcinogenic risk could be additive and result in a higher aggregate cancer risk. . . . [Jenkins, 2/10/02]

3/11/02

70 s/mm² is not the AHERA standard, as explained in the AHERA regulations themselves

It is a LABORATORY BACKGROUND, the same as a DETECTION LIMIT or lab SENSITIVITY

A "LABORATORY BACKGROUND" is like going to a salad bar with a container for the salad.

The scale at the cashiers is good for weighing the large amount of salad, because the weight of the container is relatively small.

But if you went to the cashiers with an empty container and asked that it be weighed for traces of cyanide, you would be out of luck, since the cyanide would weigh much less than the container.

The container for the salad is like a "LABORATORY BACKGROUND"

In their naivete of analytical testing methods, Region 2 is under the mistaken belief that 70 s/mm² is the natural, typical background level of asbestos in normal air. Region 2 states this explicitly, seen in the excerpts in the preceding section.

EPA Region 2 has unfortunately completely misinterpreted the regulations at Title 40 of the Code of Federal Regulations, which describe in detail the meaning of the 70 s/mm² level for the AHERA TEM clearance test.

It is only the detection limit of a particular air test for asbestos, or the sensitivity of the method, a LABORATORY BACKGROUND. The word "background" refers to the fact that one particular filter material through which air is drawn is already contaminated with asbestos.

...

Extensive excerpts are given of the AHERA regulations, which make it very clear that 70 s/mm² only refers to the detection limit or sensitivity or laboratory background of the AHERA TEM clearance test. Nowhere in the AHERA regulations is the word "standard" or "safe" used in conjunction with 70 s/m². In fact, in the next section, it can be seen that the same AHERA regulations state that there is NO safe exposure to asbestos.

...

The actual AHERA standard for asbestos in air is ZERO

The AHERA regulations explicitly state:
"there are no safe exposures to asbestos"

The AHERA regulations actually do give a standard for asbestos in air, namely ZERO. The AHERA regulations are explicit, saying there are no safe exposures to asbestos:

40 CFR § 763. Appendix B to Subpart E to Part 763 -- Asbestos Model Accreditation Plan

...

1. WORKERS [*same language included for supervisors and all others involved in abatement*] ...

...

(b) Potential health effects related to asbestos exposure. The nature of asbestos-related diseases; routes of exposure; dose-response relationships and the lack of a safe exposure level; the synergistic effect between cigarette smoking and asbestos exposure; the latency periods for asbestos-related diseases; a discussion of the relationship of asbestos exposure to asbestosis, lung cancer, mesothelioma, and cancers of other organs. [*emphasis added*]

...

Asbestos School Hazard Detection and Control Act

...

§ 3601. Congressional statement of findings and purposes (a) The Congress finds that-- (1) exposure to asbestos fibers has been identified over a long period of time and by reputable medical and scientific evidence as significantly increasing the incidence of cancer and other severe or fatal diseases, such as asbestosis; (2) medical evidence has suggested that children may be particularly vulnerable to environmentally induced cancers; (3) medical science has not established any minimum level of exposure to asbestos fibers which is considered to be safe to individuals exposed to the fibers ... [*emphasis added*]

...

Even EPA Region 2 agrees that there are no ambient air standards for asbestos. Walter Mugdan, Regional Counsel, stated:

EPA has not promulgated an outdoor ambient air quality standard for asbestos; nor has any other regulatory agency done so, for that matter.

[*Mugdan, Walter E., Esq. (January 25, 2002) Environmental law issues raised by terrorist events in 2001. Speech before the NY Bar Association. Posted at www.NYenviroLAW.org]*

...

70 s/mm² AHERA is 2375 to 4750 times higher than EPA's 10⁻⁶ risk level

The table below compares the AHERA 70 structures per square millimeter (70 s/mm²) level with the EPA one-in-a-million risk level (10⁻⁶ risk level; ten to the minus six risk level).

Since the EPA one-in-a-million cancer risk level for asbestos is 0.000004 fibers per milliliter (PCM), the AHERA level is 2375 to 4750 times higher than the EPA cancer risk level. In other words, the 70 s/mm² level would lead to 2.4 to 4.8 excess cancers per one thousand. This is unacceptable.

The 70 s/mm² level is converted to "PCM equivalents" to make this comparison possible. See section above for an explanation of PCM equivalents. The theoretical level of PCM equivalents for 70 s/mm² is given in the AHERA regulations at 40 CFR § 763 App. A. The Region 2 air monitoring data also gives real-world PCM-equivalents to

70 s/mm². For Manhattan asbestos air tests, the PCM equivalents range from 0.0095 to 0.019 f/mL (PCM). . . . [Jenkins, 3/11/02]

EPA 110 Liberty St. study shows air fails 10⁻⁴ risk level, but not AHERA level

The EPA 110 Liberty St. study shows that the AHERA TEM clearance level of 70 s/mm² is easier to achieve than EPA's WTC criterion of 0.0009 f/cc PCMe (the 10⁻⁴ risk level for a 30 year exposure). In other words, even for the finely divided WTC dust, the AHERA TEM clearance level represents higher levels of airborne asbestos than the EPA WTC criterion of 0.0009 f/cc.

There have been claims that the asbestos from the WTC was so finely pulverized that there would not be any significant fraction of fibers longer than 5 µm, and exposures to WTC asbestos are harmless. This would mean that the AHERA level would still be under the 0.0009 f/cc PCMe level. The new EPA study disproves this theory.

See Section G on the 110 Liberty St. study for more information. After rigorous EPA abatement, air levels were either "at" or above the EPA criterion of 0.0009 S/cc PCMe, but below the AHERA TEM level of 0.0022 s/cc, for 4 apartments and one store.

AHERA 70 s/mm² is higher than background or typical levels

The AHERA level of 70 s/mm² is the equivalent of 0.022 structures (TEM) per cubic centimeter (s/cc², or also s/mL), assuming that the standard volume of air is drawn during testing.⁴⁵

This level is far higher than outdoor ambient background levels in urban cities, and is also much higher than found indoors, even in buildings with asbestos containing building materials. The EPA regulations and statutes state that in any cleanup, background levels or even zero exposures are the goal.⁴⁶

My 6/9/02 memorandum contained the following memorandum summarizing background levels of asbestos in air from the ATSDR Toxicological Profile for Asbestos. The table also included the AHERA clearance level of 70 s/mm² (same as 0.002 s/mL), and stated that this was an unsafe level.

ATSDR AIR LEVEL FINDINGS COMPARED TO LEVEL CHOSEN BY REGION 1			
Background ambient air levels are from studies determined to be the most credible by the ATSDR ⁴⁷			
	Concentration in TEM structures per milliliter (s/mL). This includes all asbestos fibers and bundles of fibers, and so is higher than "PCM" fibers.	Equivalent concentration in PCM fibers per milliliter (PCM f/mL). PCM fibers are only those single fibers which are longer than 5 micrometers with a certain aspect ratio.	
	expressed as exponential	expressed as exponential	
ATSDR finding: outside air, rural, no known source of asbestos contamination nearby	0.00001 (1 x 10 ⁻⁵)	0.0000002	(2 x 10 ⁻⁷)
ATSDR finding: outside air, urban, no known source of asbestos contamination nearby	0.0001 (1 x 10 ⁻⁴)	0.000002	(2 x 10 ⁻⁶)
ATSDR finding: 1988 EPA survey of 94 public buildings containing asbestos materials, mean concentration	0.006 (6 x 10 ⁻³)	0.0001	(1 x 10 ⁻⁴)
ATSDR finding: 1988 EPA survey of 41 schools containing asbestos materials, mean concentration	0.03 (3 x 10 ⁻²)	0.005	(5 x 10 ⁻⁴)
AHERA TEM clearance test level, the "70 structures per square centimeter" level, converted to s/mL and PCM equivalent f/mL. This is an unsafe level for long term exposures. ⁴⁸	0.02 (2 x 10 ⁻²)	0.01 approximately	(1 x 10 ⁻²)

EPA ORD validates again ATSDR findings of background asbestos air levels

In its 10/02 draft, EPA's ORD also recapitulates the same findings of the ATSDR, namely that the AHERA 70 s/mm² level is much higher than background:

ATSDR's Toxicological Profile for Asbestos (ATSDR, 1999) provides a summary of background asbestos levels.

...

Data from several studies indicate that in urban areas, most ambient air concentrations range from 3*10⁻⁶ to 3*10⁻⁴ PCM f/cc, but they may range up to 3*10⁻³ PCM f/cc as a result of local sources. In another investigation, the median concentration in U.S. cities has been estimated to be 7*10⁻⁵ PCM f/cc.

A recent analysis of monitoring data for asbestos in ambient air worldwide estimated rural and urban levels at about 1*10⁻⁵ TEM f/cc (2*10⁻⁷ PCM f/cc) and 1*10⁻⁴ TEM f/cc (2*10⁻⁶ PCM f/cc), respectively.

In a review of indoor air monitoring data from a variety of locations, arithmetic mean concentrations ranged from 3*10⁻⁵ to 7*10⁻³ PCM f/cc. Levels of asbestos in 94 public buildings that contained asbestos ranged from ND to 0.2 TEM f/cc (ND to 3*10⁻³ PCM f/cc), with an arithmetic mean concentration of 0.006 TEM f/cc (10⁻⁴ PCM f/cc). Analysis of data based on air samples from 198 buildings with asbestos-containing materials

(ACM) indicated mean asbestos levels ranging from 4×10^{-5} to 2.43×10^{-3} TEM f/cc (7×10^{-7} to 4×10^{-5} PCM f/cc).

Asbestos concentrations in 41 schools that contained asbestos ranged from ND to 0.1 TEM f/cc (ND to 2×10^{-3} PCM f/cc), with an arithmetic mean of 0.03 TEM f/cc (5×10^{-4} PCM f/cc). Another study reported average concentrations of airborne asbestos fibers $> 5 \mu\text{m}$ in length of 8×10^{-5} TEM f/cc and 2.2×10^{-4} TEM f/cc in 43 non-school buildings and 73 school buildings, respectively (the 60:1 conversion factors would not apply to these data, since the TEM readings were already on fibers $> 5 \mu\text{m}$ in width, so they are likely to be more directly comparable to PCM results). In another study in 71 U.S. schools, the mean, the 95 percentile, and the maximum asbestos levels were 1.7×10^{-4} , 1.4×10^{-3} , and 2.3×10^{-3} PCM f/cc, respectively.

A study of 49 buildings in the United States reported mean asbestos fiber levels of 9.9×10^{-4} PCM f/cc in buildings with no ACM, 5.9×10^{-4} PCM f/cc in buildings with ACM in good condition, and 7.3×10^{-4} PCM f/cc in buildings with damaged ACM.

In general, concentrations of asbestos in both indoor and outdoor settings and in both rural and urban settings appears to be less than, and by some studies, sometimes substantially less than, 3×10^{-3} f/cc on a PCM volumetric basis.

...

[Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster, External Review Draft, 10/02, National Center for Environmental Assessment, Office of Research and Development, EPA, Publication Nos. NCEA - W - 1395, or EPA/600/P-2/002A, <http://www.epa.gov/ncea> or http://oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=36387]

EPA Region 2 believes that the AHERA level is the normal air background level

As documented in my 3/11/02 memorandum, EPA Region 2 believes (believed) that the AHERA level was the background air level:

Region 2 mistakes 70 s/mm² as a normal air “background” level

Regional Counsel for EPA’s Region 2 explained his belief of the meaning of 70 s/mm². He believes that it is a normal air background, and when the AHERA clearance test is run, the results of the test are COMPARED WITH the 70 s/mm² “background” level:

These rules include what is commonly called a clearance test ... The specified AHERA clearance test procedure includes, *inter alia*, a step in which air monitored in the affected space is compared with the specified “background” level of 70 structures per square millimeter (70 s/mm²).

[Mugdan, Walter E., Esq. (January 25, 2002) Environmental law issues raised by terrorist events in 2001. Speech before the NY Bar Association. Posted at www.NYenviroLAW.org]

This is wrong. There is no comparison going on at all with the results of the test and any purported background level of 70 s/mm². Instead, the AHERA TEM clearance test

requires a comparison with the actual background air, which must be done by sampling the air outside and actually testing it, according to the procedures of the AHERA test.

As seen above, the word “background” in the regulations refers to a laboratory background from unavoidable asbestos contamination of the filter through which air is drawn. . . . [Jenkins, 3/11/02]

New EPA study of background levels of asbestos in air

During June to September, 2002, EPA conducted a study of background study of asbestos in air in buildings in upper Manhattan to compare to the residential buildings in lower Manhattan below Canal St. The buildings were not chosen randomly or systematically, and EPA even went knocking on doors for participation. There are lists of major asbestos construction sites in NYC. It would have been a simple task for EPA to choose buildings around these asbestos sites. This is the problem with any study that does not use a rigorous protocol to choose study participants, namely intentional selection bias. Thus, we cannot in any way trust EPA's selection of buildings to establish a background level of airborne asbestos.

As seen below, from the excerpts of the study, EPA would have us believe that buildings in upper Manhattan that were built between 1892 to 1981 have even higher levels of airborne asbestos than EPA's 1 in 10,000 risk level for 30 years exposure of 0.0009 f/cc PCM equivalents. There are other credibility problems with EPA's upper Manhattan background study as well.⁴⁹

Due to the lack of willing participants on this list, the difficulty with obtaining access, and time constraints under the Inter-Agency Agreements (IAA), EPA initiated cold calling and essentially door to door solicitation in order to solicit volunteers and gain access to buildings for participation in the Study. Therefore, not all of the buildings sampled as part of the Study were obtained from the list provided. Any building willing to participate in the Study was considered for sampling until fourteen buildings were obtained. This is a deviation from the initial sampling plan regarding representation of the diverse housing stock mentioned above. The buildings sampled were constructed roughly between 1892 and 1981.

. . .

Air - There were sixty-two air samples collected, forty-eight in residential spaces and fourteen in common spaces. Each of the samples were analyzed using Phase Contrast Microscopy (PCM), Transmission Electron Microscopy (TEM) AHERA, and TEM Phase Contrast Microscopy equivalents (PCMe) methods. PCM - There was a higher percentage of detections in the common space areas (71%) than in the residential areas (42%) although the minimum and maximum detected concentrations were the same. The UCL for the common area (0.0058 f/cc) is slightly more than twice the value for the residential area (0.0023 f/cc).

This difference may not be an unusual occurrence as common areas, such as laundry rooms and hallways may contain more fibrous material, especially in laundry rooms and high traffic areas. Since the common space areas and the residential areas differ, it is recommended to use the 95% UCL for the residential spaces of 0.0023 f/cc as the

background value.

...

[WORLD TRADE CENTER BACKGROUND STUDY REPORT INTERIM FINAL, April 2003, Prepared for: United States Federal Emergency Management Agency, IAG No.: EMW-2002-IA-0127, Prepared by: United States Environmental Protection Agency, Region 2, New York City, Response and Recovery Operations, 290 Broadway, New York, NY 10007-1866, http://epa.gov/wtc/bg_report_section1.pdf]

K: 1% ASBESTOS IN SETTLED DUST ALSO IS NOT A HEALTH STANDARD

“EPA considered implementing the NCP but choose not to, even though . . . about 39 percent of bulk dust samples were above the one percent EPA-defined action level for using the NCP.” [1/27/03 EPA IG report]

IG is in danger of mistaking the 1% level as a safety standard – 1% is just another detection limit, like the AHERA 70 s/mm² level

Although not entirely clear by the wording, the conclusion of the EPA IG report appears to be that 1% asbestos is some type of safety standard. It is not. It is just another detection limit of an outdated method using a light microscope (PLM), just like the AHERA TEM clearance level.

The 1% asbestos level applies only to the original asbestos containing building material (ACBM) itself under the Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAP). Any contamination resulting from these building materials would undoubtedly contain much less than 1% asbestos. All of the elaborate cleanup procedures required by EPA apply to the contamination and dusts derived from the original building materials. The CAA NESHAP specifically states that the cleanup must be to BACKGROUND levels, not 1%.

But, EPA claims that the CAA NESHAP does not even apply to the WTC cleanup. They are probably right, because the NCP applies instead. See Section V on the NCP and Section E on the NESHAP.

EPA IG report in error that NCP was not invoked

The EPA IG report was incorrect. The NCP was invoked for the WTC cleanup. Administrator Whitman has testified as such. See the Section V on the NCP.

1% asbestos trigger for NCP is for a *prima facie* case, lower levels also trigger

There is a 1990 guidance memorandum to the regions stating that if the Clean Air Act NESHAP is triggered for a specific, original asbestos-containing material (not necessarily any pollution resulting from this original building material), then this could also be used as a legal basis for an action under the Comprehensive Environmental Response and Liability Act (CERCLA), which includes NCP actions: .

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires notification to the National Response Center immediately following the release of a hazardous substance in an amount that exceeds its reportable quantity. 42 U.S.C. 5 9603. Asbestos is a CERCLA hazardous substance. 42 U.S.C. 5 9601(14): 40 C.F.R. § 302.4. Accordingly, we encourage regions to review asbestos NESHAP referrals for determination of whether CERCLA causes of action also exist. The purpose of this memorandum is to assist that effort by identifying the elements necessary to establish a CERCLA Section 103(a) claim and providing a legal analysis of relevant statutes and regulations.

...

We recommend that CERCLA Section 103(a) violations be alleged when prima facie evidence exists.

...

As stated previously, the CERCLA definition of release includes any "dumping, or disposing into the environment" and "the abandonment or discarding of barrels...or other closed receptacles containing hazardous substances...." 42 U.S.C. 5 9601(22). Consequently, particular attention should be paid to cases that allege violations of the asbestos disposal requirements. 40 C.F.R. § 61.151(a) and 61.156.

A Section 103(a) claim may be particularly appropriate if the evidence indicates that a) asbestos waste material remained on site after the completion of the demolition in violation of 40 C.F.R. § 61.152(a) and 61.156 or b) asbestos waste was transported to or deposited at a location not qualified as an "active waste disposal site" within the meaning of 40 C.F.R. § 61.156. Assuming, for example, that the waste material weighed at least ten pounds, the reportable quantity is satisfied provided the waste consisted of ten percent friable asbestos.

Moreover, if a large quantity of asbestos was present, there is circumstantial evidence that the release occurred within one twenty-four hour period. Liability may arise even if the asbestos was stored in sealed containers; the definition of release covers the abandonment of receptacles. CERCLA claims should not be limited to cases that involve conduct prohibited by the asbestos NESHAP disposal provisions. Because of the unique circumstances of each referral, the question whether to allege a Section 103(a) violation must be decided on a case-by-case basis. Given the prospect of obtaining significant penalties and further deterring violations, we encourage adding CERCLA counts when prima facie Section 103(a) evidence exists. Also, we presently recommend a bottom-line settlement figure of \$15,000 for each Section 103(a) violation. The proposed figure is consistent with the Clean Air Act Civil Penalty-Policy provision that sets the minimum penalty amount for reporting violations at \$15,000. When the CERCLA Section 103 penalty policy becomes effective, regions should calculate settlement penalties in accordance with that guidance.

...

[Inclusion of, CERCLA Section 103(a) Counts. in Asbestos NESHAP Case's, [month and day illegible] 1990, From: Michael S. Alushin, Associate Enforcement Counsel for Air, EPA, To: Regional Directors, EPA, www.epa.gov/compliance/resources/policies/civil/caa/stationary/inclu-asbes-rpt.pdf]

However, this guidance does not in any way preclude actions for asbestos concentrations that are much lower. The 1% would be just a *prima facie* level of proof for a violation or a hazard. The CERCLA (and NCP) regulations are risk-based, and in many cases CERCLA cleanups of

asbestos (such as Libby) are required for much lower concentrations. No set percent of asbestos is given to trigger an action, although the CAA NESHAP regulations are pointed to as being legally defensible without the need for a risk assessment or further proof.

Emergency Planning & Community Right-to-Know Act triggered at 0.1% asbestos

The Emergency Planning & Community Right-to-Know Act (EPCRA) Section 313 requires triggering a community right-to-know notification for a spill of any carcinogen in concentrations over 0.1%. This includes asbestos, an established human carcinogen. This puts into better context the 1% rule for the original asbestos containing material under the CAA NESHAP (not releases resulting from it).

40 CFR §372.38 Exemptions.

(a) De minimis concentrations of a toxic chemical in a mixture. If a toxic chemical is present in a mixture of chemicals at a covered facility and the toxic chemical is in a concentration in the mixture which is below 1 percent of the mixture, or 0.1 percent of the mixture in the case of a toxic chemical which is a carcinogen as defined in 29 CFR 1910.1200(d)(4), a person is not required to consider the quantity of the toxic chemical present in such mixture when determining whether an applicable threshold has been met under §372.25 or determining the amount of release to be reported under §372.30.

...

[<http://www.epa.gov/epahome/cfr40.htm>]

If another part of EPA has established that releases of carcinogens like asbestos trigger agency action at much lower levels than 1%, then obviously there is regulatory concern over levels lower than 1% asbestos.

See 40 CFR 372, Toxic Chemical Release Reporting; Community Right-to-Know; Final Rule (February 16, 1988; 53 FR 4500). Also see the following EPA web site for more information on EPCRA:

<http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/epcraOverview.htm#fact>

EPA claims that 1% is safety standard for asbestos dust

Both EPA and NYC officials repeatedly claimed that 1% or less asbestos in settled dusts was safe and a health-based benchmark:

9/13/01

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.

...

[Headquarters Press Release, Washington, DC, For Release 09/13/2001, EPA INITIATES EMERGENCY RESPONSE ACTIVITIES, REASSURES PUBLIC ABOUT ENVIRONMENTAL HAZARDS, www.epa.gov]

9/13/01

As rescue efforts continue and the rubble is removed, Environmental Protection Agency officials are finding a new problem in the dust: elevated levels of asbestos. Tuesday night, one sample of dust from the ground at the rescue site contained four and a half times what the EPA worries about.

...

[ABC News, *What's in that Smoky Cloud? Concerns about Air Quality*, Last Updated: Sep 13, 2001, http://abclocal.go.com/wabc/health/WABC_oncall_091301asbestos.html]

9/14/01

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.

...

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."

Air Samples taken on Sept. 13 th 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 asbestos, ranging from 2.1 to 3.3 % slightly above the 1 percent trigger for defining asbestos material. [emphasis added]

...

[Headquarters Press Release, Washington, DC, For Release 09/14/2001, EPA, OSHA UPDATE ASBESTOS DATA, CONTINUE TO REASSURE PUBLIC ABOUT CONTAMINATION FEARS, www.epa.gov]

9/14/01

Some samples of the dust that cloaked the disaster scene, victims and rescuers on

Tuesday showed slightly elevated levels of lead and asbestos, the agency said. But by Wednesday, levels of the substances had dropped below the threshold of any concern, said Bonnie Bellow, a spokeswoman for the Environmental Protection Agency. Tests on samples taken yesterday would not be completed until today, she said.

...

[THE CHEMICALS, Monitors Say Health Risk From Smoke Is Very Small, By ANDREW C. REVKIN, 9/14/01, NY Times]

9/14/01

Of the 24 dust samples the agency took in the first two days of the chaos, many contained asbestos, but only one registered levels above acceptable maximums, says EPA spokesperson Tina Kreisher. That sample, taken from very near the epicenter of the disaster in Manhattan's financial district, contained 4.5 percent asbestos fibers. It was taken as agents fled the collapsing buildings on Tuesday. Dust samples from Thursday, she says, also showed elevated levels of 2.1 percent to 3.3 percent. A level of 1 percent or less is considered safe.

...

[Asbestos Alert. How much of the chemical does the World Trade Center wreckage contain? By David France and Erika Check, 9/14/01, NEWSWEEK WEB EXCLUSIVE, <http://msnbc.com/news/629268.asp?0sp=w12b2&cp1=1>]

9/14/01

Nearly four days after the World Trade Towers collapse sent massive columns of dust and smoke over lower Manhattan and into the shifting winds around New York Harbor, there is still no clear picture of how much asbestos or other hazardous materials may have been set free into the environment, officials say.

BUT IN THE MEANTIME, the federal Environmental Protection Agency is beginning to enforce measures meant to keep the untold pollutants from spreading any further than they already have, says EPA administrator Christine Todd Whitman, who maintains that the risks are negligible.

...

Of the 24 dust samples the agency took in the first two days of the chaos, many contained asbestos, but only one registered levels above acceptable maximums, says EPA spokesperson Tina Kreisher. That sample, taken from very near the epicenter of the disaster in Manhattan's financial district, contained 4.5 percent asbestos fibers. It was taken as agents fled the collapsing buildings on Tuesday. Dust samples from Thursday, she says, also showed elevated levels of 2.1 percent to 3.3 percent. A level of 1 percent or less is considered safe.

...

Given these assurances, officials have said they are considering reopening the New York Stock Exchange on Monday, though it is just a few blocks from the Twin Towers.

...

[Asbestos Alert. How much of the chemical does the World Trade Center wreckage contain? By David France and Erika Check, 9/14/01, NEWSWEEK WEB EXCLUSIVE, <http://msnbc.com/news/629268.asp?0sp=w12b2&cp1=1>]

9/21/01

Whitman detailed dust sampling undertaken thus far at the World Trade Center site, and confirmed that EPA has done a total of 101 dust samples, of which 37 were slightly over the one percent asbestos (the amount above which material is considered asbestos-containing).

...

[EPA press release, 9/21/01, www.epa.gov]

10/1/01 [approximate date]

Benchmarks, Standards and Guidelines Established to Protect Public Health

Since September 11, the U.S. Environmental Protection Agency (EPA) and other federal agencies have been taking samples of the air, dust, water, river sediments and drinking water from the World Trade Center site and surrounding areas in Manhattan, Brooklyn, Staten Island and New Jersey. EPA and other agencies have analyzed these samples for the presence of pollutants that might pose a health risk to response workers and the public. The samples are evaluated against a variety of benchmarks, standards and guidelines established to protect public health under various conditions. EPA considers 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 the benchmarks, standards and guidelines EPA is using to evaluate environmental conditions in the aftermath of the World Trade Center disaster.

ASBESTOS . . . In Dust

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

EPA is using the 1% definition in evaluating dust samples from in and around ground zero. The vast majority of the samples taken to date have levels of asbestos below 1%. In fact, in an urban environment like New York City, we can expect the presence of a low level of asbestos under normal circumstances (these low everyday levels are called "background levels").

The majority of areas in which EPA has found levels of asbestos above the 1% definition have been in the vicinity of the work zone at the World Trade Center site.

...

[EPA website responding to WTC disaster, guidance on standards, approximate date 1-1/01, <http://www.epa.gov/epahome/wtc/activities.htm>]

10/3/01

Asbestos Monitoring Data Bulk Dust and Debris Samples:

EPA and OSHA have also sampled dust at the site and in the surrounding area for asbestos.

Of 177 bulk samples collected by EPA and OSHA, 48 contained more than one percent asbestos, the level EPA and OSHA use to define asbestos-containing material. The existence of dust that contains more than one percent of asbestos does not in itself constitute a significant health hazard ambient air samples are more accurate measures of actual exposure potential, and asbestos is primarily considered hazardous after long-term exposure but dust samples do provide important information about potential exposure.

...

[Headquarters Press Release, 10/03/2001, EPA AND OSHA WEB SITES PROVIDE ENVIRONMENTAL MONITORING DATA FROM WORLD TRADE CENTER AND SURROUNDING AREAS, www.epa.gov]

One of the first decisions that EPA had to make when sampling for asbestos in the dust from the WTC collapse was what reference value to use when reporting the data in other words, at what concentration of asbestos in the bulk dust samples would the Agency characterize the dust as containing asbestos in quantities of significance? EPA elected to use the definition of ACM [asbestos containing material] from the NESHAPs regulations i. e., the 1% asbestos content standard.

...

[Mugdan, Walter E., Esq. (January 25, 2002) Environmental law issues raised by terrorist events in 2001. Speech before the NY Bar Association. Posted at www.NYenviroLAW.org]

10/25/01

EPA is using the 1% definition in evaluation 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 the certified personnel.

...

[Joel A. Miele, Sr., P.E. Commissioner, NYC Dept. of Environmental Protection, letter to Residents of Lower Manhattan, 10/25/01]

1/13/02

All the agencies play down the importance of test results that found dust samples that contained less than 1 percent asbestos.

"They keep calling it a trace. This implies to the public that there is no hazard from it," said Dr. Jerrold Abraham, director of environmental and occupational pathology at Upstate Medical University in Syracuse. "If you're talking about pure chrysotile asbestos, there are 10 billion or more fibers per gram, or about a fifth of a teaspoon. "Their whole

measuring and reporting system needs to be made more honest."

The EPA's Bellow tried to answer the criticism.

"We didn't see ourselves as the primary source for information on what the health implications were. We're not a health agency," she said, adding that these are national issues that EPA headquarters should be addressing.

...

[NY officials underestimate danger, 1/13/01, By Andrew Schneider, This story was published in A-section of The Post-Dispatch. Updated by the St. Louis Dispatch on its anniversary date, 1/13/03, under a new title, "World trade center attack asbestos health threat" and can be found at www.stltoday.com]

1/25/02

One of the first decisions that EPA had to make when sampling for asbestos in the dust from the WTC collapse was what reference value to use when reporting the data in other words, at what concentration of asbestos in the bulk dust samples would the Agency characterize the dust as containing asbestos in quantities of significance? EPA elected to use the definition of ACM [asbestos containing material] from the NESHAPs regulations i. e., the 1% asbestos content standard.

...

Around 35% of the samples of bulk dust taken in Lower Manhattan in the first few days after the collapse exceeded the 1% level.

...

By contrast, when WTC dust was found to contain concentrations in excess of 1%, it was nevertheless still quite low typically between 1% and 4%.

...

[Mugdan, Walter E. (January 25, 2002) Environmental law issues raised by terrorist events. Speech before the NY Bar Association, NYC. Walter Mugdan is Regional Counsel for EPA Region 2. Posted at www.NYenviroLAW.org]

EPA recants claim that 1% asbestos in WTC dust is safe in April, 2002

My 4/30/02 memorandum, abstracte below, documented that Region 2 has now officially recanted earlier claims that 1% asbestos is safe. This is apparently because a journalist confronted EPA with the documentation in my 3/11/02 memo:

RECENTLY REGION 2 REVERSES CLAIM THAT 1% IS SAFE LEVEL

EPA Region 2 has recently reversed their position that 1% asbestos in dusts is a safe level. In a March 21, 2002 statement to the press, EPA stated that the 1% level was only a "guideline," but not a health standard.

[Gonzales, J. (March 21, 2002) A Red Flag on Air Tests at WTC, NY Daily News]

In the days after Sept. 11, federal officials repeatedly referred to two "standards," one for asbestos in dust and debris and another for asbestos fibers in air. For dust and debris, the agency standard was 1% asbestos content. For air, it was usually 70 asbestos fibers per square millimeter of a testing filter.

...

But as Jenkins explains in her memo, federal regulations never meant the 1% figure to be considered a health standard or even to be applied to measure dust.

...

"We have never said it was a health standard," said the EPA's Mears about the 1%.

"We're only using it as a guideline. We say clean up the dust and get rid of the dust regardless of whether it's 1% or below 1% it doesn't matter."

In a January 25, 2002 speech, Counsel for Region 2, Walter Mugdan, also stated that the 1% level was not a health standard, but only the detection limit of the PLM method: Note that Walter Mugdan is also incorrect in claiming that PLM is the required analytical method for anything relating to asbestos.

Note that the 1% standard is not necessarily health- or risk-based, but rather keyed to the detection limits of the specified analytical method [PLM].

... [Jenkins, 4/30/02]

110 Liberty St. study – WTC dust with less than 1% asbestos cause hazardous levels

EPA's study on the cleaning of a building in lower Manhattan at 110 Liberty St., contaminated with WTC dust, proves irrefutably that EPA itself found that WTC dust containing less than 1% asbestos causes hazardous air levels.

The following is a direct quote from the study released 6/4/03 by EPA. A mixed use residential and commercial building at 110 Liberty Street was found by EPA to have hazardous levels of WTC-related contaminants, such as asbestos, lead, silica, and fiberglass. These are EPA's conclusions, not the conclusions of somebody else interpreting the data.

The pre-cleaning analytical results for all of the data sets listed above were also evaluated to determine if the concentration of contaminants in the dust were elevated above health-based benchmarks. . . . Based on pre-cleaning data, there were ten residential units and five commercial units that exceeded a health-based benchmark for either lead, dioxin, PAH, or some combination of the three compounds. Based on post-cleaning data, an additional three residential units and one common area exceeded a healthbased benchmark for either asbestos, lead, MMVF, or alpha-quartz, or a combination of these compounds.

Cumulatively, nineteen sites inside the building or 76 percent exceeded a health-based benchmark for one or more contaminants associated with the WTC collapse. This indicates that some contaminant concentrations exceeded health-based benchmarks.

...

[There were 13 residential units and 6 businesses total.]

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, p. 108, http://epa.gov/wtc/confirmation_clean_study.htm]

Page 17 of the study describes the testing of the bulk, settled WTC dust in the building, responsible for the hazardous airborne levels:

Prior to commencement of the study, bulk samples were collected from three units in the building. Samples were collected from units that contained excessive amounts of dust, in an attempt to characterize the asbestos concentration in dust from worst case locations in the building. . . . Analysis of the samples indicated that less than one percent asbestos was present.

As discussed in greater detail in the Section G on the 110 Liberty St. study, 7 out of 13 apartments had what EPA called “minimal” dust – there was no visible WTC dust except under the baseboard heaters. But EPA had to completely abate most of these “minimal dust” apartments two times to get them to meet EPA’s health benchmarks. Several of the “significant dust” apartments had to be cleaned 3 or 4 times, and some never passed EPA’s testing.

EPA vermiculite study – dust less than 0.1% causes hazardous air levels

On 5/21/03, EPA released its study simulating the hazards of vermiculite attic insulation in homes.⁵⁰ Air levels of asbestos were measured for vermiculite insulation containing less than 0.1% asbestos, which is over 10 times less than 1%. Tests were performed during various activities, such as removing the insulation, installing it, moving boxes around in the insulation, or living in a house with the insulation undisturbed.

This is the first study that I am aware of that measured air concentrations of asbestos inside a confined space like a home, and correlated those air concentrations with the percent of asbestos in the dust or other material. In all other studies, concentrations of asbestos in the dusts have been measured as the amount of asbestos fibers per surface area, by using either EPA’s ultrasonication extraction procedure for carpets, or wipe or microvacuum samples for hard surfaces. Although the measurement of the amount of fibers per surface area is much more relevant in terms of resuspension, a study where the material was measured by a volume percent is helpful in demonstrating the false EPA and NYC contentions that 1% asbestos in dust is safe.

Even though the insulation contained less than 0.1% asbestos, hazardous air levels occurred. Installing the insulation in the attic resulted in concentrations as high as 3.3 total asbestos fibers per cubic centimeter by TEM (3.3 s/cc or s/mL).⁵¹ This would be 150 times the AHERA TEM clearance level of 0.022 s/cc (same as 70 s/mm²).⁵²

When the study simulated residential activities in the attic, such as moving around boxes, air asbestos levels were as high as 0.43 s/cc by TEM, which is 20 times the AHERA clearance level.⁵³

Removal of the vermiculite insulation by the homeowner resulted in concentrations as high as 0.60 s/cc TEM, or 27 times the AHERA TEM clearance level.

These levels inside a house are much higher than what EPA measured in outside air at Ground Zero. As noted elsewhere, air concentrations in a confined space, such as a house or apartment, will be much higher than outside, even if the dust contains the same percentage of asbestos.

We would expect even higher levels in air for thick layers of WTC dusts, since they are more finely divided than vermiculite attic insulation, and more easily resuspended. There are no studies to my knowledge which tested air levels of asbestos for substantial accumulations of WTC dusts in a confined space where there were either actual or simulated human activities. All air tests by EPA were conducted only after extensive abatement, or prior to abatement under passive conditions. The studies by the Ground Zero Task Force and HP Environmental were also under passive conditions, meaning that the dusts on surfaces were undisturbed.

The elevated levels found in the EPA vermiculite attic insulation study could represent the minimum level to which NYC citizens were exposed when they removed the original layers WTC dust from their homes or offices using the NYC DOH do-it-yourself cleanup guidelines.

Using a HEPA vacuum would not have been any protection whatsoever from the elevated airborne levels generated by heavy dust layers, since simple movement in the dust by the person or cleaning equipment would resuspended fibers. The HEPA vacuum would never have a chance to remove them, as demonstrated by EPA studies on air levels during HEPA vacuuming.⁵⁴

Early criticisms that 1% asbestos is not an EPA safe level

The following is documentation that 1% asbestos is not a safety standard from my 12/3/01 and 3/11/02 memoranda. This alleged 1% safety level was also addressed in my 12/19/01, 1/11/02, and 2/10/02 memoranda.

3/21/02

In the days after Sept. 11, EPA officials used standards to determine dangerous asbestos contamination that were never intended to measure health risks, according to a new 43-page memo by a dissident Environmental Protection Agency scientist.

Cate Jenkins, a 22-year veteran with the agency's Hazardous Waste Identification Division in Washington, charged that the agency "misrepresented safety levels and standards for asbestos" and failed to accurately detect possible health risks to the public.

Jenkins first criticized her agency's handling of the World Trade Center disaster in late November, arguing that EPA officials effectively "waived" federal asbestos guidelines by endorsing lenient cleanup methods.

Her latest memo raises new allegations that the standards the EPA publicized as benchmarks for judging asbestos contamination in both dust and air were intended only to measure the presence of asbestos in building materials.

An EPA spokeswoman roundly rejected Jenkins' charges yesterday and defended the agency's work. "We have a number of scientists in the agency who looked at Cate's approach and none of them agree with her view," said spokeswoman Mary Mears.

In the days after Sept. 11, federal officials repeatedly referred to two "standards," one for asbestos in dust and debris and another for asbestos fibers in air. For dust and debris, the agency standard was 1% asbestos content. For air, it was usually 70 asbestos fibers per square millimeter of a testing filter.

The "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 [1% asbestos]," EPA Administrator Christie Whitman announced Sept. 18.

Whitman was correct about one thing. Most dust samples were below the 1% standard, but a significant portion were not. Around 35% of those taken in the first few days were above 1%.

But as Jenkins explains in her memo, federal regulations never meant the 1% figure to be considered a health standard or even to be applied to measure dust. The standard was developed as a way to gauge whether any building material such as floor tiles or pipe insulation contained asbestos and should be considered hazardous waste requiring professional abatement. But any dust released by the breakup of such materials must be considered hazardous, Jenkins claims, because it came from asbestos-containing products in the Trade Center.

"She's absolutely correct, this is not a health-based standard," said Joel Shufro, an industrial hygienist with the New York Committee for Occupational Safety and Health. "People exposed to 1% or less can have significant exposure with adverse health impacts," he said.

"We have never said it was a health standard," said the EPA's Mears about the 1%. "We're only using it as a guideline. We say clean up the dust and get rid of the dust regardless of whether it's 1% or below 1% it doesn't matter." According to Mears, the agency sent its vacuum trucks to clean all dust off area streets. "It's real easy to be a Monday morning quarterback," Mears said.

One Supporter. One person Jenkins has convinced is Rep. Jerrold Nadler (D-Manhattan). "A lot of New Yorkers have been exposed to very bad health risks, possibly even deaths years from now because EPA put out these standards as if they had anything to do with health risks," Nadler said.

...

[A Red Flag on Air Tests at WTC, By Juan Gonzalez, Daily News, 3/21/02]

3/11/02

In guidance under the Clean Air Act asbestos NESHAP, the EPA clearly states that the 1% level is only to be used to determine whether a building material itself contains asbestos, and that 1% is not a safe level, or a "standard." Under the NESHAP, any dusts or contamination resulting from the use of building materials containing asbestos, which are called emissions, are regulated at much, much lower concentrations of asbestos in the dusts themselves.

...

An asbestos-containing product, as stated by the regulation was defined for the first time to be a product with greater than 1% asbestos, by weight. The intent of the 1% limit was:

... to ban the use of materials which contain significant quantities of asbestos, but to allow the use of materials which would (1) contain trace amounts of asbestos which occur in numerous natural substances, and (2) include very small quantities of asbestos (less than 1 percent) added to enhance the material's effectiveness. (38 FR 8821).

It must be clearly understood that the EPA NESHAP definition of 1% by weight was not established to be a health-based standard. . . . [emphasis added]

[US EPA (April 18, 1989) Interim Asbestos NESHAP Enforcement Guidance - "Friable asbestos" 1% by Area of Volume vs. 1% by Weight. Office of Enforcement and Compliance Monitoring EPA Publication No. EPA 560/5-88-001. Available online at: <http://es.epa.gov/oeca/ore/aed/comp/ecom/e6.html>]

...

Region 2 Counsel agrees that the 1% level is not a safety standard, contradicting the other Region 2 claims. He states that this level only relates to the detection limit of the method that Region 2 chose to use in Lower Manhattan, the crude PLM method.

Note that the 1% standard is not necessarily health- or risk-based, but rather keyed to the detection limits of the specified analytical method.

[Mugdan, Walter E. (January 25, 2002) Environmental law issues raised by terrorist events. Speech before the NY Bar Association, NYC. Walter Mugdan is Regional Counsel for EPA Region 2. Posted at www.NYenviroLAW.org]

However, what Region 2 Counsel fails to admit is the fact that more sensitive test methods, namely TEM, is required by official EPA policy when the less sensitive test, PLM, fails to show the presence of asbestos. See later sections on the EPA guidance requiring TEM testing of settled dusts and other solid materials.

...

In Superfund guidance, EPA found 1% asbestos or lower is hazardous

In guidance for Superfund cleanup actions, EPA has also stated that less than 1% asbestos in soils could present hazards:

Questions and Answers about Asbestos and EPA's Libby Investigation

Q : I recently read that EPA found less than 1% (or trace levels) asbestos at Fireman's Park and other locations that were sampled. Is that a safe level?

A : This is a very difficult question, and at this time we are not sure. Levels at 1% or less may be safe. Even higher levels could be considered safe at remote locations

where no one comes in contact with the material. The key to determining whether there is a risk is exposure. If there is no exposure pathway i.e., a way for the asbestos to get into your body, such as contact with the material, or people driving over the material so that they breathe in the fibers, there is no risk. Levels of 1% or less could present a risk where there is enough activity to stir up soil and cause asbestos fibers to become airborne. [www.epa.gov/region8/superfund/libby/qsafe.html]

Soils containing only 0.001% asbestos can lead to hazardous air levels

One study found that soils containing only 0.001% asbestos can lead to air concentrations of 0.01 fibers per milliliter (f/mL) (PCM). As seen from the preceding section on asbestos in air, this level of 0.01 f/mL is many times over either the EPA one-in-a-million cancer risk level of 0.000004 f/mL (PCM), or the typical background levels of asbestos in outdoor air of 0.000002 f/mL (PCM); or indoor air of 0.000003 f/mL (PCM).

Suitable Action Levels . . . Airborne dust clouds were generated from mixtures of soils with different asbestos varieties in bulk concentrations ranging from 1 to 0.001 % asbestos. . . . The experiments showed very clearly that even the lowest bulk amphibole asbestos content tested (0.001%) was still capable of producing measurable airborne asbestos concentrations (greater than 0.01 fibers ml ⁻¹). [Addison, J. (1995) Vermiculite: A review of the mineralogy and health effects of vermiculite exploitation. Reg. Tox. and Pharm. 21: 397 - 405]

Decontamination of demolition sites must be cleaned up to background, not just 1%, under the EPA asbestos NESHAP

Under EPA's NESHAP, the surrounding soils around a demolition site must be cleaned up to background levels of asbestos.

Region 2 has attempted to draw guidance from these NESHAPs regulations, citing them in its justification for claiming that 1% is the cleanup level, drawing an analogy to the regulations for the asbestos containing building materials themselves.

The correct analogy, however, would be to compare what is required for soils surrounding a demolition site, where the WTC is considered the demolition site. As seen below, the surrounding soils are required to be cleaned up to background levels, not 1%.

Decontamination of Demolition Site

If the surrounding soil has been contaminated by the demolition activities at the site, the site must be cleaned up to background levels of asbestos contamination. Alternatively, the site may be operated in accordance with section 61.154 (Standard for active waste disposal sites) and closed in accordance with section 61.151 (Standard for inactive waste disposal sites for asbestos mills and manufacturing and fabricating operations). However, according to 40 CFR 61.05, the establishment of an active waste site requires prior approval from EPA or the delegated State program. To clean up the site to background levels, it will probably be necessary to remove all the asbestos contaminated soil. The contaminated soil should be treated and disposed of as asbestos-containing waste material.

Decontamination of Area Surrounding Demolition Site

If a site assessment detects contamination of soil surrounding a demolition site, the site must be cleaned up to background levels of asbestos contamination. Alternatively, the site may be operated in accordance with section 61.154 (Standard for active waste disposal sites) and closed in accordance with section 61.151 (Standard for inactive waste disposal sites for asbestos mills and manufacturing and fabricating operations). However, according to 40 CFR 61.05, the establishment of an active waste site requires prior approval from EPA or the delegated State program. To clean up the site to background levels, it will probably be necessary to remove all the asbestos contaminated soil. The contaminated soil should be treated and disposed of as asbestos-containing waste material. . . . [US EPA (1994) Asbestos/NESHAP Demolition Decision Tree. EPA Manufacturing, Energy, and Transportation Division, Office of Compliance. Available from the EPA OPPTS Ombudsman's office]

. . .

Under both the asbestos NESHAP and AHERA regulations, ZERO emissions of asbestos-containing dusts are required, not "emissions of dusts containing less than 1% asbestos."

In the collapse of the WTC, the airborne dusts are also analogous to the dust emissions from the transport or disposal of asbestos wastes under AHERA or the NESHAP. From the above section, they are probably more analogous to contaminated soils around a demolition site. They are not, however, as Region 2 is trying to argue, analogous to the original building materials themselves where the 1% rule applies..

The requirement for zero emissions, not emissions of dusts containing less than 1% asbestos, is made clear in the following guidance and regulations:

[NESHAP] Q: Is there a numeric emission limit for the release of asbestos fibers during renovations or demolitions in the asbestos NESHAP regulation?

A: No, the Asbestos NESHAP relating to demolitions or renovations is a work practice standard. This means that it does not place specific numerical emission limitations for asbestos fibers on asbestos demolitions and removals. Instead, it requires specific actions be taken to control emissions. However, the Asbestos NESHAP does specify zero visible emissions to the outside air from activity relating to the transport and disposal of asbestos waste. [US EPA. Common Questions on the Asbestos NESHAP. Posted at <http://www.epa.gov/opptintr/asbestos/neshap.pdf>]

[NESHAP] 40 CFR §61.144 Standard for manufacturing. . . .

(b) Standard. Each owner or operator of any of the manufacturing operations to which this section applies shall either:

- (1) Discharge no visible emissions to the outside air from these operations or from any building or structure in which they are conducted or from any other fugitive sources; or
- (2) Use the methods specified by §61.152 to clean emissions from these operations containing particulate asbestos material before they escape to, or are vented to, the outside air.
- (3) Monitor each potential source of asbestos emissions from any part of the manufacturing facility, including air cleaning devices, process equipment, and buildings housing material processing and handling equipment . . .

[AHERA] 40 CFR § 763 - Appendix D to Subpart E -- Transport and Disposal of

Asbestos Waste

For the purposes of this appendix, transport is defined as all activities from receipt of the containerized asbestos waste at the generation site until it has been unloaded at the disposal site. Current EPA regulations state that there must be no visible emissions to the outside air during waste transport. However, recognizing the potential hazards and subsequent liabilities associated with exposure, the following additional precautions are recommended.

...

The regulations themselves define the building materials as those containing 1% or more asbestos, and the dusts emanating from these materials are defined as emissions or debris. The 1% regulations do not apply to the emissions. . . . [AHERA] 40 CFR §763.83 Definitions]

...

The asbestos-free level is "no asbestos detected by TEM" not 1%

The NESHAP regulations themselves require the use of transmission electron microscopy (TEM) to determine whether wastes can be considered "asbestos free." The standard for being asbestos free is not 1%, but instead no detectable asbestos by the most sensitive test method, TEM. The use of polarized light microscopy (PLM) is not sufficient according to the regulations, because this method cannot reliably determine asbestos at concentrations less than 1%, and because this method cannot detect the thinner, smaller asbestos fibers, such as chrysotile.

[NESHAP] 40 CFR § 61

§61.155 Standard for operations that convert asbestos-containing waste material into nonasbestos (asbestos-free) material . . .

(b) Conduct a start-up performance test. Test results shall include:

...

(3) Results of analyses, using transmission electron microscopy [TEM], that document that the output materials are free of asbestos. Samples for analysis are to be collected as 8-hour composite samples (one 200-gram (7-ounce) sample per hour), beginning with the initial introduction of RACM or asbestos-containing waste material and continuing until the end of the performance test.

...

(c) . . . Transmission electron microscopy (TEM) shall be used to analyze the output material for the presence of asbestos. During the initial 90-day period, all output materials must be stored on-site until analysis shows the material to be asbestos-free or disposed of as asbestos- containing waste material according to §61.150 . . . *[emphasis added]*

12/3/01

The EPA has officially stated that asbestos levels LOWER than 1% could present health hazards :

Levels at 1% or less may be safe. Even higher levels could be considered safe at remote locations where no one comes in contact with the material. The key to determining whether there is a risk is exposure. If there is no exposure pathway i.e., a way for the asbestos to get into your body, such as contact with the material, or people driving over

the material so that they breathe in the fibers, there is no risk. Levels of 1% or less could present a risk where there is enough activity to stir up soil and cause asbestos fibers to become airborne. [www.epa.gov/region8/superfund/libby/qsafe.html]

. . .

The Ground Zero Task Force study confirms that asbestos concentrations at less than 1% in surface dusts can lead to airborne concentrations over established limits

. . . [*Jenkins 12/3/01 memorandum*]

L: TESTING DUSTS – EPA REFUSAL TO USE ELECTRON MICROSCOPES

“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, and guidance?” [1/27/03 EPA IG report]

This section of the report addresses EPA’s failure to use electron microscope methods for settled dusts. These test methods are called TEM for transmission electron microscopy. EPA chose to use the antiquated light microscope method instead, called PLM (polarized light microscopy) for WTC dust both outdoors and inside apartments. With PLM, the test gives false negative results no asbestos found.

The EPA IG report of 1/27/03 asks the cryptic question of whether EPA’s decisions were consistent with “consistent with applicable statutes, regulations, policies, and guidance.” This section answers that question in regards to the use of TEM electron microscopy for settled dust, whether that dust is in bulk form (enough to scoop into a bag), or whether there is a thin layer that needs to be tested by wipe sampling, a micro vacuum sampling apparatus, or by EPA’s ultrasonification extraction procedure for carpets and other soft materials..

EPA Region 2 refused free TEM laboratory resources from Region 8 in a conference call on 9/12/01. Region 8 had a contract with a mobile laboratory that could have been on the WTC scene in 45 minutes. Region 2 told Region 8: “We don’t want you fucking cowboys here. The best thing they could do is re-assign you to Alaska.” This scandal is covered in Section L of this report.

After 9/11, EPA only offered the results from the cheap, antiquated PLM method to citizens of New York to test whether the settled dust they were exposed to contained asbestos. But EPA had the results of the more sophisticated TEM electron microscope test for its own building at 290 Broadway in Manhattan. They had these results by 9/14/01, finding asbestos where the old PLM method did not find at the EPA building. Armed with this special information, EPA had its own building evacuated and professionally abated. This incident is addressed in Section N of this report.

Of course, EPA has and is using the TEM electron microscope method at other contamination sites around the country. The best example is the Libby, Montana Superfund site, where interior dusts inside residences, as well as bulk outdoor dust, were tested with TEM methods. That subject is also addressed in Sections L and O.

Why TEM electron microscope asbestos methods are needed for WTC dust

Because of the force of the WTC implosion, asbestos fibers were highly pulverized into smaller than usual fiber sizes. With the old PLM light microscope method, many of the thin WTC asbestos fibers, fibers that are still longer than 5 micrometers long (5 μg ., or 5 microns), cannot be seen.⁵⁵ EPA has recognized the limitations of the old PLM light microscope method for years. EPA developed, and required the use of the newer electron microscopy method for bulk asbestos materials through official published guidance.

The following is a description of the need for PLM versus TEM testing of asbestos:

The importance of using instruments with the appropriate resolution when counting asbestos fibers is further emphasized in that a single "fibril" of chrysotile may be as thin as 50nm while those of amphiboles are larger at approximately 500nm [Mueller and Stanley, 1975]. Thus counting fibers with the light microscope from either environmental samples or from tissue, yields data which, at best, provide information on only a small percentage of the overall fiber burden since the diameters of most asbestos fibers are below the limit of resolution of the light microscope [Ashcroft and Heppleston, 1973; Crossman et al., 1996; Pooley and Ranson, 1986; Murphy et al., 1986]. It was the recognition of this limitation of the light microscope for asbestos fiber analysis that resulted in the analytical transmission electron microscope being defined as the "state of the art" instrument for analysis of air samples for asbestos under the Asbestos Hazard Emergency Response Act (Title II of the Toxic Substance Control Act 15, U.S.C. Sections 2641 through 2654). The counting protocol when using TEM provides not only a morphological definition of the structures to be counted, but allows the analyst the capability to use magnification appropriate to "see" those structures that are below the level of detection by the light microscope. Simply because the analytical transmission electron microscope is used in a count does not mean the data reflect a true representation of the fiber burden because the scan must be made at a sufficiently high magnification to permit detection of short as well as long thin fibers [Murai et al., 1994].

This issue is of particular relevance when discussing the subject of fiber length and pathogenicity since results from models in which fiber length was determined solely by the light microscope must be critiqued with these limitations in mind.

...

[Accepted for publication in the American Journal of Industrial Medicine, 4/28/03, Asbestos Fiber Length as Related to Potential Pathogenicity: A Critical Review, Ronald F. Dodson, Ph.D., FCCP, FAHA; Mark A.L. Atkinson, M.A., D.Phil.; and Jeffrey L. Levin, M.D., M.S.P.H., The University of Texas Health Center at Tyler, Tyler, TX]

EPA reverses – performs TEM tests for 110 Liberty St. study near Ground Zero

Long after EPA and the NYC DEP instructed NYC citizens and health officials that dusts in the interior of buildings was not hazardous unless it contained more than 1% asbestos, as measured

by the old PLM light microscope method, a newly released study by EPA reveals that EPA itself performed TEM analyses of dusts inside a building at 110 Liberty St. to assess cleaning methods. This was the first time that EPA used TEM analyses of dusts related to the WTC, with the exception of using TEM dust analyses in its own building at 290 Broadway a few days after 9/11.

EPA's use of TEM for the 110 Liberty St. study constitutes an admission by EPA that TEM testing is necessary to detect the presence of asbestos laden dust and the efficiency of any cleaning procedure. See Section G for a more complete discussion of EPA's WTC dust cleaning study at 110 Liberty St.⁵⁶

Criticisms and press coverage of EPA not using TEM analyses for WTC dust

EPA Region 2 is apparently currently claiming that they were unaware of the need to use TEM and the other better test methods, and that there was a training problem:

3/19/03

With backing from top agency enforcement officials, EPA's research office has begun an initiative to ensure the uniformity of the agency's analytical methods across regions and program offices.

...

The effort was prompted by concerns following Region II's investigation of environmental hazards at the World Trade Center site and their consistency with asbestos measures used by EPA Region VIII in Libby, MT.

"When the agency uses different measures, then people can begin to ascribe motives, so the Administrator prompted us to look into this," according to EPA research chief and science advisor Paul Gilman. "It's hard to have credible decisions without credible data,"

...

An EPA official adds "this is an effort to make the science better, to put good science out there for the regulated community to use. . . . new group that will examine the creation, verification and validation of environmental methods and training across the agency.

...

[From Inside EPA Environmental Policy Alert, 3/19/03, www.insideepa.com]

I publically criticized EPA's failure to use TEM analyses for bulk WTC dust, failure to take wipe and/or microvacuum samples of hard smooth surfaces inside buildings, and failure to use EPA's ultrasonification extraction method for carpets and other porous materials early in the WTC investigation through memoranda which were received by relevant staff at Region 2. Their first alert of the need to use TEM came on 9/12/01 from Region 8. It is absurd to claim that there was any lack of training or knowledge of EPA requirements.

Below are excerpts of press on the TEM v. PLM issue, as well as early criticisms of EPA:

5/2/02

A seven-story co-op building half a mile north of Ground Zero was recently found to be contaminated with high levels of asbestos.

The building, at 150 Franklin St. in Tribeca, has housed a family-run child care center for years, and neither the child care center nor other tenants in the building evacuated their homes following the Sept. 11 attack on the World Trade Center.

Like many people who live downtown, the building's tenants simply cleaned up the dust in their apartments and tried to return to normal. Not until mid-April seven months after the collapse of the twin towers did the building's co-op board discover the high asbestos levels.

...

Stratton, whose wife operates the Treehouse toddler center out of the couple's apartment, insisted that "the children have not been exposed to anything," because no asbestos was found inside the toddler center. The building's elevator, like many in the former warehouse buildings that dot Tribeca, has an iron gate instead of a solid door, and its shaft has windows that face the street. Since several of the shaft's windows were broken on Sept. 11, dust from the trade center collapse may have easily penetrated the elevator area, Stratton conceded.

At the time, according to Stratton, the co-op board believed the assurances from EPA and city officials that air quality downtown was safe, so it did not conduct extensive testing within the building. One of the co-op tenants, however, said she was worried about environmental hazards.

...

The one tenant was worried enough that by mid-April she asked Joel Kupferman of the New York Environmental Law and Justice Project to come to 150 Franklin and collect dust samples. Kupferman sent three samples to a laboratory. The lab results showed levels of 1.2%, 1.4% and 1.8% asbestos *[by using TEM electron microscopy]*. He immediately notified the EPA and the city's Department of Environmental Protection, and those agencies analyzed new samples on April 18.

The DEP, using a crude analytical method called polarized light microscopy, detected no asbestos. But EPA scientists, using a more sophisticated method called transmission electron microscopy, found even higher levels, from 2% to 5% asbestos. "We recommended that it be professionally cleaned," said EPA spokesperson Mary Mears. . . . [Asbestos Fallout Is Found In Co-op Near WTC Site, Juan Gonzales, 5/2/02, NY Daily News]

5/9/02

But Ms. Jenkins and other critics of her agency's performance have said that one of the EPA's failings was its unwillingness to urge New York to use the most-up-to-date method of asbestos testing -- a method employing electron microscopes that the EPA has used elsewhere. The city instead advised building owners to use only an older technique, in which testers search for contaminants using polarized-light microscopes that work much like ones used in high-school chemistry labs. Electron microscopes, used with computers, can detect asbestos fibers that light scopes don't reveal.

...

Owners of many large commercial buildings have done thorough cleanups followed by state-of-the-art testing, according to outside firms doing much of this work. But owners of many smaller buildings have cut corners, according to the environmental firms. Tests with electron microscopes, for example, cost as much as \$100 per sample, with potentially hundreds of samples necessary in a typical building. The light-scope tests cost as little as \$10 a sample.

Dow Jones & Co., which publishes The Wall Street Journal, said it has relied heavily on electron scopes in testing the seven floors of the World Financial Center building it leases across the street from the disaster site. The most recent testing found a "small spot" of asbestos contamination in a light fixture on the 11th floor, Dow Jones spokesman Steven Goldstein said. That area is being recleaned. The company, which evacuated its offices Sept. 11, plans to return to the building in late July or early August, Mr. Goldstein added.

In contrast, many residential buildings have relied on the light scopes, which the New York City Department of Environmental Protection recommended in a Sept. 14 memo to building owners. "I've had several apartment landlords tell me, 'Just go with the memo,'" says Steve Vanderwoude, vice president of Applied Technology Services Inc., a testing firm in New Rochelle, N.Y.

Some residents who have arranged for their own tests using electron scopes have found asbestos missed by light testing. At 150 Franklin St., a seven-story cooperatively owned building several blocks north of the disaster site, residents each vacuumed and wiped down their apartments, following the city's guidelines. They also swept the roof and other common areas.

Still, electron-scope testing last month found asbestos levels of between 1.2% and 1.8% of sampled material. One sample was taken from a third-floor elevator shaft, near a day-care center. Similar levels were found at two locations on the building's roof.

Medical experts say there isn't a "safe" level of the substance, but the federal government requires asbestos removal from work sites if the level exceeds 1%.

After receiving the test results on April 15, the New York Environmental Law and Justice Project, a tenants-rights group assisting residents at 150 Franklin St., notified city authorities. The city found no asbestos when it tested the building using light scopes.

But EPA officials agreed, in this case, to retest the city's samples. Using an electron scope, the federal agency said it found asbestos exceeding 1%.

...

[emphasis added] [AFTERMATH OF TERROR, Bureaucratic Buck-Passing Delayed Asbestos Cleanup After 9/11 Attacks, By JIM CARLTON, 5/9/02, THE WALL STREET JOURNAL]

5/8/02

Succumbing to pressure from angry tenants near the site of the former World Trade Center, the Environmental Protection Agency has agreed to take responsibility for cleanup and testing of residences potentially contaminated with asbestos after the Sept. 11 terrorist attacks.

...

They also say the testing methodology needs to be more comprehensive than what city officials had required after Sept. 11. The city essentially had recommended landlords rely on polarized-light microscopes to detect asbestos. But the light scopes aren't as sensitive as newer electron microscopes, which the residents have used to find asbestos in areas cleared by light scopes.

...

[EPA, in Reversal, to Test Homes In Lower Manhattan for Asbestos By JIM CARLTON, 5/8/02, THE WALL STREET JOURNAL]

12/19/01

The NYC Department of Environmental Protection (NYC DEP) gave impossible and unsafe instructions to owners of buildings. Furthermore, the instructions violated the standards set by the federal EPA. The NYC DEP advised building owners¹ to test dusts inside buildings to see if they were over 1%. They said that if the dusts were over 1%, a professional asbestos abatement contractor should be used for the cleanup:

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.

Unless the windows were blown out by the blast, interior dusts are in too thin a layer to enable them to be scooped up into a jar or bag. Only dusts that are in "bulk" form, which can be put into a bag or jar, can be tested for the percentage of asbestos.

If there is only a thin, visible surface dusting, or even an invisible layer of dust, you are forced to use what are called "wipe" samples or "microvacuum" samples. Wipe samples can only be tested for the number of asbestos fibers per area, not a percentage of asbestos in the total dust. Microvacuum samples are also typically only analyzed for number of structures per area, although there is a rarely used, very expensive ASTM method for microvacuum samples that can sometimes be employed to give mass concentration - percent values. . . . *[Jenkins, 12/19/01]*

1/11/02

This memorandum compares data for asbestos in settled dusts and air inside residences in the town of Libby, Montana, which is designated as a Superfund site due to this residential contamination, and similar data for the interior of buildings in Lower Manhattan contaminated by fallout from the World Trade Center (WTC).

...

EPA is using this AHERA TEM clearance test and claiming that if it shows 70 or fewer asbestos structures per square millimeter, then the air is safe. . . This statement by EPA is false and a gross misrepresentation of the AHERA regulations which do not in any way claim that a simple air test alone showing 70 or fewer structures per square millimeter can be used directly to determine if air is safe. . . . The first, and fatal problem in using

the AHERA TEM test is that it is quite insensitive. It cannot detect airborne asbestos at levels that are shown to cause excessive cancers. . . . EPA is conducting the AHERA TEM clearance test under passive conditions when the dusts are not being disturbed. . . . any activities which stir up dusts will result in vastly higher airborne asbestos concentrations.

. . .

By even performing the AHERA TEM clearance test in lieu of professional asbestos abatement, EPA is violating the AHERA regulations. This is because the AHERA TEM clearance test is only allowed in conjunction with a whole range of asbestos abatement procedures that go on prior to even taking the test. It was designed to catch only gross contamination problems caused by some worker on the asbestos abatement project, such as emptying one bag of asbestos contaminated material into another inside a room that had previously been carefully abated.

. . .

EPA data on bulk dusts taken outside buildings in Manhattan. All the analyses performed EPA for Manhattan used the less sensitive PLM method. EPA did not fraction the sample and use electron microscopy techniques in addition to PLM as did the Ground Zero Task Force study above. EPA in its risk assessment for Libby, however, noted that soil samples showing non-detectable asbestos by PLM alone actually had high levels when analyzed by scanning electron microscope (SEM) methods.

. . .

EPA data, PASSIVE CONDITIONS, AFTER INCOMPLETE CLEANUP. EPA has been using the simple AHERA TEM clearance test method inside buildings at the request of tenants and others. This is a violation of the AHERA protocols, which only allow this test to be performed AFTER professional and complete asbestos abatement, which must thoroughly clean all surfaces. The AHERA TEM clearance method is only meant as an inexpensive, but not an assurance by itself, that asbestos has been adequately abated. The use of a leaf blower or other strong fan in conjunction with taking the air sample would be needed for that in addition to wipe samples of surfaces. EPA Region 8 found that at Libby, even when there were activities going on to disturb dusts, air monitors worn by people sitting on couches, etc. always gave higher readings than a stationary air monitor in the same room (such as is the case in the AHERA TEM test).

. . . *[Jenkins 1/11/02]*

2/10/02

Even if testing is done at the low levels associated with asbestos health effects (0.000004 f/mL), there must be human activities or simulated human activities in the same room at the same time of the testing. When testing airborne asbestos levels inside homes in Libby, Montana, the Superfund site, EPA had both stationary air monitors and monitors worn by residents going about their normal daily activities. . . .

[Jenkins, 2/10/02]

3/11/02

If asbestos were present at Region 2's detection limits, levels would be higher than the Libby Superfund site

The detection limits of the Region 2 air tests are also higher than or comparable to the

air found inside homes at the Libby Superfund site. An earlier section showed that if asbestos were present at the AHERA levels, it would be higher than in homes in Libby.

On other words, even if Region 2 found no asbestos, even testing inside residences with normal activities going on, it would not be able to say that the air was safer than at Libby. See the table below.

COMPARISON OF REGION 2 DETECTION LIMITS WITH LIBBY SUPERFUND SITE			
Higher Reg. 2 detection limits	0.0043 f/mL (PCM)	almost 2 times higher than Libby	
Lower Reg. 2 detection limits	0.0011 f/mL (PCM)	about one-half that in Libby	
AIR LEVELS INSIDE RESIDENCES IN LIBBY, MONTANA			
Average concentration, Libby residences	0.0024 f/mL (PCM)	0.0023 - 0.0024 f/mL (PCM), range	

...

EPA guidance requires the most sensitive method, transmission electron microscopy (TEM), for certain bulk materials under both the asbestos NESHAP and AHERA

Region 2 only used the less sensitive method, PLM, in violation of EPA policy

EPA advises against the use of polarized light microscopy (PLM) for those situations where the asbestos fibers are thin and cannot be detected by PLM. EPA has issued guidance for the use of a more sensitive test method for bulk materials (building materials, dusts and soils lying on surfaces) using transmission electron microscopy (TEM).

The asbestos fibers from the WTC are primarily of the chrysotile category, where many of the fibers are thin and cannot be detected using PLM. TEM is the more sensitive method that can detect them in settled dusts, soils, and other solid materials, as well as in air.

In 1994, EPA issued guidance to offer added precaution and protection for workers and building occupants under both the asbestos in schools rule (AHERA) and the Clean Air Act asbestos NESHAPS for the improved method for the analysis of bulk samples. EPA recommended that if any materials were found not to contain asbestos by the old method (PLM, polarized light microscopy) should be retested using transmission electron microscopy (TEM).

Abstracts of the EPA advisory from the *Federal Register* follow:

This notice announces the availability of an improved asbestos bulk sample analysis test method for use with bulk samples collected for identification of asbestos-containing materials under the Asbestos Hazard Emergency Response Act (AHERA) regulations and the asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP).

...

The test method provides clarifications and improvements to the 1982 EPA "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" (as found in 40 CFR part 763 Appendix A to Subpart F). Specifically, use of the improved method can provide more precise analytical results especially at low asbestos concentrations, enhanced analysis of floor tiles which may contain thin asbestos fibers below the limits of resolution of the polarized light microscope (PLM), and clearer instruction on the analysis of bulk materials, particularly where multiple layers are present.

The 1982 method is limited in that it does not provide guidance for analyzing materials that contain thin (<0.25 micrometers) asbestos fibers. As a consequence, floor tiles which were analyzed according to the 1982 method and for which negative results were reported may actually contain undetected asbestos. At this time EPA does not have data to support identification of other materials which may have thin fibers.

The improved method addresses the thin fiber limitation of the 1982 method by providing directions for using transmission electron microscopy (TEM). The test method includes improved procedures for reducing matrices so that fibers may be made available for microscopic analysis.

In light of the availability of the improved method, EPA recommends that local education agencies (LEAs) use the improved method in place of the 1982 procedures as found in 40 CFR part 763 Appendix A to Subpart F. EPA has made the determination that the improved method is more capable of producing accurate results than the 1982 protocol and thus serves as a preferred substitute method. Further, EPA recommends that LEAs which have PLM laboratory results indicating floor tiles to be non-asbestos-containing (asbestos present in less than or equal to 1 percent) reconsider whether these materials may have thin asbestos fibers.

...

Before undertaking activities which might trigger asbestos NESHAP requirements, it is recommended that LEAs consider resampling multi-layered materials which have been found to be nonasbestos-containing for AHERA purposes or assume them to be asbestos-containing prior to disturbance according to the guidelines set forth in this current notice, in the January 5, 1994 NESHAP *Federal Register* notice, and in the improved analytical method to avoid potential violation of the asbestos NESHAP. *[emphasis added]*

...

EPA NESHAP regulations require testing by the sensitive TEM method for asbestos-derived wastes to determine if they are asbestos free

The asbestos-free level is "no asbestos detected by TEM" not 1%

The NESHAP regulations themselves require the use of transmission electron microscopy (TEM) to determine whether wastes can be considered "asbestos free." The standard for being asbestos free is not 1%, but instead no detectable asbestos by the most sensitive test method, TEM. The use of polarized light microscopy (PLM) is not sufficient according to the regulations, because this method cannot reliably determine asbestos at concentrations less than 1%, and because this method cannot detect the thinner, smaller asbestos fibers, such as chrysotile.

[NESHAP] 40 CFR § 61.15 5 Standard for operations that convert asbestos-

containing waste material into nonasbestos (asbestos-free) material.

...

Each owner or operator of an operation that converts RACM and asbestos-containing waste material into nonasbestos (asbestos free) material shall: (a) Obtain the prior written approval of the Administrator to construct the facility. . . . In addition to the information requirements of §61.07(b)(3), a (i) Description of waste feed handling and temporary storage. (ii) Description of process operating conditions. (iii) Description of the handling and temporary storage of the end product. (iv) Description of the protocol to be followed when analyzing output materials by transmission electron microscopy.

...

(b) Conduct a start-up performance test. Test results shall include:

(1) A detailed description of the types and quantities of nonasbestos material, RACM, and asbestos-containing waste material processed, *e.g.*, asbestos cement products, friable asbestos insulation, plaster, wood, plastic, wire, etc. Test feed is to include the full range of materials that will be encountered in actual operation of the process.

(2) Results of analyses, using polarized light microscopy, that document the asbestos content of the wastes processed.

(3) Results of analyses, using transmission electron microscopy [TEM], that document that the output materials are free of asbestos. Samples for analysis are to be collected as 8-hour composite samples (one 200-gram (7-ounce) sample per hour), beginning with the initial introduction of RACM or asbestos-containing waste material and continuing until the end of the performance test.

...

(c) During the initial 90 days of operation . . . (2) Monitor input materials to ensure that they are consistent with the test feed materials described during start-up performance tests in paragraph (b)(1) of this section. (3) Collect and analyze samples, taken as 10-day composite samples (one 200-gram (7-ounce) sample collected every 8 hours of operation) of all output material for the presence of asbestos. Composite samples may be for fewer than 10 days. Transmission electron microscopy (TEM) shall be used to analyze the output material for the presence of asbestos. During the initial 90-day period, all output materials must be stored on-site until analysis shows the material to be asbestos-free or disposed of as asbestos- containing waste material according to §61.150.

...

(h) Nonasbestos (asbestos-free) output material is not subject to any of the provisions of this subpart. Output materials in which asbestos is detected, or output materials produced when the operating parameters deviated from those established during the startup performance testing, unless shown by TEM analysis to be asbestos-free, shall be considered to be asbestos-containing waste and shall be handled and disposed of according to §§61.150 and 61.154 or reprocessed while all of the established operating parameters are being met. *[emphasis added]*. . .

The Occupational Safety and Health Administration (OSHA) also recommends the use of sensitive TEM analyses for settled, bulk dusts and other solid asbestos materials. The following are the relevant OSHA regulations:

[OSHA] 29 CFR 1926.1101 Appendix A -Polarized Light Microscopy of Asbestos - Non-Mandatory

...

Light microscopy has been used for well over 100 years for the determination of mineral species. This analysis is carried out using specialized polarizing microscopes [PLM] as

well as bright field microscopes. . . .

When electron microscopy was applied to asbestos analysis, hundreds of fibers were discovered present too small to be visible in any light microscope [such as PLM]. There are two different types of electron microscope used for asbestos analysis: Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM). Scanning Electron Microscopy is useful in identifying minerals. The SEM can provide two of the three pieces of information required to identify fibers by electron microscopy: morphology and chemistry. The third is structure as determined by Selected Area Electron Diffraction -- SAED which is performed in the TEM. Although the resolution of the SEM is sufficient for very fine fibers to be seen, accuracy of chemical analysis that can be performed on the fibers varies with fiber diameter in fibers of less than 0.2 um diameter. The TEM is a powerful tool to identify fibers too small to be resolved by light microscopy and should be used in conjunction with this method when necessary. The TEM can provide all three pieces of information required for fiber identification. Most fibers thicker than 1 um can adequately be defined in the light microscope.

The light microscope remains as the best instrument for the determination of mineral type. This is because the minerals under investigation were first described analytically with the light microscope. It is inexpensive and gives positive identification for most samples analyzed. Further, when optical techniques [PLM] are inadequate, there is ample indication that alternative techniques [TEM and SEM] should be used for complete identification of the sample.

. . .

[emphasis added] [Code of Federal Regulations posted at either OSHA site at http://www.osha.gov/OshStd_toc/OSHA_Std_toc.html or <http://www.access.gpo.gov/nara/cfr/cfr-table-search.html>]

Settled dusts in Lower Manhattan had higher asbestos than soils in Libby, MT
Region 2 claims that asbestos levels are “low” in Manhattan dust

The settled dusts in Lower Manhattan tested in the early days after the WTC collapse had higher concentrations of asbestos than outdoor soils in the town of Libby, Montana, the Superfund site.

Around 35% of the samples of bulk dust taken in Lower Manhattan in the first few days after the collapse exceeded the 1% level.

. . .

[Mugdan, Walter E. (January 25, 2002) *Environmental law issues raised by terrorist events. Speech before the NY Bar Association, NYC. Walter Mugdan is Regional Counsel for EPA Region 2.*]

There was a higher percentage of samples that had over 1% asbestos from the WTC than soils in Libby, Montana, the town that is a Superfund site. The concentrations of asbestos, when the asbestos was found, are the same in Libby as in Lower Manhattan. In Libby, soils from yards from residences, etc., are being removed because of the asbestos hazard they pose.

. . .

Region 2 Counsel has claimed that the asbestos concentration in WTC dusts was low and not a health hazard. This directly contradicts the findings of the extensive risk

assessment for Libby where the same concentrations, occurring less frequently, were the basis for placing Libby on the Superfund list:

...

Dusts from the collapse of the WTC present more risk than soils in Libby because they are a finely divided surface dust with no vegetation to hold them in place. Although the dusts from the WTC have now been removed to some extent, we do not know how effective the removal is to date, or whether dusts have been effectively removed from roofs, which have a larger surface area than the streets in Lower Manhattan.

... [Jenkins, 3/11/02]

4/30/02

This memorandum discusses side-by-side testing of the same dust samples ("bulk dust") from WTC fallout. Two different test methods were used. One method is transmission electron microscopy (TEM), which is very sensitive, detecting the very thin asbestos fibers that are known to predominate in WTC dusts, and also capable of detecting fibers at levels as low as 0.0001%. The other method is polarized light microscopy (PLM), using a standard light microscope, which cannot detect the thin fibers found in WTC dusts, and which can only reliably detect 1% or higher levels of asbestos. TEM is a much more sensitive method than PLM.

After the WTC collapse, EPA Region 2 only used the less sensitive method, PLM, for bulk dusts in Lower Manhattan. This is despite the fact that official EPA guidance requires the use of the more sensitive TEM methods when thin asbestos fibers are present, such as is the case for WTC fallout. EPA regulations and guidance require determining if any asbestos is present in dusts and other emissions from the original asbestos containing materials, by using the sensitive TEM method which can detect asbestos at concentrations much lower than 1%.

...

EPA Policy requires TEM for bulk dusts if small asbestos fibers present

Even if all personnel in Region 2 had never encountered a situation where there was a need to test dust for asbestos, then Region 2 was still obligated to follow the official EPA policy guidance that requires the use of TEM methods for dusts. EPA advises that TEM should be used when the asbestos fibers are thin, since they cannot be detected by PLM. The fact that WTC dust is predominantly thin fibers that cannot be detected by PLM was discussed earlier. The following are excerpts from EPA's 1994 Federal Register notice which instituted the policy to use TEM:

...

The Occupational Safety and Health Administration (OSHA) also recommends the use of the more sensitive TEM tests for settled bulk dusts instead of PLM. The following are the relevant parts of the OSHA regulations:

...

Comparison of results of side-by-side TEM and PLM tests on the same samples

The following table compares the results of TEM and PLM tests for the same samples of bulk dusts from the WTC collapse, tar and soils. More information on the materials and sampling is given after the table.

COMPARISON OF TEM and PLM TESTS FOR SAME SAMPLES				
	DATE	PARTY SAMPLING	TEM - asbestos	PLM - asbestos
150 Franklin St., NYC ^{57, 58}				
debris on roof - 1	4/17/02	EPA/NYC DEP	2.3 %	none detected
debris on roof - 3	4/17/02	EPA/NYC DEP	5.0 %	none detected
debris, ledge, elevator shaft, 3 rd floor-31	4/17/02	EPA/NYC DEP	2.0 %	none detected
debris, ledge, elevator shaft, 3 rd floor - 33	4/17/02	EPA/NYC DEP	2.2 %	none detected
WTC dust, roof, front	4/15 & 21/02	NYELJP	1.4 %	none detected
WTC dust, roof, rear	4/15 & 21/02	NYELJP	1.8 %	none detected
WTC dust, third floor, widow sill inside elevator shaft with broken window	4/15 & 21/02	NYELJP	1.2 %	2.9 % (probable lab problem, see below)
tar under sink	3/18/98	NYELJP	0.24	none detected
tar from roof	3/18/98	NYELJP	2.80	0.24
200 Rector Place, NYC ⁵⁹				
WTC dust, interior living room along left ledge of book case cabinet, after cleaning, Apt. 33F	12/17/01	Kallaway, Inc.	present, up to 1%	none detected
WTC dust, living room, after cleaning, Apt. 33F	12/4/01	Kallaway, Inc.	present	none detected
WTC dust, bedroom floor, after cleaning, Apt. 17 J	4/16/02	A. O. Lawrence	present	none detected
WTC dust, kitchen and dining room floor, after cleaning, Apt. 17J	4/16/02	A. O. Lawrence	present	none detected
EPA Region 2 building at 290 Broadway, NYC ⁶⁰				
Inside lobby by the security	9/14/01	Stratus Corp/GSA	present	none detected
Inside lobby by the entrance to bathroom	9/14/01	Stratus Corp/GSA	present	none detected
Inside lobby by the entrance to building	9/14/01	Stratus Corp/GSA	present	none detected
Outside by the main entrance	9/14/01	Stratus Corp/GSA	present	none detected
Outside on the sidewalk	9/14/01	Stratus Corp/GSA	present	none detected
Libby Montana Superfund site				
soils		EPA Region 8	"high levels" (scanning electron microscope, SEM, similar to TEM)	none detected

NYELJP samples from 150 Franklin St.

The New York Environmental Law and Justice Project (NYELJP) collected dust samples from the roof and from an elevator shaft with broken windows at 150 Franklin St., a co-op building. This address is 7 blocks north of the area defined by EPA Region 2 as being contaminated by fallout from the WTC. EPA Region 2, the NYC Department of Environmental Protection (DEP), and the NYC Department of Health repeatedly claimed that no asbestos found from WTC fallout this far away.

After finding asbestos at over 1% in all three samples using TEM test methods, the NYELJP contacted the NYC DEP. The DEP collected their own samples, but used PLM analyses and found no asbestos.

The NYELJP then contacted EPA Region 2, telling them that the DEP was wrong to have used PLM methods. As a result, Region 2 re-analyzed the samples taken by DEP using the TEM method. Region 2 found asbestos from 2 to 5 % using TEM. . . .

[Jenkins, 4/30/02]

M: WILLIAM MUSZYNSKI TO CHAIR “FORUM” TO INVESTIGATE WHY WTC TESTING DID NOT USE ELECTRON MICROSCOPES FOR DUSTS

“With backing from top agency enforcement officials, EPA's research office has begun an initiative to ensure the uniformity of the agency's analytical methods across regions and program offices. The new Forum on Environmental Measures is likely to enhance the credibility and defensibility of EPA assessments of environmental conditions in court, sources say . . . The effort was prompted by concerns following Region II's investigation of environmental hazards at the World Trade Center site and their consistency with asbestos measures used by EPA Region VIII in Libby, MT.” [From Inside EPA Environmental Policy Alert, 3/19/03]

“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, and guidance?” [1/27/03 EPA IG report]

One area ripe for investigation by the EPA IG is the role of Region 2's William Muszynski in actively refusing to use electron microscopes to identify asbestos in settled WTC dusts. Section L discussed the need and EPA requirements to use TEM electron microscope methods for settled dusts, instead of the antiquated light microscope PLM methods. WTC fallout is highly pulverized, and there are a lot of long, thin fibers which cannot be detected with PLM.

It is questionable that instead of being subject to an IG investigation, Muszynski now chairs a forum to “investigate” what went wrong with Region 2's choice of test methods for WTC fallout, and why Region 2's choices of methods were inconsistent with Region 8's. EPA's new forum “to ensure consistency of analytical methods” is described more completely below.

At a minimum, convening the “forum” is an admission that NYC citizens were treated disparately, and worse, than others by EPA in the aftermath of the WTC collapse.

3/19/03

EPA OFFICES BEGIN EFFORT TO ENSURE CONSISTENT ANALYTIC METHODS

With backing from top agency enforcement officials, EPA's research office has begun an initiative to ensure the uniformity of the agency's analytical methods across regions and program offices.

The new Forum on Environmental Measures is likely to enhance the credibility and defensibility of EPA assessments of environmental conditions in court, sources say. As a result, it is being strongly endorsed by EPA enforcement chief J.P. Suarez, in part

because it would enhance the agency's legal clout and standing with the regulated community.

The effort was prompted by concerns following Region II's investigation of environmental hazards at the World Trade Center site and their consistency with asbestos measures used by EPA Region VIII in Libby, MT. *[emphasis added]*

"When the agency uses different measures, then people can begin to ascribe motives, so the Administrator prompted us to look into this," according to EPA research chief and science advisor Paul Gilman. "It's hard to have credible decisions without credible data," Gilman adds and notes that enforcement officials are actively supporting the plan in part because of their need to defend environmental forensic techniques in court.

An EPA official adds "this is an effort to make the science better, to put good science out there for the regulated community to use. If it's clear what's expected and companies still ignore validated measures, then there will be less argument about going after those who are out of compliance." The agency's Office of Research & Development is poised to formalize the charter for the new group that will examine the creation, verification and validation of environmental methods and training across the agency.

...

EPA officials say several flaws in how some measures work in the field . . . have hurt EPA in court even though in the lab the methods were sound. "In certain management scenarios, these methods needed to be refined" to accurately measure what they were intended for, according to one EPA source.

The new group will be co-chaired by Ramona Travato of EPA's Information Office and Region II's William Muszynski. . . .

...

[From Inside EPA Environmental Policy Alert, 3/19/03, www.insideepa.com]

Muszynski's refusal of free electron microscope support from Region 8 day after disaster

This new forum is suspect for the following reason: William Muszynski, Acting Region 2 Administrator at the time of the WTC disaster, will serve as co-chair. A day after the disaster, 9/12/01, Muszynski refused to use the required superior methods for asbestos, even when offered them for free from Region 8. Region 2's Muszynski was less than polite in his refusal, directing the following two sentences to Region 8 in the 9/12/01 conference call:

We don't want you fucking cowboys here. The best thing they could do is transfer you to Alaska.

On April 29, 2003, the White House Press Secretary Ari Fleischer denounced Cuba's reelection to the United Nations Human Rights Commission, equating it to "putting Al Capone in charge of bank security." He said it raised questions about the United Nations' commitment to human rights:

Literally just a few moments ago, the United Nations voted to reelect Cuba to the Human Rights Commission. This is a setback for the cause of human rights. Cuba does not

deserve a seat on the Human Rights Commission. Cuba deserves to be investigated by the Human Rights Commission. . . . Having Cuba serve again on the Human Rights Commission is like putting Al Capone in charge of bank security. It was an inappropriate action that does not serve the cause of human rights in Cuba or at the United Nations.

. . .

The Human Rights Commission undermines its own credibility at the United Nations when they allowed Cuba to get reelected.

. . .

But it certainly does raise eyebrows and raise questions about the United Nations Human Rights Commission's commitment to human rights.

[4/29/03, US State Dept., White House Press Secretary Ari Fleischer press briefing, <http://usinfo.state.gov>]

The same criticism can be leveled against EPA for appointing Muszynski as a co-chair to investigate why Region 2 did not use better methods to test WTC dust and contaminated air.

This obscene incident (both in words and intent to deny human beings, NYC citizens, the best available) did happen. Although the participants have been ordered never to go “on record” about Muszynski’s decision on 9/12/01, nobody will deny it “on record” either. This is a cover up. The government is supposed to be open about its actions and decision making process. There was nothing “deliberative” or “confidential” about the 9/12/01 teleconference that should warrant an edict of silence.

Since I was not a direct participant, the incident has not gotten extensive press coverage, although the LA Times did cite me as an authoritative source in a cleaned-up version:

9/4/02

Cate Jenkins, a senior environmental scientist at the EPA, said the agency refused offers from other EPA branches to provide more sensitive testing equipment the week after the towers' fall. "They were using the equivalent of a magnifying glass when they should have been using an electron microscope," she said. "And now that they have the chance to redeem themselves, the new cleanup plan is using methods that our own studies show fall short. It's grossly inadequate."

. . .

[LA Times, 9/4/02 - A Toxic Legacy Lingers as Cleanup Efforts Fall Short, By Maggie Farley, Los Angeles Times Staff Writer, September 4, 2002, <http://www.latimes.com/news/specials/911/la-na-poison4sep04.story?null>]

Past memoranda have addressed Muszynski’s 9/12/02 actions with no claim from anyone at EPA that what I described was untrue. My 4/30/02 memo stated:

4/30/02

Region 2 was offered free TEM analyses for bulk dust by EPA Region 8 on September 12, but refused.

EPA's Region 8 in Denver called Region 2 on September 12, a day after the disaster. In

a conference call, Region 8 offered Region 2 the free use of 30 to 40 TEM and SEM (scanning electron microscope) testing capabilities for WTC dusts. Region 8 had a contract with EMSL Laboratories for the TEM's and SEM's, which were being used to evaluate soils at the Libby, Montana Superfund site. Region 8 was willing to divert its resources to Region 2 to assist after the disaster. Twelve of the TEM/SEM's were close by and could have been in Lower Manhattan in 40 minutes.

Region 2 refused the offer. This is despite the fact that Region 2 had great familiarity with the need and EPA requirements for TEM testing of asbestos, explained below. . . .
[Jenkins, 4/30/01]

This sudden interest by Region 2 in what is being done in Libby is also in marked contrast to Region 2's refusal of assistance from Region 8 personnel on September 12, 2001, one day after the WTC collapse. On that day, Region 8 personnel were told by the Region 2 administrator: "We don't want you fucking cowboys here. The best thing they could do is transfer you to Alaska." . . . [Jenkins, 10/22/02]

Muszynski is further compromised as any suitable party for participation on the forum because he has already made official statements in a 10/30/01 press release saying that EPA testing shows there are no harmful levels of contaminants. Thus, he risks considerable liability serving as co-chair of any "forum" that finds that the methods Region 2 used were inappropriate. The following is a quotation of Muszynski in an EPA press release, still posted on the EPA website:

"We continue to closely monitor air quality and other environmental conditions in and around ground zero," said William J. Muszynski, EPA Acting Regional Administrator. "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. We welcome all concerned members of the public to our lower Manhattan offices to review the information we've gathered and to visit our Web site."

. . .
[EPA Region 2 press release, 10/30/01, www.epa.gov]

N: EPA BUILDING IN NYC – EARLY SECRET ASBESTOS ABATEMENT

While EPA was recommending do-it-yourself cleanups for even the most heavily contaminated buildings without even paper dust masks, assuring citizens there were no hazards if they followed the NYC DOH guidelines, EPA secretly had its own building professionally abated for asbestos less than a week after the disaster. In Section E on cleaning up after 9/11, it was documented that EPA never told citizens that they should use professional abatement, even if there were heavy layers of WTC dust.

Region 2 fiddled while Manhattan burned, safe and secure in their ultraclean offices, never telling of the need, never warning anyone.

What is new, not covered by previous memoranda, are two additional contemporaneous news articles discovered while researching this report that shed more light on the incident.

EPA excuse that rescue workers responsible for the contamination at 290 Broadway

EPA offered the following excuse for professionally abating their building: They feared that rescue workers had tracked in WTC dust. There are problems with this argument. First, it is doubtful that the rescue workers went to the EPA building at 290 Broadway. If they had, any asbestos that was on their shoes or clothing would have fallen off by the time they got there. EPA was saying that this was not a contaminated part of the city.

There is also nowhere in the news or other advisories from EPA or NYC officials warning that citizens should take precautions when going back to their homes or offices north of lower Manhattan or to the other boroughs after 9/11, because they might be carrying WTC dust. There are also no advisories for citizens or others to test their buildings or homes for asbestos that they may have carried back on their clothes, or to professionally abate them. For EPA to claim that there were some kind of very unique circumstances where rescue workers carried WTC dust to their building alone at 290 Broadway is highly contradictory.

Next, EPA did not just HEPA vacuum its lobby, or just wet wipe the lobby. They had their whole building systematically cleaned. All EPA personnel were displaced from the building during this cleaning process for a week. This was a major operation.

The second flaw in the explanation offered by EPA is this: EPA found asbestos in the dust outside their building as well as in the lobby. This means the most logical source of the asbestos would be the original collapse of the WTC, not the non-existent rescue workers. Any dust from rescue workers from the Ground Zero area which got deposited outside of the 290 Broadway

building would have quickly mixed with other dust on the street and be diluted and undetectable. If asbestos were found in the dust outside on the sidewalks and street as well as the lobby, then it came from the WTC itself, not rescue workers.

EPA abated its building based on positive dust tests, but negative air tests. EPA has denied citizens any indoor dust testing during the free cleanup program, saying risks are only related to air measurements, and dust testing is irrelevant.

The only positive tests EPA had for asbestos at 290 Broadway were in the settled dusts, not in the air. The air tests were negative for any asbestos.

EPA has repeatedly claimed that measurements of settled dust were irrelevant to any estimation of risk. Even after intensive lobbying by citizens and scientists, EPA still denied citizens the right to test settled dusts on surfaces in their apartments during EPA's voluntary residential cleanup program. EPA will only test for asbestos in the air.

In complete contradiction, at its own building, EPA had surface dust testing as well as air test. They gave greater credence to the results of the dust tests than the air tests. It was on the basis of the dust tests, not air tests, that EPA abated its building.

EPA used a more sophisticated test method for dusts at their building, electron microscopy. EPA denied this testing for the rest of Manhattan, even when it was offered for free.

Furthermore, EPA used a more sophisticated test method for the dusts at their building (both inside and out). EPA used transmission electron microscopy (TEM) for the dusts. EPA only offered the antiquated light microscope testing (PLM) for outdoor dusts for the rest of Manhattan. (EPA did test outdoor dust, but not indoor dusts.) The sophisticated TEM tests at the EPA building were positive, but the PLM tests were negative.

On the basis of positive results from a test denied to the rest of Manhattan, EPA abated its own building. The test EPA used for the rest of Manhattan, PLM, was negative for the EPA building.

Section L discussed how EPA Region 2 even refused the offer of free TEM dust testing capabilities from Region 8 on 9/12/01, just two days before the exact same test for dusts was used at its own building. Region 2 insisted on using only PLM testing for asbestos for the rest of Manhattan, which uniformly gave false negative results. Even for its own building at 290 Broadway, PLM testing of dusts gave negative results.

EPA buys its employees respirators

Another new fact that came to light is a 10/19/01 article, where EPA admitted buying respirators for its employees. At the same time, EPA was telling the common citizens that they did not even need a drugstore dust mask while cleaning up their apartments and offices covered with 6 inch layers of WTC dust, because EPA was instructing the citizens to follow the NYC DOH do-it-yourself guidelines which said as much very explicitly.

Press accounts and other documentation of Region 2 building special abatement

9/15/01

Heavy rains and shifting winds Friday reduced the smoke and burning odors that had plagued large portions of the metropolitan area this week, and on Friday officials released the results of air tests conducted Thursday that showed no evidence of any airborne asbestos or other harmful contaminants outside of lower Manhattan.

...

In lower Manhattan, the U.S. Environmental Protection Agency, tapping emergency cleanup funds under the federal Superfund program, has launched an elaborate air testing program that includes six new monitoring stations and a high-tech portable unit that will be parked close to the blast site.

Dust samples taken at the site have shown relatively high levels of asbestos, a carcinogen. EPA spokeswoman Bonnie Bellow said Friday that air tests Thursday in two federal buildings in lower Manhattan - 290 Broadway and 26 Federal Plaza - did find airborne asbestos, but that none of the samples exceeded one-tenth of the maximum level allowed in workplaces by the Occupational Safety and Health Administration.

"There's nothing at this point that indicates that business can't resume" in the Wall Street area on Monday as scheduled, she added.

...

[Tests: Dust Not a Danger Here, Dan Fagin, *Newsday*, 9/15/01,
<http://www.nynewsday.com/templates/misc/printstory.jsp?slug=ny%2Dlidust152367598sep15§ion=%2F>]

10/19/01

Even as they were reassuring the public, EPA officials distributed respirators late last week to their own employees in the Federal Building. The handouts came in response to complaints from the employees of terrible air quality in the building, a few blocks from the Trade Center site.

EPA spokeswoman Mary Helen Cervantes said the masks were distributed for the voluntary use of those employees who might have respiratory ailments or who feel some temporary discomfort from the air.

...

[Asbestos Higher in Newer Test, 10/9/01, by Juan Gonzalez, NY Daily News]

1/18/02

After the World Trade Center attacks, the EPA told residents near ground zero to clean their apartments with wet rags and mops. At the same time, the EPA had its downtown offices professionally cleaned for hazardous materials.

...

Reports that the EPA's Manhattan offices had been professionally cleaned came out in a Dec. 19 conference call . . . for the EPA's regional and national asbestos coordinators, said Cate Jenkins, a senior chemist in the EPA's Hazardous Waste Identification Division. Walter Mugdan, the EPA's counsel for Region 2, told listeners, including Jenkins, that the offices had been cleaned professionally for hazardous materials.

...

Mary Helen Cervantes, Region 2 spokeswoman, said the agency cleaned only the office lobbies with high-efficiency vacuum trucks. Standard janitorial workers cleaned the upper floors with standard wet mops, she said.

...

[House Member Questions EPA Office Cleanup, by Christine Houghney, Washington Post, 1/18/02]

1/17/02

Calling into question the integrity of the Environmental Protection Agency's (EPA) actions in lower Manhattan since the World Trade Center attacks, Rep. Nadler exposed a gross disparity in how the EPA has responded to the aftermath of the 9/11 attacks compared with other instances of hazardous materials contamination around the country.

...

Rep. Nadler charged that the EPA has abrogated its responsibility to protect public health by proclaiming lower Manhattan "safe" without comprehensive data to support that statement. And the Congressman revealed that the EPA had its own office building at 290 Broadway extensively tested and properly cleaned, in stark contrast to EPA directives which told Manhattan residents to follow NYC Department of Health (NYCDOH) guidelines that advise cleaning with "wet rags."

...

Congressman Nadler also revealed today that the Federal buildings at 290 Broadway and 26 Federal Plaza were tested inside and outside for high levels of hazardous materials and, when some were found, the areas were cleaned (HEPA vacuumed) by properly trained personnel. Some sources have also indicated that even greater cleanup measures were taken.

However, even when the EPA received test results from a study commissioned by the Task Force that indicated serious levels of asbestos and other materials inside downtown apartments, the EPA continued to guide residents to the NYC Department of Health (NYCDOH) for direction. The NYCDOH directed residents who are the same distance away from Ground Zero as the Federal buildings, to clean asbestos-laden dust "with wet rags and mops" or "wet brooms."

...

"We must ask why is what the EPA says is good enough for New York residents not

good enough for the EPA itself? Either the cleanup measures taken at the EPA office were necessary to protect its workers or the EPA wasted tax-payer dollars on an unnecessary cleanup,” stated Congressman Nadler.

...

[Nadler Exposes Dramatic EPA Double-Standards and Mishandling of Hazardous Materials Testing and Removal in Downtown Manhattan Residences, 1/17/02, <http://www.house.gov/nadler/press.htm>]

5/9/02

But Ms. Jenkins and other critics of her agency's performance have said that one of the EPA's failings was its unwillingness to urge New York to use the most-up-to-date method of asbestos testing -- a method employing electron microscopes that the EPA has used elsewhere. The city instead advised building owners to use only an older technique, in which testers search for contaminants using polarized-light microscopes that work much like ones used in high-school chemistry labs. Electron microscopes, used with computers, can detect asbestos fibers that light scopes don't reveal.

The EPA's experience with its own New York building illustrated the distinction. Just days after Sept. 11, EPA officials in lower Manhattan had their building lobby at 290 Broadway decontaminated after tests using an electron scope turned up particles of asbestos. Tests by a light scope had failed to turn up anything.

EPA spokeswoman Bonnie Bellow said in an interview that the agency's testing of its lobby is irrelevant. Officials decided to do a thorough cleanup regardless of test results because they feared rescue workers had tracked in asbestos-laden dust, she added.

...

[AFTERMATH OF TERROR, Bureaucratic Buck-Passing Delayed Asbestos Cleanup After 9/11 Attacks, By JIM CARLTON, 5/9/02, THE WALL STREET JOURNAL]

The following is from the Stratus Corporation report on sampling efforts at 290 Broadway, the EPA building in Manhattan.

10/5/01

This report covers the work performed at the Federal Building located at 290 Broadway in New York, New York. These samples were being collected after the tragic events of 11 September 2001, which concluded with the collapse of the World Trade Center Towers. Since asbestos products were known to be present within the towers, it was feared that asbestos debris may have traveled out from the disaster site, and as such may pose a threat of asbestos contamination in the building.

Summary:

On 13 September 2001, air sampling was performed in the building by Phase Contrast Microscopy (PCM), and by Transmission Electron Microscopy (TEM). All of the PCM results were less than 0.01 fibers per cubic centimeter (f/cc), and all of the TEM sample results were No Asbestos Structures Detected (NSD). On 14 September 2001 Stratus Corporation was directed to collect two TEM air samples, and “wipe” samples inside and outside the building lobby, as well as to collect some bulk samples from WAC filters.

These samples were collected to determine if asbestos fibers are now present within the dust around the area. After consulting with the laboratory, it was decided that the following types of samples would be collected:

...

On 14 September 2001, two dust samples were collected outside the building entrance, and three samples were collected inside the lobby. The initial TEM qualitative analysis did find chrysotile asbestos to be present in the dust at all locations inside and outside the building.

On 14 September 2001, two tape samples were collected outside the building entrance, and three samples were collected inside the lobby. No asbestos was detected in any of these three samples by PLM qualitative analysis, or by TEM qualitative analysis.

On 14 September 2001, three samples were collected from the HVAC filters. One sample was collected from AC-1, one sample was collected from AC-32, and one sample was collected from AC-31. No asbestos was detected in any of these three samples by PLM qualitative analysis, or by TEM qualitative analysis.

One of the two TEM air samples collected on 14 September 2001, simultaneous to the "wipe" sampling both yielded results of No Asbestos Structures Detected (NSD). The other sample did detect asbestos, and was collected inside the lobby, by the West wall.

Additionally to sampling at this building, Stratus performed sampling at several other GSA buildings around the area. One of these buildings which was sampled is the federal building at 201 Varick Street. This building is located North of the disaster site, many blocks further away than all of the other buildings. 201 Varick Street is just over one mile North of the disaster site. 290 Broadway is approximately 3/8 of a mile North East of the disaster site. All initial sampling at the federal building located at 201 Varick Street was negative for the presence of asbestos with the exception of one of three vacuum samples collected outside the building. Since this building appears to have been unaffected by the disaster, in terms of asbestos, it will be used as a control, by which to compare other readings.

After the discovery of asbestos in the lobby of the building, the EPA informed the building management, that the EPA would be cleaning the lobby areas, of all the buildings in the area. Additionally, building cleaning personnel also began performing cleaning inside the building lobbies.

...

Conclusion

The disaster which befell the World Trade Center, sampling was performed to see if there may have been any effect on 290 Broadway due to asbestos materials believed to have been in the towers which collapsed. Initial air sampling results were clean, but samples of the dust inside, and outside the lobby indicated that asbestos fibers were present in the dust. According to the building management, EPA officials, cleaned the lobbies of all building in the area, and building maintenance personnel, also performed cleaning operations after these samples were collected. Additional air sampling was performed for three days, from 16 September to 19 September 2001, with samples running around the clock for the first two days. With the exception of 3 samples, all TEM samples yielded results of No Structures Detected. Of the other three samples two were overloaded samples which had qualitative scans performed on them. These scans revealed no asbestos structures in those samples. The one remaining sample did find an

asbestos structure, and was collected outside the building entrance. The reading on this sample was 25 structures per millimeter squared, which is less than the AHERA clearance criteria of 70 structures per millimeter squared. On 27 September 2001, an additional set of PCM, and TEM air samples was collected. All PCM samples were below 0.01 f/cc, and all TEM samples in this batch yielded results of No Structures Detected. All air sample results collected between 14 September, and 19 September 2001, as well as the additional samples collected on 27 September, indicated normal air samples results for asbestos that would be considered safe to occupy the building.

...

[Asbestos Emergency Monitoring Report at 290 Broadway after the World Trade Center Disaster, Final Report, 10/5/01, Stratus Corporation, 17 North Street, Tarrytown, New York 10591. Made available from an EPA response to a FOIA request provided to the NY Environmental Law and Justice Project]

The following is from my 12/19/01 memorandum prepared after a meeting of the same day in which Walter Mugdan from Region 2 described the abatement at the 290 Broadway building. Also included is my memoranda of 4/30/01 documenting the abatement of 290 Broadway. This incident was also discussed in my 1/11/02 and 3/11/02 memoranda, not abstracte below.

4/30/02

On the basis of positive TEM results, but negative PLM results on the same samples, Region 2 had its own building abated for asbestos after the WTC collapse

EPA's Region 2 had positive results from sensitive TEM testing for its own building at 290 Broadway in Manhattan, and on this basis decided to abate for asbestos. The samples were taken on September 14, and Region 2 would have had the results by September 15 *[or perhaps as early as 9/14/01]* . The PLM tests on the same samples were negative. See the table in an earlier section. In addition, all of the other tests were negative, with the exception of one air test that Region 2 dismissed as being below levels of concern.

But for the fact that Region 2 had the positive results of the more sensitive TEM method for dusts (which were negative by PLM), it would have taken no action to clean its building, or clean the lobbies of the other federal buildings in Manhattan with HEPA vacuum trucks. The Region 2 building was cleaned using wet-wiping methods among others. EPA employees were "displaced" for a week (employees evacuated from their offices) during these unusual cleaning operations.

Region 2 is reportedly offering as a defense that it was GSA who made the decision to use sensitive TEM tests on settled dusts in their building, not they. But it was EPA who acted upon the results, allowing its building to be cleaned with the unusual procedures, and taking upon itself the task of cleaning the lobbies of the other federal office buildings in the area. The following are quotes from the Stratus report, the GSA contractor, prepared on October 5, 2001.

After the discovery of asbestos in the lobby of the building, the EPA informed the building management, that the EPA would be cleaning the lobby areas, of all the buildings in the

Additionally, building cleaning personnel also began performing cleaning inside the building lobbies.

Region 2 was also reminded at the time by the very laboratory data sheets showing the positive TEM results for its building that EPA required the use of TEM. At the bottom of every table giving the results of the analyses for the bulk dust analyses on the 290 Broadway building, SciLabs included the following statement, reminding its clients of the obligations under EPA guidance and NY State regulations to perform TEM for both floor covering and similar materials, and that TEM was the appropriate method:

Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (see also EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94).

It is interesting and telling that Region 2 withheld the testing data on its building when responding to a 9/21/01 Freedom of Information Act (FOIA) request from the New York Environmental Law and Justice Project (NYELJP). The testing at 290 Broadway would have been responsive, since the FOIA requested all documents meeting the following description:

[A]ll monitoring data, studies and reports of air, dust, bulk (including but not limited to hazardous materials and water samples) taken from September 11, 2001 to present in response to the World Trade Center disaster (including but not limited to lower Manhattan and Staten Island land fills).

It is also interesting and telling that Region 2 omitted the fact that TEM testing of dusts was performed at its own building in a February 22, 2002 letter from EPA Administrator Whitman to Congressman Nadler. Ms. Whitman was explaining both the testing that had been performed at Region 2's offices in Manhattan, as well as the asbestos abatement which took place. In an attachment to her letter, the dust testing was "incorrectly" described as being only by the PLM method. In fact, both methods were used, TEM and PLM.

In 1998, Region 2 used TEM extensively for assessing the cleanup of another federal building

Region 2 is reportedly offering the excuse of confusion and panic after the collapse of the WTC for only using PLM testing, instead of the required TEM testing of dusts. But this argument has no merit for the following reason:

Bob Fitzpatrick, the Region 2 Asbestos Coordinator, was directly involved in the oversight of an asbestos abatement for the INS at 26 Federal Plaza during the 1998 time period, which extensively used TEM testing of dusts. After the WTC disaster, Bob Fitzpatrick was and is the Region 2 Asbestos Coordinator, responsible for the evaluation and oversight of asbestos abatement and control. Thus, Region 2 cannot claim to have no institutional knowledge of the need or requirements for TEM testing of bulk dusts. It is not as though they had to research the issue for the first time.

The following describes the 1998 abatement: Roofing work had resulted in the dropping of asbestos insulation onto the suspended ceiling tiles on the 16th floor at 26 Federal Plaza in Manhattan, the offices of the Immigration and Naturalization Service (INS). The General Service Administration hired an asbestos abatement firm who initially did a

poor job, resulting in increased contamination of the offices. The INS requested that Region 2 as well as the Public Health Service (PHS) help oversee additional asbestos abatement.

On behalf of the INS, both Region 2 and the PHS demanded, and got, from 4000 to 5000 TEM tests of dusts from just the one floor of this office building. The following table compares Region 2's dust testing after the WTC with the dust testing Region 2 required for a single floor of an office building. It is obvious that additional costs were not the reason for not using TEM for dusts after the WTC disaster.

EPA Region 2 Settled Dust Testing Requirements, Comparison of Two Abatements			
	Asbestos Test Method	Number of Samples	Estimated Cost to Taxpayer (\$10-20 per PLM, \$25-50 per TEM)
Single floor of office building, 26 Federal Plaza, 1998	TEM	4000 to 5000	\$100,000 - \$250,000
Lower Manhattan after WTC collapse	PLM	about 250	\$2,500 - \$5,000

...

By the first of October, EPA also had the results of an independent study which showed that the majority of the asbestos in WTC fallout could not be detected by standard microscope techniques such as PLM. The HP Environmental Report found that 95 to 96% of the asbestos fibers were too thin to be detected by PLM. This should have been an additional alert to Region 2 for the need of TEM dust testing. . . . [Jenkins, 4/30/02]

12/19/01

First, the EPA found no asbestos in any of WTC fallout samples outdoors that was over 1% north of Warren St. As a result, EPA told the press and everyone that the only contaminated areas were below Warren St. and West of Broadway, the "zone of contamination." Next, EPA referred everyone to the NYC Department of Health (NYC DOH) cleanup recommendations inside this same "zone of contamination" south of Warren. These are the controversial recommendations which do not even recommend HEPA respirators, which just say "avoid breathing the dust" while you mop up the asbestos.

This is what happened next: EPA's offices are at 290 Broadway, which is 2 blocks north of Warren St., outside the "zone of contamination." Even though EPA said there was no asbestos over 1% up this far north at its offices, and that it was safe, EPA had its own offices cleaned by certified asbestos abatement contractors. At taxpayer expense. . . . [Jenkins, 12/19/01]

O: LIBBY SUPERFUND SITE – COMPARISON TO WTC TESTING AND CLEANUP

“The effort was prompted by concerns following Region II's investigation of environmental hazards at the World Trade Center site and their consistency with asbestos measures used by EPA Region VIII in Libby, MT.” *[From Inside EPA Environmental Policy Alert, 3/19/03]*

“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? Are EPA's current indoor air efforts sufficient? Newspaper articles and some “experts” have raised questions about the adequacy of the clean-up plans, and the scope of the project. . . .” *[1/27/03 EPA IG report]*

EPA is sensitive about comparisons of the asbestos contamination levels inside homes at the Libby, MT Superfund site with asbestos levels inside apartments and offices in NYC after the WTC collapse. They are sensitive about the disparity between the test methods used at Libby compared to after the WTC as well, and are sensitive about the fact that NYC citizens are not getting as good a cleanup as residents of Libby, MT.

EPA does not like having it known that they are treating one community more favorably than another. EPA particularly does not like the country to know that victims of 9/11 are the ones that are not being given as good treatment as another town in the U.S.

WTC and Libby are being cleaned up under the same statutory authority, the NCP

Prior to 12/20/01, EPA was actively testing and abating Libby homes for asbestos under the authority of the National Contingency Plan (NCP). This was before Libby became a Superfund site on 12/20/01. In Libby, under the NCP authority alone, not under Superfund, EPA had even demolished one home and rebuilt it, because it was impossible to get rid of the asbestos contamination, even with replacement of carpets, upholstered furniture, and professional abatement. When Libby became a Superfund site on 12/20/01, the only difference was eligibility for special funding from industry sources for the cleanup. There was no change in the way the Libby homes were being cleaned, or even in the EPA Region 8 personnel who were in charge of the site.

EPA is also testing and cleaning up NYC under the NCP, as explained in greater detail in Section V. When FEMA activated Emergency Support Function #10 for the WTC, EPA became

involved and automatically invoked the NCP for testing and the cleanup.

The NCP is one of a group of statutory authorities which has been rolled into the Comprehensive Environmental Response and Liability Act (CERCLA). CERCLA includes, but is not limited to, Superfund. It also includes the original statute, the NCP, which was enacted long before CERCLA.

Thus, there should not be any differences between the testing done at Libby and for the WTC. There should not be any differences in the degree to which homes are cleaned up in Libby compared to those in NYC after the WTC. But there has been. New Yorkers have been treated very poorly compared to the residents in Libby, MT. It is true that environmental justice was a long time in coming to Libby. However, the past inequities in Libby are not a justification for repeating the transgression in NYC.

EPA responses to comparisons between the WTC and Libby

The “Q's & A's for Asbestos” document explanations

In a widely circulated document (below), EPA gave reasons for the inferior cleanup and testing for residents and workers in NYC, compared to residents at the Libby, MT site.

Q's & A's for Asbestos and Vermiculite, (March 26, 2003)

...

Did the World Trade Center (WTC) have any vermiculite insulation?

Previous answers have been no but Monokote was used and then later sprayed on . . .

...

What is the difference between the asbestos exposures for Libby versus the WTC?

Current data indicates that the WTC situation poses short-term exposure (e.g., one year) to low levels of contamination via very few pathways (e.g., air, dust). EPA has collected and analyzed over 9900 samples for airborne asbestos in lower Manhattan, and of these, only 22 samples were above the standard (11 of these were collected prior to September 30; the other 11 were collected on October 9, November 27, December 27, January 14, February 5, February 11, March 9, March 29, March 30, April 2 and May 25).

In contrast, Libby presents long-term exposure to high levels of asbestos contamination by many pathways, with confirmed public health impacts. Libby is being cleaned up under Superfund authority. The WTC is NOT a Superfund site, and is being addressed via FEMA authority.

How could EPA remove contaminated insulation in Libby and declare NYC safe without sampling indoors?

EPA's actions in Libby are based on the results of the ATSDR public health screening

and the other unique multiple exposure factors at Libby. For the WTC, EPA is working with City, State and Federal partners to address the continuing concerns of residents and workers in NYC, even though sample results have not indicated significant problems associated with the WTC since the fires were extinguished.

...

[Q's & A's for Asbestos and Vermiculite, 3/26/03 - Possibly a draft, although not labeled as such. There is no new document with the title "Q's & A's for Asbestos and Vermiculite" posted at EPA's new web page for vermiculite information at <http://www.epa.gov/asbestos/verm.html> . The document quoted above may still be a work in progress. Source of document members of the EPA work group on public communications on vermiculite hazards, 4/17/03]

The above is disingenuous and a misrepresentation of the facts.

The "Q's and A's of Vermiculite" incorrectly claims the WTC is being cleaned up under the FEMA authority, and Libby under the Superfund authority. Libby began the actual physical cleanup and testing many years ago under the NCP authority alone. The WTC is also being tested and cleaned up under the NCP/CERCLA authority, as explained earlier in this section, as well as in greater detail in Section V.

EPA's claim, above, that air levels after the WTC collapse showed no hazards is false, and addressed in other sections of this report. Briefly, until recently, EPA had only tested outdoors, and not indoors in the confined spaces that lead to much higher asbestos concentrations. Furthermore, other parts of EPA have now officially disowned any claim that the AHERA TEM clearance level of 70 s/mm² (or 0.022 s/cc) is a safety standard. EPA had made the claim of safety after the WTC based solely on this AHERA TEM clearance level. The safety standard for residents in Libby is much, much lower than this AHERA TEM clearance level, or even the detection limit of the air test EPA used after the WTC disaster.

The "Q's and A's of Vermiculite" asks the interesting question of how EPA could have declared NYC safe without sampling indoors. In Libby, they did test indoors. This report is in part an attempt to answer that question by documenting the actions and forces which led to EPA making such unsupported safety declarations.

The "Q's and A's of Vermiculite" are incorrect in claiming Libby represents exposures to higher levels of asbestos. It is true the exposure periods have been longer. However, EPA is making very limited progress in preventing the exposures for being of equally long duration in NYC. Cleanups are only voluntary, not systematic. They are also fewer and farther between, and not as rigorous in NYC compared to Libby. Much more needs to be done after the WTC than is currently planned by EPA.

EPA forum to prevent future testing disparities such as Libby versus the WTC

Section M also discussed the new forum that EPA convened to attempt some resolution of the difference in test methods used for Libby compared to the WTC. A press account of this new forum states the following:

3/19/03

EPA OFFICES BEGIN EFFORT TO ENSURE CONSISTENT ANALYTIC METHODS

With backing from top agency enforcement officials, EPA's research office has begun an initiative to ensure the uniformity of the agency's analytical methods across regions and program offices.

The new Forum on Environmental Measures is likely to enhance the credibility and defensibility of EPA assessments of environmental conditions in court, sources say. As a result, it is being strongly endorsed by EPA enforcement chief J.P. Suarez, in part because it would enhance the agency's legal clout and standing with the regulated community.

The effort was prompted by concerns following Region II's investigation of environmental hazards at the World Trade Center site and their consistency with asbestos measures used by EPA Region VIII in Libby, MT. *[emphasis added]*

...

[From Inside EPA Environmental Policy Alert, 3/19/03, www.insideepa.com]

Strong advocacy required to get action in Libby, just as after the WTC

EPA would never have agreed to even the limited indoor air testing and sporadic voluntary cleanups if it were not for the scientists, the press, citizens, and locally elected officials who had no qualms about publically criticizing EPA and NYC officials in their advocacy for better testing and a free indoor cleanup. Realize that by reversing course and testing indoor air and performing residential cleanups, EPA and NYC have now laid themselves open to legal liability. They were very reluctant to do so. If they could have gotten by with no public scrutiny and exposure, they would have ignored the WTC contamination, just the same as they did in Libby for so many years..

It was the exact same advocacy that finally resulted in EPA initiating a cleanup in Libby. They knew about the problem in Libby in the early '50's, but did nothing, letting things deteriorate with ever increasing numbers of citizens succumbing to lung cancer and mesothelioma. Please read the EPA IG report on Libby which begins with the following opening paragraph:

In November 1999, the media ran a series of newspaper articles which reported that miners and their families in the area of Libby, Montana died or became ill from exposure to asbestos contaminated vermiculite ore, which has been mined near Libby since the

1920s. Subsequently, the media reported that Environmental Protection Agency (EPA) officials knew about the exposure to asbestos and the dangers it posed, but did not take any action. Following these articles, EPA officials requested that we conduct this review.

...

[Office of Inspector General Report, EPA's Actions Concerning Asbestos-Contaminated Vermiculite in Libby, Montana, 2001-S-7, March 31, 2001, http://www.epa.gov/oigearth/ereading_room/list301/montana.pdf]

Press coverage of comparison of Libby and WTC testing and remediation

1/13/01

Much of the asbestos-tainted vermiculite that spewed from the collapsing World Trade Center was dug from a mine in the Cabinet Mountains above this picturesque Kootenai River town. And in Libby, as in New York, environmental and health officials failed to disclose just how dangerous the mineral could be.

...

The company knew it was deadly. But it did not require miners to wear respirators. Federal and state officials knew the dangers, but they looked the other way.

Until, that is, the death toll began to climb. So far, hundreds of miners and their relatives have succumbed to the diseases caused by the asbestos fibers that painfully destroyed their lungs. Hundreds more are clinging to a torturous life, sucking air from portable oxygen bottles. And the federal government says its testing has found signs of the disease in thousands more who have been examined.

...

Their findings make suspect many of the absolute statements the government is making in playing down the hazards those living in lower Manhattan face from asbestos.

...

"If the risk to the people of Libby is high enough to warrant the imposition of a Superfund designation, why are government agencies just shrugging off the fact that many of the apartments and businesses in lower Manhattan have identical levels of asbestos or higher?" asks Cate Jenkins, a senior chemist in EPA's hazardous waste division.

Little of what the government is doing about the asbestos from the twin towers surprised the people of Libby.

"It's the same damned government babble and indecision that led to half this town being either dead or dying from asbestos," says Les Skramstad, as he watches the news from New York. "You'd think what happened here would have taught the government why it's important not to sweep this asbestos under the rug," says Skramstad, a former miner who is one of four members of his family with asbestosis from the vermiculite.

"Twenty or thirty years from now, when those New Yorkers start falling over dead, some young government bureaucrat will get all choked up apologizing for what the EPA and others didn't do. "That's what they did here."

...

[This story syndicated and covered in over 100 newspapers, as well as by the electronic media]

[Mining town in Montana endured the horrors of disease from asbestos, 1/13/02, By Andrew Schneider, St. Louis Post-Dispatch]

1/13/01

No one really knows how many, if any, people might be killed by the asbestos. But a study released three weeks ago by EPA investigators on the health risks to vermiculite miners and their families in Libby, Mont., bodes ominously for what New Yorkers may face.

"The concentrations of asbestos in both settled dusts inside homes in Libby is comparable to the settled dusts inside the buildings in lower Manhattan," Jenkins said.

She and others in the agency are questioning why, if Libby is dangerous enough to be declared a Superfund site, is the EPA shrugging off even higher levels in New York. "It is unfathomable to believe that EPA can stand behind antiquated science when the report on Libby, issued by the same agency, irrefutably documents the validity of the new methods," Jenkins said.

...

[This story syndicated and covered in over 100 newspapers, as well as by the electronic media]

[Asbestos Risks Near Ground Zero May Be Far Greater Than Government Reports, By Andrew Schneider, ST. LOUIS POST-DISPATCH, 1/13/02. Updated by the St. Louis Dispatch on its anniversary date, 1/13/03, under a new title, "World trade center attack asbestos health threat" and can be found at www.stltoday.com]

1/10/01

"They are not using good clean-up methods on Lower Manhattan," she said this week. "We have spent a lot of money recovering human remains. Though it is expensive, it's important to honor the living as they have the dead."

...

While EPA Administrator Christie Whitman has assured the public that the human health risks from asbestos exposure near Ground Zero are low, Jenkins has noted that sampling in Lower Manhattan apartments has shown concentrations above the agency's action level.

Moreover, indoor dust samples show higher levels of asbestos than similar samples in Libby, but little is being done to protect residents, Jenkins said.

Her latest ammunition is a Dec. 20 report from Chris Weis, an EPA toxicologist working on the Libby cleanup, that states Libby's asbestos contamination poses "an imminent and substantial endangerment to public health."

...

Among other data, Weis analyzed dust samples from indoor locations in Libby, which found asbestos in 13 to 25 percent of the locations. "This dust may serve as an on-going source of potential exposure for residents," Weis said.

Jenkins took that information and compared it with a report prepared by environmental

consultants for the Ground Zero Elected Officials Task Force in New York.

...

[Ground Zero asbestos like Libby's EPA chemist says New York dust as toxic as that in Montana, 1/10/01, Susan Drumheller, Idaho Spokesman, www.spokesmanreview.com]

1/18/02

Yet another charge has been lodged by Cate Jenkins, an EPA chemist, who has performed a risk assessment study of reported asbestos levels in New York homes, and found the city has a level comparable to that of Libby, Mont., where hundreds of people died of asbestos poisoning from nearby mines.

She cautioned, however, that her analogy to Libby is a projection. It is not based on epidemiological studies, which rely on medical histories to chart the onset of diseases and the conditions that caused them.

"If EPA doesn't call for uniform, proper cleanups in these Manhattan homes, the risks will be very high down the line for people," she said.

...

[Some See N.Y. Air as a Hidden Menace: Many believe EPA cited safety too quickly. Pollutants indoors a key worry. By Josh Getlin, LOS ANGELES TIMES, 1/18/02]

1/11/02

Four months ago today, September 11 marked the tragic loss of thousands of lives in an unprecedented terrorist attack on U.S. soil. The event may also be the biggest environmental disaster to ever hit New York City maybe any densely populated downtown in America. Now, some experts are calling for Ground Zero and surrounding neighborhoods to be designated a federal toxic waste site.

...

Cate Jenkins, a chemist at the EPA in the office of solid waste, agrees that the agencies may have ignored some potent health hazards. "I think people really are at risk here, because unless there is thorough and effective cleanup, people are at risk of breathing asbestos fibers, and once they get in their lungs, they never go away."

...

Jenkins compared dust samples drawn from N.Y. apartments in an independent study done by the Ground Zero Task Force with similar samples drawn from houses in Libby, Montana, a small town designated in December 2001 as a Superfund site after a surrounding vermiculite mine released deadly asbestos fibers into the air, allegedly killing hundreds.

...

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

For example, one sample of dust from a windowsill in an apartment on Warren Street, 4 blocks away from Ground Zero, had 79,000 fibers per square centimeter of asbestos, some 22 times the highest level found in house dust in the town of Libby, which has just

5,000 residents, she notes.

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

...

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

...

[Yearning to breathe in a toxic zone, Tragic mound, toxic ground, 1/11/02, Francesca Lyman, MSNBC, <http://www.msnbc.com/news/686072.asp?0si#BODY>]

2/10/02

In memos that leaked out, an EPA chemist criticized the agency for applying less stringent standards to the Trade Center area than to asbestos problems elsewhere.

...

[WTC's Air of Uncertainty - Experts weigh health risks of twin towers fires & dust, 2/10/02, NY Daily News, By PAUL H.B. SHIN and RUSS BUETTNER]

Early criticism comparing Libby and WTC contamination levels and test methods

Memoranda abstracted below compared both asbestos levels and the disparity in testing methods in residences at the Libby, MT Superfund site and inside buildings in Manhattan after the WTC collapse.

1/11/02

This memorandum compares data for asbestos in settled dusts and air inside residences in the town of Libby, Montana, which is designated as a Superfund site due to this residential contamination, and similar data for the interior of buildings in Lower Manhattan contaminated by fallout from the World Trade Center (WTC).

...

EPA data on bulk dusts taken outside buildings in Manhattan. All the analyses performed EPA for Manhattan used the less sensitive PLM method. EPA did not fraction the sample and use electron microscopy techniques in addition to PLM as did the Ground Zero Task Force study above. EPA in its risk assessment for Libby, however, noted that soil samples showing non-detectable asbestos by PLM alone actually had high levels when analyzed by scanning electron microscope (SEM) methods.

...

In Libby, Montana, interiors of homes and residential soils have been contaminated with asbestos from an adjacent vermiculite mining operation. Homes have vermiculite insulation in attics, and vermiculite was used for gardening. In addition, there are

numerous waste piles of vermiculite in the area.⁶¹

...

In Lower Manhattan, interiors of residences and offices were contaminated with asbestos, fiberglass, fine particulate matter, and possibly significant concentrations of other toxic materials from the fallout from the implosion of the World Trade Center (WTC).

Tables at the end of this memo provide levels of asbestos in settled dusts and air in two apartments before cleanup from the Ground Zero Task Force Study,⁶²

...

In order to compare asbestos levels found in Manhattan with that from Libby, the data in the tables is for asbestos fibers longer than 5 μm , width greater than 0.25 μm , and an aspect ratio greater than or equal to 3 to 1. This is called "PCM-equivalent asbestos." The data from Libby only includes asbestos levels that are PCM-equivalent. The Ground Zero Task Force Study of WTC contamination provided not only total asbestos levels, but also PCM-equivalent asbestos levels.

...

As can be seen from the above tables, the asbestos contamination in Lower Manhattan, up to seven blocks away from Ground Zero, is comparable or higher than that found in Libby, Montana, a designated Superfund site.

Most of the available data for Manhattan is before even a rudimentary cleanup. One particular piece of data, the residue inside an air vent at 105 Duane St., three blocks outside the boundary where EPA said there was any contamination (7 blocks from Ground Zero), is particularly alarming. This air duct sample was taken on December 3, 2001, long after all cleanups that had been thought necessary were completed.

... [Jenkins, 1/11/02]

2/10/02

Even if testing is done at the low levels associated with asbestos health effects (0.000004 f/mL), there must be human activities or simulated human activities in the same room at the same time of the testing. When testing airborne asbestos levels inside homes in Libby, Montana, the Superfund site, EPA had both stationary air monitors and monitors worn by residents going about their normal daily activities.

...

It is alarming that 20% of samples from indoors (or this could be both indoors and outdoors) were over background levels. [ATSDR study of lower Manhattan after WTC] Although it was not stated, there could also be more than 20% of the indoor dusts that had detectable levels of asbestos, but which were not over background. At the Libby, Montana Superfund site (see attachment), only 11 to 23% of the indoor dust samples had detectable asbestos from the random homes selected in Phase 1 of the Libby investigation. ... [Jenkins, 2/10/02]

3/11/02

70 s/mm² AHERA is higher than levels found at the Libby Superfund site

The 70 s/mm² AHERA TEM clearance level is higher than the air levels found inside

homes at the Libby, Montana Superfund site, the air levels that caused Libby to become a Superfund site.

The following table gives the air levels inside residences that resulted in the designation of Libby as a Superfund site. Because most of the inside air samples had non-detectable asbestos, it was necessary to estimate the detection limit of the tests performed at Libby. This estimate was from 0.0001 to 0.0003 f/mL (PCM).

The average level of asbestos inside residences in Libby is 0.0024 f/mL (PCM).

The AHERA 70 s/mm² level is equivalent to 0.0095 to 0.019 f/mL (PCM). (See preceding section.)

The AHERA 70 s/mm² level is 4 to 8 times higher than the air inside residences at Libby.

COMPARISON OF AHERA 70 s/mm ² LEVEL WITH LIBBY SUPERFUND SITE			
70 s/mm ² equivalent low range, Region 2 data	0.0095 f/mL (PCM)	4 times higher than Libby	
70 s/mm ² equivalent high range, Region 2 data	0.019 f/mL (PCM)	8 times higher than Libby	
AIR LEVELS INSIDE RESIDENCES IN LIBBY, MONTANA			
Average concentration of asbestos in air inside Libby residences**	0.0024 f/mL (PCM)	0.0023 - 0.0024 f/mL (PCM), range	
Air levels during routine activities, samples where asbestos detected.	0.009 f/mL (PCM)	0.003 - 0.036 f/mL (PCM), range	4/10 samples with detectable asbestos
Air levels during active cleaning, samples where asbestos detected.	0.008 f/mL (PCM)	0.007 - 0.010 f/mL (PCM), range	3/17 samples with detectable asbestos
Non-detect samples, both from tests done while routine and active cleaning taking place. Estimated detection limit	0.0002 f/mL (PCM)	0.0001 - 0.0003 f/mL (PCM), range	20/27 samples with NON-detectable asbestos. 27 total samples (10 + 17)
** Calculated as follows: $(0.0002)(20/27) + (0.008)(3/27) + (0.009)(4/27) = 0.00237$			
Source: Table, page 10 of risk assessment, Weis, C. P., Senior Toxicologist/Science Support Coordinator, U.S. EPA (December 20, 2001) Excerpts from: Amphibole mineral fibers in source materials in residential and commercial areas of Libby pose an imminent and substantial endangerment to public health. Posted at: http://www.epa.gov/region8/superfund/libby/riskassess.html			

...

If asbestos were present at Region 2's detection limits, levels would be higher than the Libby Superfund site

The detection limits of the Region 2 air tests are also higher than or comparable to the air found inside homes at the Libby Superfund site. An earlier section showed that if asbestos were present at the AHERA levels, it would be higher than in homes in Libby.

In other words, even if Region 2 found no asbestos, even testing inside residences with normal activities going on, it would not be able to say that the air was safer than at Libby. See the table below.

COMPARISON OF REGION 2 DETECTION LIMITS WITH LIBBY SUPERFUND SITE		
Higher Reg. 2 detection limits	0.0043 f/mL (PCM)	almost 2 times higher than Libby
Lower Reg. 2 detection limits	0.0011 f/mL (PCM)	about one-half that in Libby
AIR LEVELS INSIDE RESIDENCES IN LIBBY, MONTANA		
Average concentration, Libby residences	0.0024 f/mL (PCM)	0.0023 - 0.0024 f/mL (PCM), range

. . .

Settled dusts in Lower Manhattan had higher asbestos than soils in Libby, MT
 Region 2 claims that asbestos levels are “low” in Manhattan dust

The settled dusts in Lower Manhattan tested in the early days after the WTC collapse had higher concentrations of asbestos than outdoor soils in the town of Libby, Montana, the Superfund site.

Around 35% of the samples of bulk dust taken in Lower Manhattan in the first few days after the collapse exceeded the 1% level.

[Mugdan, Walter E. (January 25, 2002) Environmental law issues raised by terrorist events. Speech before the NY Bar Association, NYC. Walter Mugdan is Regional Counsel for EPA Region 2.]

There was a higher percentage of samples that had over 1% asbestos from the WTC than soils in Libby, Montana, the town that is a Superfund site. The concentrations of asbestos, when the asbestos was found, are the same in Libby as in Lower Manhattan. In Libby, soils from yards from residences, etc., are being removed because of the asbestos hazard they pose.

. . .

Region 2 Counsel has claimed that the asbestos concentration in WTC dusts was low and not a health hazard. This directly contradicts the findings of the extensive risk assessment for Libby where the same concentrations, occurring less frequently, were the basis for placing Libby on the Superfund list. . . . *[Jenkins, 3/11/02]*

P: CARPET AND POROUS MATERIAL TESTING AND CLEANING

“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, and guidance?” [1/27/03 EPA IG report]

This section addresses the problem of both testing and cleaning soft porous materials acting as reservoirs for asbestos and other toxic materials, releasing them slowly over time. Soft porous materials include carpet, upholstered furniture, draperies, papers, and other personal items.

EPA recommends dry HEPA vacuuming, unsafe and ineffective

By recommending the NYC DOH do-it-yourself cleanup guidelines, EPA was recommending the use of simple consumer-type dry HEPA vacuum cleaners for carpeting, upholstered furniture, and other soft items. See Section E of this report for details of the NYC DOH cleanup guidelines.

HEPA vacuuming is ineffective in removing asbestos from carpets, fabric, and other soft materials. Even HEPA vacuuming followed by wet extraction (carpet shampooing) is also ineffective. At the Libby Superfund site, Region 8 is replacing all carpeting, upholstered furniture, and other soft items as part of the cleanup, because there are no cost effective cleanup techniques.

EPA published research shows that standard HEPA vacuuming, or even the addition of wet extraction (carpet shampooing) do not remove enough asbestos. Furthermore, the EPA studies show that HEPA vacuuming and carpet shampooing increases the air concentrations of asbestos:

A study was conducted to evaluate the potential for asbestos fiber reentrainment during cleaning of carpet contaminated with asbestos. Two types of carpet cleaning equipment were evaluated at two carpet contamination levels. Airborne asbestos concentrations were determined before and during carpet cleaning to evaluate the effect of the cleaning method and contamination loading on fiber reentrainment during carpet cleaning. Overall, airborne asbestos concentrations during carpet cleaning were two to four times greater than concentrations prior to cleaning. The level of asbestos contamination and the type of cleaning method used had no statistically significant effect on the relative increase of airborne asbestos concentrations during carpet cleaning.

...

1) to evaluate the effectiveness of a high-efficiency particulate air (HEPA) filtered vacuum cleaner and a HEPA-filtered hot-water extraction cleaner

...

[Kominsky, J. R., and Freyberg, R. W. (1993) Asbestos Fiber Reentrainment During Dry Vacuuming and Wet Cleaning of Asbestos-Contaminated Carpet, EPA Risk Reduction Engineering Laboratory, EPA Publication No. EPA/600/S2-91-004, posted at <http://www.epa.gov/nepis/>]

The effectiveness of dry-vacuuming and wet-cleaning for the removal of asbestos fibers from carpet was examined, and the potential for fiber reentrainment during carpet cleaning activities was evaluated. Routine carpet cleaning operations were simulated by using high-efficiency particulate air (HEPA) filtered dry vacuum cleaners and HEPA-filtered hot-water extraction cleaners on carpet artificially contaminated with asbestos fibers. Overall, wet-cleaning with a hot water extraction cleaner reduced the level of asbestos contamination in the carpet by approximately 70%. There was no significant change in carpet asbestos concentration after dry-vacuuming. The level of asbestos contamination had no significant effect on the difference between the asbestos concentrations before and after cleaning. Airborne asbestos concentrations were two to four times greater during than before the carpet cleaning activities. Neither the level of asbestos contamination in the carpet nor the type of cleaning method used greatly affected the difference between the airborne asbestos concentration before and during cleaning.

...

[Kominsky, J. R., et al. (1991) Evaluation of Two Cleaning Methods for Removal of Asbestos Fibers from Carpet, US EPA Risk Reduction Engineering Laboratory, Cincinnati, OH 45268, EPA Publication No. EPA/600/S2-90/053, posted at <http://www.epa.gov/nepis/>]

A study was conducted to compare the effectiveness of three cleaning methods for removal of asbestos from contaminated carpet and to determine the airborne asbestos concentrations associated with each. Baseline measurements before cleaning showed an average concentration of 1.6 billion asbestos structures per square foot (s/ft²) of carpet. The effectiveness of dry vacuuming using cleaners with and without a high-efficiency particulate air filter was compared with that of wet cleaning with a hot-water extraction cleaner. The wet cleaning method reduced the level of asbestos contamination in the carpet by approximately 60%, whereas neither dry cleaning method had any notable effect on the asbestos level. The type of cleaner used had little effect on the difference between the airborne asbestos concentration before and during cleaning.

...

[Kominsky, J. R., et al. (1993) Evaluation of Three Cleaning Methods for Removing Asbestos from Carpet: Determination of Airborne Asbestos Concentrations Associated with Each Method, US EPA Risk Reduction Engineering Laboratory, Cincinnati, OH 45268, EPA Publication No. EPA/600/SR-93/155, Posted at <http://www.epa.gov/nepis/>]

EPA reverses, warning of hazards from carpets/porous materials, recommends disposal

The following are recent statements where EPA acknowledges that there are hazards from asbestos contaminated carpet and other woven materials. As shown later in this section, EPA was well aware of their own studies and other data at the time of 9/11, and should have warned about the hazards of asbestos-laden woven materials and other porous items.

[unknown date, a few months after 5/8/02]

EPA, in conjunction with New York City, developed a program to clean and/or test residences in lower Manhattan . . . Fabric surfaces such as carpets, upholstered furniture and draperies will be cleaned using a HEPA vacuum and a water extraction wet vacuum.

. . .

There are two key studies, which were conducted for EPA, which examined the effectiveness of various cleaning methods on carpets impacted by asbestos. The first, Evaluation of Two Cleaning Methods for Removal of Asbestos Fibers from Carpet (1), found that cleaning asbestos- contaminated carpets with a hot-water extraction cleaner was most effective, reducing asbestos levels by approximately 70%. The second study, Evaluation of Three Cleaning Methods for Removing Asbestos from Carpet: Determination of Airborne Asbestos Concentrations Associated with Each Method (2), again found that a hot-water extraction cleaner was most effective, producing a 60% reduction in asbestos levels in contaminated carpets.

. . .

However, because of the results of these studies, EPA cannot guarantee to residents that all asbestos fibers, if present, can be removed from fabric items. EPA anticipates that available cleaning methods for fabric items that were significantly impacted by dust or debris may not be sufficient to address the concerns of residents or EPA's concern for people's longterm health.

With this information in mind, EPA recommends that residents consider replacing some or all carpets, upholstered furniture or draperies if their home was impacted by WTC dust or debris.

. . .

[WTC Residential Dust Cleanup Program: Carpets, Upholstered Furniture and Other Fabric Surfaces Fact Sheet, www.epa.gov/wtc/factsheets/fabrics.html]

12/23/02

There are two generally accepted sampling methods for measuring asbestos fibers in carpet: ultrasonification (EPA 600/J-93/167) and the "Microvac" method developed by the American Society for Testing and Materials (ASTM D 5755-95). The ultrasonification method is intended to measure total imbedded fibers in the carpet, whereas the Microvac technique is used to capture the readily extractable fraction of fibers that can be re-entrained into the air. Limited studies indicated that asbestos counts by ultrasonification exceed the readily extractable fraction (as measured by the ASTM 5755 Microvac method) by 30 – 100 fold.

. . .

[letter from Kathleen Callahan, Assistant Regional Administrator, EPA Region 2, to Jenna

Orkin, resident, Brooklyn Heights, NYC, 12/23/02]

[undated, between 8/02 and 10/11/02 response letter from NYC DOE]

EPA has reviewed the sampling results conducted . . . for the NYC Dept. of Education . . . in Stuyvesant HS during August, 2002.

. . .

The EPA method (EPA-600/J-93/167) to test carpet for asbestos by ultrasonification is intended to determine the total asbestos content imbedded in a carpet and to evaluate the efficiency of carpet cleaning methods. There exists no widely recognized correlation between asbestos concentrations (fibers per unit area) in carpet as measured by ultrasonification and associated air concentrations. Accordingly, it is not feasible to assess the risk posed from asbestos as measured by this method.

Positive ultrasonification results indicate a potential, albeit of unknown magnitude, for asbestos exposure.

. . .

[letter from Mark Maddaloni, Dr. P.H., DABT, EPA Region 2, to NYC Dept. of Education]

12/31/02

[R]egarding your concerns about the EPA guidelines for upholstery in residential units and its application to the seats in the Stuyvesant High School auditorium, EPA has shared these guidelines with the Department of Education in the past. In general, EPA anticipates that available cleaning methods for fabric items that were significantly impacted by dust or debris may not be sufficient to assure that all asbestos fibers can be removed. EPA's recommendation is where people are concerned and feel that there is significant impact to upholstery then they should consider replacement.

. . .

[letter from Kathleen Callahan, Assistant Regional Administrator, EPA Region 2, to Jenna Orkin, resident, Brooklyn Heights, NYC, 12/31/02]

5/03

Residents were advised that retention of porous items was not recommended due to the difficulties associated with cleaning and testing. Residents were given the option of having their possessions: cleaned on the spot so the resident could immediately take possession, cleaned later and left in the apartment, or disposed of by EPA.

. . .

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, p. 108, http://epa.gov/wtc/confirmation_clean_study.htm]

EPA 110 Liberty St. study proves HEPA vacuuming and shampooing doesn't work

On 6/4/03, EPA released the results of its WTC dust pilot cleaning study at 110 Liberty St. in NYC. This report is discussed in detail in Section G.

The only method EPA used to test porous surfaces like carpeting before and after cleaning was with the ASTM microvacuum sampling method. It would have been much better to have used EPA's ultrasonification extraction method, the accepted EPA method for carpets and porous materials.

Nevertheless, the 110 Liberty St. study showed that there were no significant reductions of asbestos in carpet and other soft materials before and after EPA's elaborate abatement procedures.

In fact, of the 11 apartments where porous surfaces (carpet, etc.) were tested with the ASTM microvacuum method, 4 had some higher levels of asbestos after cleaning than before. That is correct, the concentrations were higher after cleaning. For 3 apartments, the levels were about the same, and for 4 apartments, the levels were lower.

Pre-cleaning sampling also included the collection of micro vacuum samples from up to six porous surface areas (e.g., carpets, furniture fabric) in twelve of the thirteen residential units, and both commercial units included in the study (Mattress Store, Chiropractor's Office). The samples were collected from a 10 cm x 10 cm area using dedicated, disposable templates which were left in place. Each unit contained a different number of porous surface sample areas, except Unit 4B which did not have any porous surfaces from which to collect a sample. The micro vacuum samples were analyzed for lead and for asbestos (TEM).

...

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, NY New York, NY, 5/03, EPA Region 2, http://epa.gov/wtc/interim_wtc_residential_study2.pdf]

This EPA study shows that the cleaning methods were ineffective in removing asbestos from porous soft materials and objects. EPA used dry HEPA vacuuming on couches and personal belongings. For carpeting, EPA used dry HEPA vacuuming followed by wet extraction (shampooing).

EPA did not provide any of the actual results of the microvacuum sampling of the soft materials in its report. There was not enough time to obtain them for inclusion in this report.

Criticisms of planned use of ASTM microvacuum method for the 110 Liberty St. study

I criticized EPA's planned use of the ASTM over the EPA ultrasonification method before EPA even started the study:

7/30/02

EPA TRYING TO REVERSE RESULTS OF OWN STUDIES SHOWING HEPA VACUUMING INEFFECTIVE FOR CARPETS

. . .

EPA Region 2 announced on its web site that it will do new tests to evaluate HEPA vacuuming for carpets.

This is an attempt to reverse the findings of 2 earlier EPA studies that show asbestos embedded in a carpet will not be removed with a HEPA vacuum cleaner. EPA studies also found that even wet process HEPA vacuum systems (steam or water extraction combined with a HEPA vacuum) will only remove 60% of the asbestos. The abstracts of these EPA studies are included in the references of this memo, and the full studies are available online.

The problem is that EPA will only be testing the carpet after cleaning with the microvacuum sampling method, not EPA's ultrasonification carpet test. Obviously, if a carpet is newly vacuumed, trying to find asbestos by going over the carpet again with a hand-held microvacuum is not going to pick up any significant asbestos. If the carpet is subjected to impacts, like being walked on, played on, and boxes dumped on it, the asbestos will come to the surface again.

Of course, EPA's earlier studies used the ultrasonification test method. The studies showed all types of HEPA vacuuming were ineffective. EPA tested the carpet both before and after a variety of HEPA vacuuming methods. The asbestos was not significantly removed. . . . *[Jenkins, 7/3/02]*

Recent EPA claims to citizens that carpeting will encapsulate asbestos

Recently citizens participating in EPA's voluntary cleanup program have told me that Ben Barry of EPA's Region 2 office has claimed that carpeting will encapsulate asbestos and prevent its future release. I have heard this report from two different groups. There is a press report of Mr. Barry's contention for only one of the occasions, however :

5/6/03

In late February, elevated levels of asbestos were detected in the couple's apartment after it was cleaned and tested by Environmental Protection Agency contractors. In mid-March, the agency sent them a letter they found to be confusing and technical, informing them of the excess asbestos and advising, "You will be contacted by an E.P.A. representative who will discuss these results with you and help you to decide upon a follow up course of action."

. . .

Lapson and others worry about the possibility of re-contaminating apartments if common areas found to have elevated asbestos are re-cleaned after apartments have already been scoured.

Barry said cross-contamination risks were minimal since the asbestos levels are low to begin with and the complex's new carpeting would trap any harmful fibers.

...

[Asbestos found in I.P.N., after E.P.A. cleanup, 5/6-12/03, Elizabeth O'Brien, Downtown Express,, http://www.downtownexpress.com/DE_WEB_02/asbestosfound.html]

Early documentation that HEPA vacuuming ineffective and unsafe

12/7/01

[T]he U.S. Environmental Protection Agency has advised parties returning to residences and homes in lower Manhattan to use these dry-type HEPA vacuums. This advice is by way of EPA's official referral of parties to the New York City Department of Health (NYC DOH) recommendations which mention dry-type HEPA vacuums as being preferable. The NYC DOH recommendations may be found at www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html.

EPA's advice appears contrary to and in direct conflict with the official EPA studies which found that dry-type HEPA vacuum cleaners do not reduce asbestos contamination in carpets. I am aware of no other scientific evidence to substantiate the conjecture that a dry-type HEPA vacuum cleaner would effectively remove asbestos fibers from carpeting. There will be a need to closely monitor the effectiveness of asbestos removal from carpeting through laboratory testing. . . . *[Jenkins, 12/7/01]*

12/19/01

Predicting air levels if cleanup is inadequate Air levels might also be predicted if the cleanup is inadequate. As discussed in my December 6 memorandum, the EPA determined that neither conventional nor HEPA vacuums were capable of removing significant amounts of asbestos from carpet. Only the wet-extraction HEPA vacuums removed the asbestos particles which adhere to the carpeting.⁸ Even the wet-extraction HEPA vacuums did not remove all of the asbestos, only about 60%.

Thus, the same or similar levels of asbestos could remain in the carpets as they were before the cleanup. After cleanup, the air levels could remain as high as projected in Table 2. The dust in both of the apartments in the Ground Zero Task Force study (Table 2) was not that thick, only a fine dusting where you could still read the writing on papers on a table even in the high exposure building.. This small amount of dust could easily work its way into the carpet and remain. . . . *[Jenkins, 12/19/01]*

1/11/02

Dry-type HEPA vacuums do not remove asbestos from carpets The NYC DOH

recommends dry-type HEPA vacuum cleaners, even though the EPA has found that dry-type HEPA vacuum cleaners simply do not remove the asbestos from the carpeting any better than a regular vacuum cleaner, removing essentially none at all.²⁵ Professional abatement firms recognize that dry HEPA vacuums are ineffective in removing asbestos. There is documentation of at least one certified asbestos abatement firm who removed and disposed of all carpeting which was over padding in common areas in an apartment building near Ground Zero, in recognition of the fact that there was no way to remove the asbestos.²⁶

The same EPA studies also document the fact that even the wet-extraction HEPA vacuum cleaners are inefficient in removing asbestos from carpeting only 60-70%. . . .
[Jenkins, 1/11/02]

6/9/02

SUBJECT: TESTING CARPET, THE ASBESTOS RESERVOIR

Best test for carpets; EPA ultrasonification method

No consultants needed; only cost is the lab fee

EPA shows HEPA vacuuming does not remove asbestos

EPA and other asbestos dust benchmarks/safety levels

. . .

This memorandum describes EPA's ultrasonification test method for dust in carpets and woven fabrics. This state-of-the-art test gives results as the number of asbestos structures per square centimeter (s/cm²). The results can then be related to background levels and safety guidelines. A major advantage in this test is that you do not need a consultant or industrial hygienist to take samples.

Carpets and other woven fabrics are reservoirs for asbestos and are a source of continued release. EPA studies show that carpet cannot be decontaminated with any type of HEPA vacuuming, even in combination with water or steam extraction.

There is no reason why EPA should not be offer this superior test to residents during the free testing and cleanup of residences below Canal Street, especially since this is an established EPA method specially designed for carpets.

. . .

The most meaningful asbestos test that a resident can have, whether or not they have a consultant to take samples, is EPA's ultrasonification extraction test for carpeting, draperies, or upholstery fabric. This method was developed specifically for carpeting by EPA's Risk Reduction Laboratory.⁶³ The method number is EPA 600/J-93/167, the Millette ultrasonication carpet method. Over 100 times the amount of asbestos will be found in carpet using EPA's ultrasonification test, compared to the ASTM microvacuum sampling method.⁶⁴

The ultrasonication extraction test does not require any special equipment, such a micro-vacuum pump, or an air testing pump. Therefore, no industrial hygienist or other consultant needs to be hired to do the sampling. The only cost will be the lab fee. However, this means cutting out at least 16 square inches (100 square centimeters) of carpeting or other fabrics and sending it to the laboratory. See below for ideas on how to take samples without incurring unreasonable replacement costs for carpet, drapery, or upholstery.

An ultrasonication test may be the best way to tell if asbestos is present in a residence or office. Carpeting and upholstered fabric can be tested to see if it needs abatement, or it can be tested after abatement to determine whether it was decontaminated. Hard smooth surfaces may show no asbestos contamination with the ASTM microvacuum method if tested soon after cleaning. But carpeting cannot be cleaned effectively, and will show any residual asbestos.

...

The ultrasonication method is not likely to result in an over-count of asbestos fibers due to the separation of bundles of fibers during the sonication procedure. This is particularly true for WTC fallout, which is already finely divided.⁶⁵ High impacts, such as foot traffic or children playing with toys on carpets, would certainly result in the breakdown of asbestos fibers that are bundled together into individual asbestos, resulting in an increase in the number of fibers, and also an increase in the hazard.

...

ASTM microvacuum method is inadequate for carpets and other woven fabrics

Some argue that testing carpet and fabrics with the hand-held ASTM microvacuum suction pump would be a good enough test, since it would get out the easily releasable asbestos. In this method, carpet and other fabrics are sampled by a hand-held air suction pump. The fabric is essentially vacuumed by the pump. The asbestos is caught on a filter, and then the filter is sent to the lab for testing.

However, this ASTM microvacuum sampling pump is only a first-line test for carpet and other woven fabrics, and is not definitive. The microvacuum pump does not apply any greater suction than a good vacuum cleaner. High impacts, such as a child running or rolling on the carpet, will release much more asbestos than any vacuuming process. The EPA ultrasonification method will extract over 100 times the amount of asbestos from carpet compared to the ASTM microvacuum method. The ultrasonification method is also an official EPA method specific to carpet, and is thus preferred.⁶⁶

NYC APT. BUILDING USES ULTRASONIC CARPET TESTING

The New York Environmental Law and Justice Project⁶⁷ obtained carpet samples from one NYC apartment building on Hudson St., near the intersection with Thomas St. The samples were taken on May 29, 2002, over 8 months after the collapse of the WTC. The samples were tested by EPA's ultrasonification method. The results are given in Table 1. The building is 9 blocks north of Ground Zero, and 4 blocks north of Warren St. Warren St. was defined by the New York City Department of Health as the northernmost point of contamination from WTC fallout.

The building does not have central forced air heating and cooling. Heat is by floorboard hot water pipes. Air conditioning is by individual window units. There is forced air circulation in the hallways only. The building is a well maintained with a clean boiler room and basement. As seen in a later section of this memo, these levels are high, indicating a major asbestos release. The pattern of the contamination, roof and lower hallway, is indicative of the asbestos source being the World Trade Center.

...

TABLE 1. Hudson St. carpet: levels of asbestos found using EPA's ultrasonification test
Samples taken on May 29, 2002

Building has no forced air heating and cooling to redistribute asbestos from common areas to apartments, or from apartment to apartment.

asbestos structures per square centimeter (s/cm²)

Carpet from roof, no special cleaning since 9/11. No visible dust on carpet. Indoor-outdoor carpeting on deck on roof.	624,717
Carpet from 1 st floor hall, no special cleaning since 9/11. Sample taken 4 to 5 feet from front door. No visible dust or discoloration for different areas of carpet (such as higher dirt levels in high traffic center of carpet).	645,200
Carpet from 1 st floor hall by bicycle rack, no special cleaning since 9/11. No visible dust or difference in discoloration between carpet areas.	329,427
Carpet from 10 th floor hall, no special cleaning since 9/1. No visible dust or difference in discoloration between carpet areas.	65,202
Carpet from inside 9 th floor apartment, mat which had been HEPA vacuumed. (Does not mean that HEPA vacuuming removed asbestos. Probably not that contaminated to begin with, since windows not open, not facing WTC, and no central forced air in building to re-distribute asbestos.)	less than 15,788

...

EPA FINDS HEPA VACUUMING DOES NOT REMOVE ASBESTOS FROM CARPETS, AND EPA POLICY ON CONTAMINATED CARPETS

EPA studies show asbestos that is embedded in a carpet will not be removed with a HEPA vacuum cleaner. EPA studies also found that even wet process HEPA vacuum systems (steam or water extraction combined with a HEPA vacuum) will only remove 60% of the asbestos. The abstracts of these EPA studies are included in the endnotes/references, and the full studies are available online.⁶⁸ HEPA stands for “high efficiency particulate air filter.” A HEPA vacuum does not have more suction power for removing dirt from carpet, it only has an additional filter that does not allow very small particles, including asbestos fibers, to be released in the exhaust.

High impacts such as foot traffic, hitting, or playing on carpet, upholstered furniture, or draperies will release asbestos even if these items were HEPA vacuumed. In addition, asbestos will work its way through the rug backing and settle on the floor or cushioning, which cannot be reached by any kind of vacuum.

Intuitively, if any kind of vacuum really could remove all dust and dirt, then carpeting would always return to its original pristine condition after vacuuming, never getting dirty and needing replacement. There is nothing magic about a HEPA vacuum in its cleaning powers – it only has a better filter to reduce emissions.

Regulations and policy on replacing asbestos-contaminated carpet

Neither the EPA regulations under the Asbestos Hazard Emergency Response Act (AHERA), which covers schools, nor the Clean Air Act (CAA) asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) specifically require the removal of asbestos-contaminated carpet. The regulations instead only require cleaning surfaces to background levels, as well as requiring no visible dust. You would need to argue that if you pulled the carpet back and folded it, you could see dust in the fibers along the backing, or on the cushioning or under the cushioning.

However, the U.S. Army Corps of Engineers has guidelines that are clearer on asbestos-contaminated carpet.⁶⁹ They specifically require that carpet to be removed if contaminated with any level of asbestos, not just levels over 1%. The only abatement option is removal, not cleaning.

In Libby, Montana, the Superfund site, EPA is requiring that all contaminated residences receive new carpet and upholstered furniture at no expense to the homeowner, because it was determined that asbestos could not be removed by any cost effective process, even HEPA vacuuming with wet extraction. . . . [Jenkins, 6/9/02]

Press coverage of carpet contamination issue

8/7/02

High levels of potentially dangerous asbestos - many times above the acceptable federal amount - have been found in carpeting inside the Stuyvesant High School auditorium, angry parents charged yesterday. The asbestos results came from independent tests of the carpet, which were carried out by a consultant for the Stuyvesant Parents Association, parent leaders said. School officials stood on the rug last fall to assure parents the school was safe for their children.

And the students returned to Stuyvesant in October. But after classes ended in June, the carpet was replaced during cleaning and remodeling inside the school. Subsequent tests on the carpet, conducted by engineer Howard Bader, detected asbestos levels of as much as 2.5million structures per square centimeter in one sample. Experts generally consider levels in excess of 100,000 to begin asbestos abatement efforts.

Parents, who have gone to court to force a more aggressive cleanup of the building, have been concerned about air quality at the school just blocks from Ground Zero. "We've learned the hard way that you can't trust them on this issue," said Paul Edwards of the group Concerned Stuyvesant Parents. "They told us everything was okay."

Schools Chancellor Harold Levy's office did not respond to requests for comment on the findings. Asbestos, which can cause cancer, is dangerous only when it is airborne. Inhaling the material can cause chronic lung disease and cancer. The fiber was used as fireproofing in at least 37 floors of the World Trade Center. Air tests conducted by school officials and the Parents Association since September have found no traces of airborne asbestos.

. . .

[Asbestos fear afoot at Stuyvesant, By JOE WILLIAMS, 8/7/02, NY Daily News]

8/8/02

New environmental tests show the upholstery in the Stuyvesant HS auditorium is contaminated with asbestos - as much as 25 times what experts consider acceptable. Some parents expressed alarm because many events were held in the auditorium when students returned last October following the attacks on the Twin Towers.

Stuyvesant Parents Association consultant Howard Bader called the newly discovered level of asbestos "extremely high," and added that it "raises concern that the seats are contaminated." The testing, which was done for the Parents Association, found one sample with 60,000 asbestos structures per centimeter - while another came back with a whopping 2.5 million reading. Experts say a reading of 100,000 requires an emergency

clean-up, while lower levels, such as 60,000, are still a cause for concern. Bader insisted all protocols for asbestos removal should be followed at the school.

Schools Chancellor Harold Levy's office said rugs will be removed and seat upholstery replaced before Stuyvesant reopens next month.

...

[ASBESTOS SHOCK ROCKS STUY HS, By CARL CAMPANILE, 8/8/02, NY Post]

9/9/02

But on opening day, several dozen parents stood outside protesting the school's handling of the issue. Paul Edwards, parent of a 17-year-old Stuyvesant student, wasn't planning on sending his son back until the school could answer his lingering safety questions. He and others worried that vents had not been retested and that carpeting and upholstery were still contaminated with asbestos. As a result of their protest, however, Edwards was happy that the department "agreed to remove and replace all carpeting in the building, replace the theatrical curtain in the auditorium and continue discussions."

...

[Dusting off Manhattan: A year after 9/11, worries about toxic dust plague residents, 9/9/02, By Francesca Lyman MSNBC, <http://www.msnbc.com/news/803400.asp>]

Q: ELIGIBILITY BOUNDARY FOR EPA VOLUNTARY CLEANUP PROGRAM

“Newspaper articles and some “experts” have raised questions about the adequacy of the clean-up plans . . . it is limited to south of Canal Street and may not include other areas of potential contamination (e.g., Chinatown, Brooklyn).”
[1/27/03 EPA IG report]

There is good evidence that hazardous levels of WTC dust are present beyond the current boundaries EPA set for its voluntary free residential cleanup. The eligibility boundaries are:

Residents living below Canal, Allen and Pike Streets may ask to have their homes cleaned and tested for airborne asbestos by certified asbestos contractors or they may ask for testing alone under EPA's Lower Manhattan Dust Cleanup Program.
. . . *[www.epa.gov/wtc]*

Apparently, EPA set its boundaries based on estimates of where the original ground-level tidal wave of dust went. These were based on aerial photographs from police helicopters and satellite images from the USGS.⁷⁰ EPA may also be basing its boundaries on its own testing of original WTC dust that was visible, lying on the ground after 9/11.

This section discusses the erroneous basis for EPA's arbitrary cleanup boundaries.

Uneven distribution of asbestos around Ground Zero

EPA claimed that its tests showed that high levels of asbestos in dusts were limited to the immediate Ground Zero area:

ASBESTOS . . . In Dust

. . .

The majority of areas in which EPA has found levels of asbestos above the 1% definition have been in the vicinity of the work zone at the World Trade Center site.

. . .

[EPA website responding to WTC disaster, guidance on standards, approximate date 1-1/01, <http://www.epa.gov/epahome/wtc/activities.htm>]

Contrary to EPA's claim, asbestos and other WTC toxic contaminants were not confined to areas immediately adjacent to Ground Zero.

Appendix 1 of this report provides a chart that plots the concentration of asbestos in WTC fallout on streets as both a function of distance and direction from Ground Zero. This chart functions

almost like a map of the concentrations of asbestos. The data in this chart demonstrates that asbestos is very unevenly distributed, and not in any way confined to, or more concentrated near, Ground Zero.

The leader of a large international team studying the distribution of WTC fallout in Manhattan found that dusts that settled nearer Ground Zero contained the heavier components, such as pulverized concrete and glass. However, the lighter components, those which could remain airborne for longer periods like asbestos, fell to the ground in greater relative concentrations farther away from Ground Zero. This study was published in the journal *Environmental Health Perspectives*.⁷¹ The data on surface dusts from this study is included in the chart at Appendix 1 of this report.

The following are press quotes from the lead author of the study, Lioy:

8/23/02

"The glass fiber was a surprise to everybody," Lioy said. "It was one of those things that we never anticipated."

The variability of the debris with distance was also a surprise. Samples collected just one block from the World Trade Center, on Cortlandt Street, were composed of pulverized concrete, glass, unburned or partially burned jet fuel, and construction materials. The pH of the material was an astonishing 11.5 - far more alkali than anything the human lung, with a normally acidic pH of about 4.0, would naturally be exposed to or is equipped to handle.

Samples collected on Market Street, near the East River, were less alkali but still a remarkable pH of 9.3. While the heavy concrete content seems to have decreased with distance, the Market Street sample contained more than three times as much chrysotile asbestos - the form that can produce severe lung disease - as did dust close to the World Trade Center. Heavy metal content - such as zinc, strontium, lead and aluminum - also increased with distance. So did potentially toxic organic chemicals, some of which are considered carcinogens, such as PCBs (polychlorinated biphenyls) and PAHs (polycyclic aromatic hydrocarbons).

Fire experts speculate that the area immediately around the World Trade Center got hit with the heaviest substances - the pulverized concrete, steel, office equipment, cars and construction material. But the tremendous heat from the jet-fueled inferno created an updraft that lifted small, lighter particulates and gases up, away from Ground Zero and toward the East River.

...

[Ill Winds of 9/11, Little scrutiny for Brooklyn - where attack's toxic smoke drifted, By Laurie Garrett, Newsday, 8/23/02, <http://www.newsday.com/templates/misc/printstory.jsp?slug=ny-usplum232835314aug23§ion=%2Fnews%2Fnationworld%2Fnation>]

10/29/02

There were thousands of windows in the 110 stories of the twin towers that exploded into invisible, microscopic projectiles. The dust samples contained large amounts of microscopic glass fibers, most of them less than a micron in diameter and more than 75 microns long – small enough to pierce human lungs. "The glass fiber was a surprise to everybody," Lioy says. "It was one of those things that we never anticipated."

The team was also surprised to find that the content of the pollution varied based on the distance from the towers. Samples collected one block from the World Trade Center on Cortlandt Street were composed of pulverized concrete, glass, unburned or partially burned jet fuel, and construction materials. Samples collected on Market Street, half mile from the site, contained less concrete but three times more asbestos. Heavy metals like zinc, strontium, lead and aluminum also increased with distance, as well as PCBs.

The area immediately around the World Trade Center got hit with the heaviest substances, like pulverized concrete, steel, office equipment, cars and construction material. But the tremendous heat produced by the jet-fueled inferno created an updraft that lifted lighter pollutants and gases upward, towards the East River. It was a sunny day, so the chemicals in the cloud were affected by strong ultraviolet radiation. Most organic chemicals are altered by UV light, and some are transformed into compounds that are more toxic to human beings, so as the cloud drifted, it became more lethal.

...

[*Unique and Lethal Pollution From 911, Unknown Country, 10/29/02,*
<http://www.unknowncountry.com/news/?id=2088>]

EPA's inadequate testing to determine true contamination boundaries

EPA did not use electron microscope (TEM) analyses of bulk and settled dusts

Section L addressed the problem of not using the EPA recommended TEM electron microscope methods for asbestos on the WTC fallout dust found on city streets. Thus, EPA got too many false negatives for asbestos in WTC dust, and did not realize that the contamination boundaries were farther north, and probably extended to other boroughs like Brooklyn.

High levels of asbestos have been found in WTC dust north of some parts of Canal St. when TEM testing was used by independent investigators. Canal is a diagonal street running from north-west to south-east. Asbestos was found in 2 to 5% concentrations in WTC dust at 150 Franklin St. in Manhattan, about 7 months after 9/11. 150 Franklin St. is just south of the northern portions of Canal St. However, the 150 Franklin St. address is north of the eastern parts of Canal St., and north of Chinatown. This investigation is discussed in greater detail in Section L on TEM testing.

Section L discussed the refusal by Region 2 to use TEM electron microscope testing, even when offered this capability for free by EPA Region 8.

EPA did not test WTC fallout at intermediate distances to establish boundaries

When EPA tested bulk WTC dusts from the streets shortly after 9/11, it only took 3 samples as far north as Chambers St., finding no asbestos. This was inadequate. The next set of samples where EPA tested was not before 35th St. (only 2 samples), and then one sample at 59th St. This is not enough samples, even if EPA's test method had been adequate (TEM electron microscopy instead of PLM light microscope methods).

False EPA claims that the thickness of the dust layer indicates the asbestos content

EPA is basing its boundaries for the free cleanup on visible layers of WTC dust. EPA has always claimed that the heavier the dust layer, the more concentrated the asbestos.

However, EPA's own pilot cleaning study at 110 Liberty street, discussed at length in Section G, disproves EPA's theory. Apartments where EPA itself claimed there was only minimal dust (no visible dust at all except under the baseboard heater) were as contaminated after multiple cleaning efforts as those with visible dust. EPA's own data demonstrated that the concentration of asbestos by wipe sampling in these apartments was not related to whether the dust layer was visible or not.

This means that EPA's criteria for establishing the cleanup boundaries, visible layers of WTC dust outside, are not valid.

It is probable that even if the WTC fallout was initially isolated to a certain geographical area surrounding Ground Zero, the lighter, more aerodynamic components such as asbestos and fiberglass, could become resuspended in the wind and drift to other parts of the city.

Brooklyn

EPA did inadequate testing of WTC dusts in Brooklyn, using only the insensitive light microscope PLM method for dusts. These flawed dust analyses were the basis of EPA's claim of no hazards in Brooklyn, below:

9/13/01

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.

...

[Headquarters Press Release, Washington, DC, For Release 09/13/2001, EPA INITIATES EMERGENCY RESPONSE ACTIVITIES, REASSURES PUBLIC ABOUT ENVIRONMENTAL HAZARDS, www.epa.gov]

Press accounts close to 9/11 document that papers from the WTC with readable WTC addresses rained down on Brooklyn, as well as dusts. See below..

There are two excellent photographic sources documenting heavy dust fallout in Brooklyn, and there are undoubtedly others. The overhead plume reaching into Brooklyn was photographed by NASA from space, and can be found at the following website:

<http://www.globalsecurity.org/eye/wtc.htm> . There are many additional NASA photographs available from archives.

EPA argued that the plume stayed aloft, and did not drop any dust and debris into Brooklyn. This is false. Photographs showing the ground impact of the dust clouds impinging on Brooklyn may be found at the following web site: www.planetkevin.com .

The following press accounts describe the situation:

9/27/01

More than a dozen documents, including a United States Customs notice of job openings and an aeronautical chart - wind-blown after the collapse of the World Trade Center - have been turned in to police by Brooklyn residents, according to law enforcement sources. The Federal Bureau of Investigation would not comment on anything specific that has been turned over to its investigators by several police precincts.

But FBI spokesman Jim Margolin suggested it is possible that paperwork relevant to the FBI's probe of the Sept. 11 attack is still out there, resting on a rooftop or in someone's yard. "The things we'd be most interested in would be documents concerning the hijackers," he said. Authorities say southerly winds sent an untold amount of debris - mostly paperwork - flying toward Brooklyn after the World Trade Center towers collapsed Sept. 11. One woman in Coney Island reported retrieving a signed business card belonging to someone with a World Trade Center address.

...

[AMERICA'S ORDEAL, Collecting the Rain of WTC Paper B'klyn finds could be clues, By Rocco Parascandola Newsday, 9/27/01, <http://www.nynewsday.com/templates/misc/printstory.jsp?slug=ny%2Dnyfind272386829sep27§ion=%2F>]

8/23/02

They call it World Trade Center Cough - the hacking, wheezing, horrible cough that heaves the chests of many who inhaled Ground Zero air after the Sept. 11 terrorist attacks. Scientists and health officials have studied the cough and scoured some neighborhoods of New York City for victims of inhaled Trade Center debris.

But there is a critical flaw, experts say, in all the research, Environmental Protection Agency cleanup programs and federal services related to exposure to World Trade Center debris: The efforts are concentrated on Manhattan, but, except for the area immediately around Ground Zero, the plume did not spread around the borough. It went directly to Brooklyn.

Newsday has obtained high-resolution photographs shot on Sept. 11 by satellites. From these images it is clear that the plume of toxic debris blew from Ground Zero southeast, across the Brooklyn Bridge, through the neighborhoods of Brooklyn Heights, DUMBO (Down Under the Manhattan Bridge Overpass), Cobble Hill, Boerum Hill and Park Slope, across Prospect Park and straight out to Coney Island. Though the plume's density was highest directly over Ground Zero, throughout the day the plume completely obscured the Brooklyn Bridge and neighborhoods out to Prospect Park.

On Sept. 11 the plume never crossed Duane Street, which is below Canal Street, and never moved in a northwesterly direction that might have included significant parts of TriBeCa and SoHo in Manhattan. Further, studies of the debris indicate its toxicity may have actually been higher for some chemicals and asbestos as it crossed the East River, and Brooklyn hospitals report continuing respiratory disease cases.

...

"For some reason my assumption was the most affected people were right under the Trade Center. But we all got about as much in Brooklyn," New York City Council member David Yassky said in an interview.

...

"There was a film of dust on everything - on cars, stores, everywhere in Brooklyn Heights. If you were there, as I was, you saw several hours of debris rain down on your neighborhood," he said. "When you think about where all the scientific studies and social services have focused, well, I'm stunned. It's kind of amazing that nobody analyzed the plume" before deciding how to focus studies and services.

...

"The data is beginning to materialize saying the most important area outside of lower Manhattan was Brooklyn," said environmental scientist Paul Lioy of Rutgers University. Lioy heads a large team of federal and academic scientists that is trying to determine precisely what was in the plume and firesmoke, and where it fell day by day.

"This was a very horrendous air pollution event," Lioy said in an interview. "The tremendous crush of all this material was horrific. You had dust, smoke, fires, fumes, the remnants of those tragic planes. It was a very complex event, unlike anything we or anybody else has ever seen."

...

Unfortunately, Lioy writes in a scientific study entitled "Lessons Learned," little is known about the debris that reached Brooklyn because nobody monitored the borough. Dr. Gerald Lombardo, chief of pulmonary care at New York Methodist Hospital, has seen many cases of what he believes to be World Trade Center Cough among Brooklyn residents who do not work in lower Manhattan. "I'm pretty much in touch with all the leading pulmonary programs in New York," Lombard said in an interview, "and I would say that the number of pulmonary visits has just skyrocketed for upper respiratory problems."

In his Park Slope hospital, Lombard insisted, "the number of visits clearly doubled, and that has stayed high. It's not surprising to me that this population will be complaining for some time." Lombard is especially concerned about the microscopic glass exposure,

which, he said, could "mimic the pathophysiology of asbestos disease."

In Brooklyn Heights, the Long Island College Hospital also saw a "huge influx" of respiratory cases, Dr. Tucker Woods, an emergency room physician, said.

...

[Ill Winds of 9/11, Little scrutiny for Brooklyn - where attack's toxic smoke drifted, By Laurie Garrett, Newsday, 8/23/02, <http://www.newsday.com/templates/misc/printstory.jsp?slug=ny%2Dusplum232835314aug23§ion=%2Fnews%2Flocal%2Fnewyork>]

Chinatown

There was no reason to exclude Chinatown from the area eligible for EPA's free cleanup program. Chinatown is south of most parts of Canal St. Residents of Chinatown may be less aware of the hazards because of the language barrier, and also financially ill equipped to undertake cleanups on their own behalf. The following is a relevant press story.

5/20/02

Hundreds of people living in Chinatown and on the lower East Side packed a town hall meeting yesterday to complain of post- Sept. 11 respiratory ailments and demand faster federal action to test and clean buildings in their area.

"I've never had nosebleeds before not even as a child," said Tima Latt, 50, who lives on Grand St., a few blocks north of the geographic boundary set by federal relief agencies for testing and cleanup. "Everybody is suffering, not just the rich people," said Latt, who spoke at the second town hall meeting held at Public School 124 in two weeks.

The federal Environmental Protection Agency said this month it would test apartments south of Canal St. for asbestos and clean them where necessary. The Federal Emergency Management Agency is considering expanding the boundaries of the defined area for testing, but has not done so.

...

"When I put on the air conditioner, white dust and smoke comes out of the vents," said Carmen Velez, 58, who lives the LaGuardia Houses, one block outside the testing/cleanup boundary. "It has the same burned smell we had on Sept. 11."

...

[9/11 Cleanup Is Sought For Lower E. Side, By LESLIE CASIMIR, 5/20/02, NY Daily News]

Tunnels and subways

There is a great probability that subway and automotive tunnels are contaminated with WTC dust. Administrator Whitman is quoted as voicing a concern and an intent to test these tunnels.

Apparently, EPA has not performed this needed work, because it has not posted any information on its web site. The following is the 9/16/01 quotation from Whitman:

9/16/01

In the future, *[Administrator Whitman]* said, samples will probably also be taken from the tunnels, such as the Holland and Battery, through which debris has been transported.

...

[TERRORIST ATTACKS /Asbestos Targeted In Cleanup Effort

EPA's Whitman: 'No reason for concern', by Hugo Kugiya, Newsday, 9/16/01,

<http://www.newsday.com/news/printedition/newyork/ny-2368899sep16.story>]

R: VOLUNTARY CLEANUP PROGRAM - FAILURE TO CLEAN ENTIRE BUILDINGS – FAILURE TO CLEAN BUSINESSES

“Indoor air program is voluntary, so the entire building may not be cleaned up and there is the possibility of recontamination.” [1/27/03 EPA IG report]

EPA’s voluntary cleanup program is flawed because it is only voluntary, and only for residential spaces. It offers no cleaning whatsoever for business establishments. Not only will the cleaning be sporadic, but in the future, no person will ever have the confidence to rent either residential or office space surrounding Ground Zero because they will not know whether it is currently contaminated or will become recontaminated from nearby units and buildings that were inadequately abated.

EPA has the authority to force cleanups individual units and whole building

EPA claims that it does not have the authority to force cleanups:

Mears, the EPA spokeswoman . . . "In order for us to demand access to people's homes, it would have to be a public health emergency," Mears said. "We don't think that is the situation we have here at all."

. . .

[LA Times, 9/4/02 - A Toxic Legacy Lingers as Cleanup Efforts Fall Short, By Maggie Farley, Los Angeles Times Staff Writer, September 4, 2002, <http://www.latimes.com/news/specials/911/la-na-poison4sep04.story?null>]

EPA has the legal authority and mandate to gain access to all contamination, even in private dwellings and businesses, as discussed in Section V of this report. There does not need to be a public health emergency under the National Contingency Plan (NCP) for EPA to have legal access.

The following are the relevant parts of the NCP regulations contained in Title 40 of the Code of Federal Regulations, Part 300. Not only does EPA have the authority over indoor air and other hazards, it also has the authority for entry without the consent of the building owner. The fact that EPA has and is conducting the investigation and cleanup of the WTC under the NCP authority is discussed in Section V.

§300.400 General.

(a) This subpart establishes methods and criteria for determining the appropriate extent of response authorized by CERCLA and CWA section 311(c):

. . .

(d) Entry and access.

(1) For purposes of determining the need for response, or choosing or taking a response action, or otherwise enforcing the provisions of CERCLA, EPA, or the appropriate federal agency, and a state or political subdivision operating pursuant to a contract or cooperative agreement under CERCLA section 104(d)(1), has the authority to enter any vessel, facility, establishment or other place, property, or location described in paragraph (d)(2) of this section and conduct, complete, operate, and maintain any response actions authorized by CERCLA or these regulations.

...

[Title 40 of the Code of Federal Regulations, Part 300 (40 CFR §300,
<http://www.epa.gov/epahome/cfr40.htm>]

Recontamination problem with voluntary cleanup program

Under the voluntary program, entire buildings are not being cleaned, and there is a danger for recontamination. Heating, ventilation, and air conditioning (HVAC) systems are not being routinely cleaned under EPA's voluntary cleanup program.

5/8/02

Finally, the critics say the EPA's plan to respond mainly to residences seeking more cleanup could be flawed, since neighbors who don't request cleaning could still have asbestos in their homes which could continue to contaminate the building.

"If this is just a voluntary cleanup, it won't be much of a cleanup," said Cate Jenkins, a senior scientist with the EPA in Washington who has been helping residents pressure the agency into taking a stronger stance over the cleanup.

...

[EPA, in Reversal, to Test Homes In Lower Manhattan for Asbestos By JIM CARLTON,
5/8/02, THE WALL STREET JOURNAL]

5/15/02

Census figures show 23,700 occupied housing units below Canal Street, which could drive overall costs as high as \$113 million if every resident asked for cleaning and testing. Mears noted the agency believes far fewer than 23,000 apartment dwellers will request cleanup so the cost will be well below the top estimates.

...

The agency said last week that there were roughly 15,000 apartments in the affected area. Mears said that miscommunication between city and federal agencies led the agency to underestimate the number.

...

[EPA Rapped for NYC Cleaning Program, 5/15/02, By Michael Weissenstein, Associated Press]

9/4/02

Beginning this month, each of the 30,000 residences below Canal Street is eligible to have a team wipe down every surface in the home, wet-vacuum the rugs and upholstery and check the vent outlets for asbestos. So far, 3,205 people have applied for a full cleanup and 905 for testing only.

[A Toxic Legacy Lingers as Cleanup Efforts Fall Short, By Maggie Farley, Los Angeles Times, 9/4/02]

9/9/02

Other critics say the EPA ought to be protecting workplaces as well. "There are thousands of offices and stores where asbestos-tainted dust fell and where cleanups were insufficient," says Jonathan Bennett of the New York Committee for Occupational Safety and Health. "It still lingers in boiler rooms, crevices and carpets."

...

Rep. Jerrold Nadler, D-N.Y., an outspoken critic of the EPA's handling of the situation, puts it more strongly. "One year later, it's outrageous that people are still living in contaminated spaces," says the congressman. "People are still anguishing over the known hazards and possible hazards of what they're breathing in their homes."

...

[Dusting off Manhattan: A year after 9/11, worries about toxic dust plague residents, 9/9/02, By Francesca Lyman MSNBC, <http://www.msnbc.com/news/803400.asp>]

5/8/02

But in dozens of interviews with residents over the last eight months, questions have continued to resonate about how clean is clean. Among the issues that will probably emerge under the new cleanup policy is whether residents will consider a building clean if only some of the apartments, but not all, participate in the E.P.A. program since dust, as anyone who has ever wielded a broom can attest, tends to move around, tracked from place to place.

...

[E.P.A. to Lead Cleanup Effort of Homes, Close to Ground Zero, By KIRK JOHNSON, 5/8/02, NY Times]

110 Liberty St. study shows need for HVAC as well as whole building cleanings

In Section G on EPA's 110 Liberty St. pilot cleaning study, EPA proved that carefully coordinated, whole building abatements were necessary, including the exterior of the building. Otherwise, the apartments and stores were not able to pass even EPA's lenient air test levels.

In particular, the stores in the building had an HVAC system. The mattress store needed to be cleaned 4 times before it could pass EPA's cleaning criteria. The cleaning measures were

extreme, certainly not anything that a resident could do her/himself with a HEPA vacuum and wet wiping. After repeating these extreme measures 3 times, EPA added on the cleaning of the HVAC system. It was only after the cleaning of the HVAC system that EPA could get the mattress store to pass the air tests.

EPA tested the dust before starting its study and found that it contained less than 1% asbestos. All furnishings were removed from the apartments and stores prior to the cleanings and testing. In addition, all common areas of the building were cleaned first, and the exterior roof and facade was cleaned 2 times simultaneously.

Many tenants have said that insurers do not want to pay for the abatement of individual apartments until after the landlord has cleaned the entire HVAC system. This indicates that asbestos professionals recognize HVAC systems as known sources for recontamination of asbestos and other particulate contaminants. This recent EPA study at 110 Liberty St. also proves this fact.

Offices need to be included in cleanup program

EPA is claiming that it lacks the authority to clean offices in NYC after the WTC collapse, that insurance will take care of it, and that it is the financial responsibility of employers to clean up.

Even if this were true, not cleaning up offices in EPA's voluntary cleanup program will result in pockets of contamination, recontaminating residential spaces. This is the same as the problem with having the EPA cleanup program voluntary for residents in apartments units that are not cleaned, or not cleaned at the same time, will result in recontamination of the units that did participate in the EPA program.

Claims by EPA that it lacked the authority to clean offices

The following are claims by EPA that it could not clean offices:

5/28/03

But Mears countered that cleanup efforts are the responsibility of business owners, not the EPA. "According to OSHA standards, worker safety must be provided and financed by employers," she said.

Will Insurance Pay? "Most businesses have insurance to pay for professional cleaning," she added. "Our program is directed towards concerned citizens who may not have the money to ensure that their homes are truly free of contaminants."

...

[Poisons from Towers Crash Still Loose in Manhattan, Rep. Nadler Says, Calling EPA a

'Disgrace,' By Kent Vander Wal, 5/28/03,
<http://www.columbia.edu/cu/libraries/indexes/cq-homeland-sec.html>]

2/11/03

In a statement Monday, Jane M. Kenny, regional administrator of the EPA said the agency "has focused our cleaning and testing program on residential buildings, because lower Manhattan residents are most in need of assistance." She added that "commercial establishments had access to a variety of programs," including small business loans and private insurance.

...

[EPA Official Says Agency Is Responsible for Cleanup Testimony Contradicts Previous Public Stance On Post-Sept. 11 Cleanup in Lower Manhattan By MOTOKO RICH, Wall Street Journal, Special Page, 2/11/03]

Whitman's speech in Libby, Montana admitted EPA cleanup authority over indoor air at businesses as well as private residences

Administrator Whitman also stated, just 4 days before the WTC disaster, that EPA had the authority to clean up asbestos in businesses as well as homes in the town of Libby, Montana, whether or not the town was listed as a Superfund site (the equivalent of an National Priorities List listing):

9/7/01

And because we share that goal I want to assure you of something else. It has never been our plan to look to you to pay for any part of this clean-up, including the clean-up of residential properties.

That is why I am pleased to announce today that EPA is taking an unusual legal step to protect you from future liability, whether or not we end up listing Libby on the NPL *[National Priorities List, or Superfund]*. We will be providing homeowners with legal guarantees called "A No Action Assurance" that will protect them from EPA's ever seeking to have them assume the costs of cleanup. Similarly, local businesses in Libby that did not know about the hazards of vermiculite before November 1999, and that did not profit from its use, will also receive this guarantee.

...

[Remarks of Governor Christine Todd Whitman, Administrator of the U.S. Environmental Protection Agency, at a Town Hall Meeting, Libby, Montana, 9/7/01, <http://www.epa.gov/newsroom/>]

Section V on the National Contingency Plan (NCP) gives other examples where EPA is cleaning up businesses from hazardous releases from sources other than the business itself. The NCP is the same statutory authority under which the WTC aftermath is being remediated by EPA.

There is inadequate insurance for business cleanup in NYC

EPA is incorrect in its assertion that businesses have enough insurance to pay for cleanups. If this were true, then building owners of residential apartments, who are also businesses, would have quickly gone to their insurers and cleaned common areas and roof tops. Obviously, this did not happen.

Other businesses as well do not have adequate insurance. One major problem has been that insurers for businesses, as well as residences, have been refusing to pay based on EPA claims that there were no hazards.

Press and other accounts of problems with commercial space cleanups after WTC

The following are a few accounts which illustrate the need for an expansion of the EPA cleanup program to businesses as well as residences and schools, so that the whole area gets remediated.

6/19/02

Located one block north of the World Trade Center, the 1 million square- foot office at 100 Church St. suffered serious damage on Sept. 11. Over 500 windows were blown out, and much of the building was permeated with toxic dust. Its tenants, including the Bank of New York, Merrill Lynch and the City of New York's legal department, were forced to relocate until it was safe to return.

But when was that? According to the owner, Zar Realty Management Corp., the building wasn't ready to be reoccupied until early spring. But Allianz Insurance Co., the property's insurer, believes 100 Church was safe for tenants to return in January. The fight is continuing even though most of the tenants are now back in the building.

...

The dispute is one of the many that have erupted among landlords, insurance companies and tenants following Sept. 11 over how much cleanup work is necessary before buildings are habitable.

...

So they had to figure out the rules as they did the work, and towards the end of 2001, Zar and Allianz began to disagree over what those rules were.

...

According to the insurance company, Zar's environmental engineer, Ambient Group Inc., conducted air tests in January that failed to disclose the presence of asbestos at unsafe levels. "Thus, as of January 2002, the premises were certified as restored and ready for re-occupancy by Ambient," states a letter sent to the Insurance Department by Albert Bosch, an Allianz assistant vice president.

...

But the New York Law Department also hired an environmental engineering firm, TRC, to check on the safety of the building, and TRC came up with different results. TRC analyzed dust samples from the building's mechanical rooms and heating-and-ventilation system and found that asbestos and lead levels were unsafe. "Based on these results, TRC recommended a recleaning and encapsulation of the return-and-supply ducts and air-handling units in the building, Mr. Stein pointed out in a letter to the Insurance Department.

Then it was Allianz's turn to reinspect. The insurance company hired Lawrence Kornreich, of Enviro-Sciences Inc., to evaluate TRC's tests. Mr. Kornreich reported that TRC's tests "were based upon surface wipes and micro vac sampling tests, which are not the testing methods prescribed" by the city's Department of Environmental Protection, according to Mr. Bosch's letter. In addition, Mr. Kornreich stated that the "aggressive air samples" tested by Ambient "were sufficient to demonstrate that the premises could be reoccupied," the letter states.

So the battle was down to dueling testing methods. Mr. Stein said it's not clear whether the contamination that TRC found occurred on Sept. 11 or whether those areas were cleaned and then recontaminated during the cleanup process. But once TRC found the dangerous dust, Zar had little choice but to clean it up, and Allianz was responsible for reimbursing the costs, he said. The air-quality tests performed by Ambient in January "were voided by the discovery of areas that were contaminated," he said.

...

*[Landlord and Insurer Battle over 9/11 Cleanup, 6/19/02, By PETER GRANT, Wall Street Journal, Special to RealEstateJournal.com,
http://homes.wsj.com/columnists_com/bricks/20020619-bricks.html]*

2/10/03

Possibly hundreds of thousands of New Yorkers work for hours a day in workspaces that remain uncleaned, or insufficiently cleaned, of hazardous substances unleashed from the World Trade Center collapse -- and the Environmental Protection Agency (EPA) is to blame -- Rep. Jerrold Nadler (D-NY) said today at a City Hall press conference.

The Congressman was joined by the New York Committee for Occupational Safety and Health (NYCOSH), as well as victims of EPA inaction. Together, they presented new evidence that proves that there has been inadequate hazardous materials testing and remediation in downtown workspaces -- which is threatening the public health -- and that EPA has been lying to the public about its responsibility in the matter.

"This is an outrageous story of EPA inaction, buck-passing, cover-up, and, criminal negligence of its role in protecting the public health," Rep. Nadler said. "There is no rational or legal explanation for the EPA cleaning indoor residential spaces, but excluding workspaces."

...

TEST RESULTS AND HEALTH AND ECONOMIC IMPACT ARE SERIOUS

The EPA has maintained since days after the collapse of the World Trade Center, that the area is safe. Yet, today, Rep. Nadler introduced victims to discuss test results, health and financial impacts, and other issues related to EPA's false safety assurances and lack of action. For example:

The employees of the Securities and Exchange Commission (SEC), who work in the Woolworth Building: A representative provided evidences of samples that were taken in three areas of the building, and showed asbestos readings of above 74,000 structures per square centimeters and as high as 850,000 structures (although no amount of asbestos is considered safe, 100,000 structures and above is considered an 'asbestos emergency'). All samples were taken by Detail Associates and sent to International

Asbestos Testing Labs.

A woman who lives outside lower Manhattan, but works at the Municipal Building: She said that she had no health problems prior to September 11th. However after returning to her workplace, she has experienced significant respiratory disease.

The owners of Steamers Landing Restaurant in Battery Park City: They stated that although they undertook a major hazardous materials remediation of their restaurant at their own expense, they were unable to collect insurance to pay for it, because the EPA consistently and falsely maintained that the area was safe.

"Beyond this being a matter of life and death, if workspaces are not properly tested and remediated for hazardous materials, the City and State of New York stands to face tremendous future financial costs in terms of contingent liability as well as untold productivity impacts due to a potentially massive rise in occupational disease," said Rep. Nadler. "The EPA must end its stonewalling, and finally carry out its legal and moral responsibility to clean up all buildings contaminated in the terrorist attack."

...

[NYC WORKFORCE MAY FACE SERIOUS HEALTH RISK, 2/10/03, Press Release, Representative Jerrold Nadler, http://www.house.gov/nadler/EPA_021003.htm]

11/9/01

Dr. Stephen Levin, medical director of the Mount Sinai Center for Occupational and Environmental Medicine, told the Committee on Environmental Protection that dozens of people developed illnesses from working or living near the site. The problems include onset asthma, facial pain, upper respiratory dysfunction, chronic laryngitis, chest tightness, wheezing and psychological stress. He said the most serious problem was several new cases of asthma in adults working in nearby offices.

"Whenever there's onset asthma in an adult we always suspect an environmental problem," Levin said. "We're seeing it among office workers and that's worrisome because they're ... harder to protect."

...

[Cleanup Worries Residents, doctors see WTC health risks, By Bryan Virasami, Newsday, 11/9/01]

2/11/02

Workplaces have been left out of the EPA cleanup plan without any apparent scientific and legal basis, charged Joel Shufro, executive director of the New York Committee for Occupational Safety and Health, a union and public health group. He said his group's inquiries to the agency "have been treated with evasion and delay bordering on contempt."

In the absence of regulatory pressure, some employers have "acted responsibly" to deal with contamination issues and others have not, Shufro said at the news conference. "We are here to demand that EPA revise its plan and include workplaces as a necessary and integral part of its program."

Problems in Downtown Manhattan

Arguing that downtown Manhattan continues to show signs of workplace contamination despite official assurances that the area's air is safe to breathe, Nadler was joined by union representatives complaining of inadequate workplace cleanups, workers with lingering respiratory illness, and business owners who said their insurance recoveries have been blocked by EPA's position on the risks of the contamination.

"We cannot again bury our heads in the sand," Nadler said. "Just because we cannot necessarily see the contaminants of concern, that does not mean they aren't still there and does not mean we should go back to business as usual."

Among the workplaces where contamination remains a concern, the union representatives said, are the relocated New York office of the Securities and Exchange Commission, a Manhattan community college, and several of the city's firehouses. "In the eyes of the world, we're heroes, but in EPA's eyes, we're nothing," complained Rudy Sanfilippo, a Uniformed Firefighters Association trustee.

...

[Nadler Says Workplaces Neglected In World Trade Center Dust Cleanup, BNA, Daily Environment Report, 2/11/03]

2/11/02

New York Democratic Rep. Jerrold Nadler disclosed the testimony of Marianne Horinko, assistant administrator of the EPA, in a news conference here where he blasted the environmental agency for failing to clean up commercial spaces in the wake of the Sept. 11 terrorist attacks. When the World Trade Center collapsed, it blew piles of potentially contaminated dust into nearby buildings, and tenants and landlords have been struggling to clean it up ever since.

In Ms. Horinko's testimony, given January 6 as part of a sworn deposition in a labor dispute, she said the EPA "has the lead in the environmental response" to the terrorist attacks. In response to a question about who had the ultimate responsibility for "the cleanup of interiors," Ms. Horinko said: "Ultimately I suppose it would be Governor [Christine Todd] Whitman as the administrator [of the EPA]."

To date, the agency has said it has been offering a supporting role to the city and state of New York. After months of criticism, the EPA announced in May 2002 that it would offer cleanup to residents who request it. That cleanup program began in September, and to date the agency has cleaned 1,228 apartments and tested another 361 units. The EPA hasn't offered any cleanup program for the hundreds of offices, restaurants and retail shops in lower Manhattan.

...

[EPA Official Says Agency Is Responsible for Cleanup Testimony Contradicts Previous Public Stance On Post-Sept. 11 Cleanup in Lower Manhattan By MOTOKO RICH, Wall Street Journal, Special Page, 2/11/03]

4/12/02


Commercial tenants, particularly smaller businesses, have had similar problems to those of the residential tenants (large financial services firms were necessarily in better shape -- they had the means to clean their own spaces and the leverage to get building owners to clean the common areas). Small commercial tenants were given the same, inadequate cleaning protocols, have lacked sufficient funds (most have received only loans, not direct grant assistance), and have had insurance claims denied due to Ms. Whitman's safety assurances. They also had the same trouble getting their building owners and managers to clean common spaces. But moreover, inaction on the part of less scrupulous employers or business owners have left individual employees at these firms with nowhere to turn if their employer chose not to test and remediate properly or at all. Congressman Nadler's office has received numerous calls from employees of both private and public entities who are concerned about the indoor air in their workplace, but fear job loss if they "make too many waves."* (*Footnote: Statement taken from Constituent Services Staff Members, Office of Congressman Jerrold Nadler (NY-08).)

. . .

[U.S. Congressman Jerrold Nadler, *White Paper, Lower Manhattan Air Quality*, Last Updated, April 12, 2002,
http://www.nyenvirolaw.org/PDF/EPA%20White%20Paper%20Final%20_121.pdf or
<http://www.911digitalarchive.org/objects/112.pdf>]

S: FAILURE TO TEST FOR OTHER TOXINS DURING CLEANUP

“EPA did not have data on more than half (10 of 14) of the pollutants of concern (POC’s) that scientists believe the public was potentially exposed to immediately after the collapse of the WTC towers. . . . What additional actions, if any, should EPA take to improve its response and recovery efforts . . . Also, tests are only cleaning and testing for asbestos.” [1/27/03 EPA IG report]



Time and again EPA claimed that their voluntary residential cleaning program in lower Manhattan actually was not needed, but was for the sole purpose of reassuring residents, “calming jittery nerves,” etc. See below and Section B for quotations of EPA making these statements from May through December, 2002.

If it is true that EPA is only conducting the voluntary residential cleanup as a psychological gesture for traumatized New Yorkers, then it should do the job right and assuage their needless fears by testing for other toxic substances in addition to asbestos. There is ample discussion of these other toxic substances in the press. EPA should consider this as an indication of public concern, and therefore reason enough to test for additional toxic substances. After all, the president said “spare no expense” in the cleanup of NYC. That was a promise that must be kept:

9/14/01

“We’re getting in there and testing to make sure things are safe,” Whitman says. “Everything will be vacuumed that needs to be, air filters (in area buildings) will be cleaned, we’re not going to let anybody into a building that isn’t safe. And these buildings will be safe. The president has made it clear that we are to spare no expense on this one, and get this job done.”

...

[Newsweek, 9/14/01, Asbestos Alert, by David France and Erika Check, <http://msnbc.com/news/629268.asp?0sp=w12b2&cp1=1>]

9/14/01

"The President has said, 'Spare no expense, do everything you need to do to make sure the people of this city and down in Washington are safe as far as the environment is concerned,'" Whitman said.

...

[EPA CHIEF SAYS WATER, AIR ARE SAFE , New York Daily News; 9/14/01; SUSAN FERRARO]

5/15/02

EPA officials say the remaining dust poses little health risk. . . . EPA officials say the program is designed mainly to reassure jittery residents that their homes are safe.

. . .

[EPA Rapped for NYC Cleaning Program, 5/15/02, By Michael Weissenstein, Associated Press]

5/8/02

"This is to assuage concerns from residents in Lower Manhattan who continue to have concerns over air in their apartments," said Mary Mears, spokeswoman for Region II of the EPA.

. . .

[EPA to Clean WTC Apartments, 5/8/02, By Alex Cukan, United Press International]

12/20/02

The December 28th deadline for lower Manhattan residents to sign up for EPA's cleaning and testing program is drawing near . . . "Our cleanup program is designed to reassure residents that they have reduced the risk from exposure to dust left over from the collapse of the World Trade Center," said Jane Kenny, EPA Regional Administrator. "Now is the time to call the hotline to sign up."

. . .

[EPA Region 2, DEADLINE TO SIGN UP FOR EPA LOWER MANHATTAN CLEANING AND TESTING PROGRAM DRAWS NEAR, 12/20/02, <http://www.epa.gov/region02/news/2002/02134a.htm>]

List of WTC constituents that will be tested in EPA's voluntary cleanup program

EPA is testing for asbestos only during the voluntary cleanup program. EPA is testing additional substances at random, but in too few homes to have any statistical power to establish that these substances are not occurring elsewhere. EPA also tested other substances in its 110 Liberty St. pilot cleaning program, discussed in Section G. The following list of what will be tested during the voluntary cleanup program is from the EPA website:

What will EPA test for?

EPA will test for asbestos in the indoor air after the cleanups are completed (and in residences where people want testing without cleaning). The Agency will assess the testing results using a health-based benchmark that assumes a thirty year exposure. This means that if a population of 10,000 people is exposed to a level of asbestos above the benchmark for a period of thirty years, there could be one additional case of cancer beyond what that population would normally expect to experience.

Will you test for dioxin and lead and substances other than asbestos?

We will test for asbestos in air. This is the substance of greatest concern, and air is the

pathway of exposure. By cleaning up the dust, many other substances will also be removed. In addition, we are conducting dust-wipe testing in 250 randomly selected homes. These dust wipes will be analyzed for dioxins plus 23 elements, including:

aluminum (Al)	magnesium (Mn)
antimony (Sb)	manganese (Mg)
arsenic (As)	mercury (Hg)
barium (Ba)	nickel (Ni)
beryllium (Be)	potassium (K)
cadmium (Cd)	selenium (Se)
calcium (Ca)	silver (Ag)
chromium (Cr)	sodium (Na)
cobalt (Co)	thallium (Ti)
copper (Cu)	vanadium (V) and
iron (Fe)	zinc (Zn)
lead (Pb)	

Our scientists will evaluate whether substances other than asbestos might pose a significant risk, and will determine if any refinement to cleanup guidance is needed. Any proposed benchmarks for substances on the list will be peer reviewed by independent scientists.

...

[EPA, Frequently Asked Questions, <http://www.epa.gov/wtc/questions>]

Expert panel convened by EPA recommended testing for more toxic constituents

The expert panel convened by EPA to advise it on its own cleanup program recommended expanding the list of hazardous substances to be tested in residences:

The panel noted that the overall method of selection of contaminants of potential concern (COPC) was not unreasonable, but greater effort is needed to include more potential contaminants. They also noted that greater transparency in the selection process needed to be provided. In addition, several individual panel members noted specific contaminants that might need further consideration.

...

In summary, the following overall suggestions were made:

Include more potential contaminants as appropriate based on the availability of additional sources of relevant data as noted by the panel and observers.

...

Several panel members commented that the list of COPC seemed to have been narrowed fairly rapidly, and asked for clarification from the document authors on this process. For example, one panel member asked if technical soundness of the assessment was lost by setting benchmarks, while at the same time engaging in clean-up activities, rather than the more standard risk assessment approach applied to Superfund sites where COPC are identified and benchmarks are set prior to making clean-up decisions. The document author noted that the Superfund type of approach would be more comprehensive, but that the required representative sampling, sampling

analysis plans, and data interpretation can take years to complete, and therefore, a decision was made by the Agency to follow a parallel track. A panel member noted that the incremental costs of analyzing a sample for additional compounds such as additional metals is often not that great. Based on this consideration, the panelist asked whether it was necessary to pare down the list of COPC so early in the process. A document author responded that the a standard protocol is to pare down the list of COPC to a manageable size based on the toxicology and exposure screening process, but noted that in the clean-up sampling a full battery of metals are being tested. One panel member asked about the availability of data on PCB levels in settled dust, since the document's Appendix A did not indicate that this type of data had been used for screening out PCBs.

...

[World Trade Center (WTC) October 21-22, 2002, Peer Review Meeting Notes, 2/7/03, Prepared by: Toxicology Excellence for Risk Assessment, Prepared for: U.S. Environmental Protection Agency, <http://www.tera.org/peer/wtc/>]

The panel, hired by the EPA as part of a federally mandated peer review process, urged that the agency's cleanup plan be altered to: Ex pand testing to include a wider array of toxic contaminants, not just the handful, like asbestos or lead, that the EPA is monitoring.

...

Several panel members said they were surprised that the EPA began its cleanup program even before the panel had finished its review process.

"We felt EPA should be more inclusive of chemicals rather than exclusive," said Michael Dourson, director of toxicology for the private group and chairman of the panel. The number of chemicals tested, he said, should possibly rise to 17 from six. Dourson will write the panel's final report.

...

Under intense questioning from the panel, EPA representative Mark Madeleine repeatedly said his agency welcomed the criticism and would amend its standards to address the concerns.

...

[EPA's 9/11 cleanup needs a fresh look, 10/29/02, NY Daily News, <http://www.nydailynews.com/news/local/v-pfriendly/story/30987p-29393c.html>]

Earlier comments on need to test and account for the aggregate, synergistic carcinogenicity and toxicity of different toxic constituents

Throughout the oversight process of the WTC cleanup, many public health officials and scientists have stressed the need to test for and calculate the aggregate, synergist risk of the range of all toxic constituents found in WTC dust. This was long before EPA convened its peer review panel, who was quoted above.

In particular, EPA failed to test for toxic constituents in dust other than for asbestos, even though their limited air and surface water sampling indicated a need to do so. The following are earlier

comments submitted to EPA on the need to consider aggregate risks from other toxicant contaminants in addition to asbestos.

11/15/01

The EPA tested dusts from the Trade Center fallout covering streets and other surfaces. EPA found asbestos. . . . EPA did not test for other toxic substances in these surface dusts, such as fiberglass, PCB's, dioxins, lead, etc. [Jenkins, 11/15/01]

2/11/02

For carcinogens, the detection limit should be at or lower than the cancer risk at the 10^{-6} ("ten to the minus six") risk level. This corresponds to those levels found by EPA to be associated with a cancer risk of 1 in a million. It is EPA policy to evaluate human exposures to carcinogens at this level as "the point of departure" for any formal decision process for remediation that might justify exposing citizens to higher cancer risks . . . because several carcinogens are potentially present at levels of concern, it would not be sufficiently protective to test each carcinogen at the 1 in 10,000 risk level (10^{-4} risk level). This is because the carcinogenic risks of the all of the carcinogens could add up. If each is only tested 10^{-4} risk level, then the aggregate risk could be much higher than 1 in 10,000, which is always EPA's action level. For other hazardous substances, which are not carcinogens, the detection limit must be at or below the established EPA reference dose for humans (RfD), or the lowest observed effect level (LOEL) in any animal study divided by a safety factor of 10,000. . . . [Jenkins, 2/11/02]

2/10/02

It is particularly important to test asbestos at the 10^{-6} risk level, because other carcinogens and possible carcinogens are potentially present in WTC fallout, including fiberglass, dioxins, PCB's, and heavy metals. If several are present, the carcinogenic risk could be additive and result in a higher aggregate cancer risk. . . . [Jenkins, 2/10/02]

Lead

Hazardous levels of lead have been found in indoor WTC dust

High levels of lead have been found in WTC dust by EPA as well as independent researchers. The following is a press account of research published in the journal *Environmental Health Perspectives*.⁷²

Dr. Paul Liroy of the University of Dentistry and Medicine of New Jersey announced last week that he had found levels of lead in dust samples from around the World Trade Center disaster area that may pose a threat to the public health. At a public meeting at

New York University, Dr. Liroy characterized the levels as "moderate", and said that the lead needs to be removed from homes and buildings, especially where children are likely to come across it.

...

[Environmental Aftermath, By Michael Burger, Gotham Gazette, 10/22/01, <http://www.gothamgazette.com/commentary/106.burger.shtml>]

EPA 110 Liberty St. pilot cleaning study shows hazardous lead levels, and fact that asbestos testing does not indicate whether lead has been cleaned up

As discussed in greater detail in Section G on EPA's pilot cleaning study of apartments at 110 Liberty St., testing for asbestos is not a surrogate for testing for lead.

Before cleaning, only 23% of the apartments had safe levels of lead (only 3 out of 13 apartments had safe levels). Most of the apartments (7 out of 13) did not even have visible WTC dust, except around the heating baseboards.

Asbestos testing was not an indicator of whether hazardous lead levels were present. Failure to meet the EPA asbestos criterion was responsible for triggering 82% of the second and third cleanings. However, the other 18% of the additional cleanings that were required were due to high lead concentrations, not to asbestos. In these lead contaminated apartments, the asbestos levels passed EPA's criterion. Thus, using asbestos in air as the only for determining whether an apartment was cleaned would not have caught the lead contaminated apartments.

The EPA 110 Liberty St. study concluded the following, which is absolutely false and unsupported by the data in the study:

The study found that conducting asbestos in air sampling after cleaning could be used as a surrogate method for determining if future cleaning was needed.

...

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, NY New York, NY, 5/03, EPA Region 2, p. 114, http://epa.gov/wtc/confirmation_clean_study.htm]

During EPA's voluntary cleaning program, EPA is finding elevated lead levels

During its voluntary residential cleanup program, EPA has also found elevated lead in an apartment that had already been abated by the landlord. EPA subsequently cleaned the apartment again as part of its voluntary program, and the lead levels were reduced to acceptable levels. Like EPA's 110 Liberty St. study, this also demonstrates the need to test for lead and other toxic constituents:

4/15/03

The Wilsons wanted to stay in Lower Manhattan, but the reminders of the Sept. 11 terror attack have intensified for them in recent months with the heightened Code Orange security measures. They had already decided to leave when they found out something that strengthened their resolve: they had elevated levels of lead in their apartment at 22 River Terrace, according to the results of an in-depth testing and cleaning of their apartment by the Environmental Protection Agency.

The March E.P.A. letter to the Wilsons stated that "the only metal on this list that was identified as posing a potential health effect from the WTC collapse was lead."

"It was shocking," Josh Wilson said. "My general question is how can this happen?"

E.P.A. contractors cleaned the Wilsons' apartment several months ago and subsequent tests revealed safe levels of lead, but the letter did not explicitly say that the current levels were safe. A chart indicating the levels before and after the cleaning was enclosed in the mailing.

Wilson, who declined to be photographed for this article, said that representatives of his building's landlord, Rockrose Development Corporation, assured him that the building had been cleaned according to government standards after the trade center collapse. He said he would never have signed a lease in November, 2001 if he thought that he might be jeopardizing the health of his then-4-month-old son.

"I asked them all these questions and they yes-sed me to death," Wilson said of Rockrose.

The level of lead found on the Wilson's kitchen counter top before the E.P.A. cleaning was 41.9 micrograms per square foot. This exceeds the threshold of 40 micrograms per square foot used by the Department of Housing and Urban Development and the more stringent 25 micrograms per square foot threshold adopted by the E.P.A. for their residential cleaning program in Lower Manhattan. After the cleaning the level was 6.58.

Rockrose denies any negligence in the post-9/11 cleanup of their apartments.

"We did all the required cleaning and testing," said Sofia Estevez, the vice president for marketing and leasing at Rockrose.

Estevez said that the only apartments that were not cleaned after the trade center disaster were those whose owners declined the service. Furthermore, according to company policy, the Wilson's apartment would have been thoroughly cleaned and repainted before the family moved in, Estevez said.

Had the apartment been cleaned after Sept. 11, there is still a chance that some lead could have returned afterwards, said Mary Mears, an E.P.A. spokesperson. Mears said she could not address the Wilsons' particular situation without more information, but noted that lead travels in dust and, hypothetically, some lead could return to an apartment that had been cleaned, especially during the cleanup of the World Trade Center site.

In addition, a certain amount of lead is often present in urban air due to years of lead-based paint and gasoline use, Mears said.

Last August, the E.P.A. began a program of voluntary asbestos testing and cleanup of residences south of Canal, Pike, and Allen Sts. Out of about 6500 households that registered for the program by the Dec. 28, 2002 deadline, 250 were randomly selected to receive a wipe test and analysis of 16 potential toxins, including lead, dioxin, mercury, and chromium. The Wilsons were among the 250.

Mears said that tests had been completed on 150 of the 250 apartments. She said some others also had elevated lead levels, but she did not have the exact number. In some cases, the lead could have been from lead-based paint, said Mears. She said there were no plans to conduct additional wipe tests in other apartments in 22 River Terrace since the cleaning program in the Wilsons apartment had reduced the level of lead.

...

However, this brought small comfort to Wilson and his family, who could have been living with elevated lead for more than a year. They feel betrayed by Rockrose.

"They expressly told us not to worry," Wilson said. . . .

...

[Dangerous lead was found in some apartments, 4/15/03, Elizabeth O'Brien, Downtown Express, <http://www.downtownexpress.com>, specific archived article at: http://www.zwire.com/site/news.cfm?BRD=1841&dept_id=112709&newsid=7722002&PA G=461&rft=9]

Fiberglass (man-made vitreous fiber, MMVF)

In EPA's 110 Liberty St. study, high fiberglass concentrations were found even after apartments had been cleaned by rigorous EPA abatement, which had been preceded by professional abatement by the landlord as well as a cleanup by the fire department. Air at some locations exceeded EPA's criterion for fiberglass. High fiberglass concentrations were the cause of 3 recleanings.⁷³ Fiberglass exceeded EPA's criterion level in 2 of the apartments even after EPA had rigorously abated these individual apartments 2 times! See Section G on EPA's 110 Liberty St. pilot cleaning study.

The following are the conclusions of EPA's Office of Research and Development on fiberglass, and press coverage of the fiberglass issue.

10/02

The NYCDOHMH/ATSDR Final report also included data on synthetic vitreous fibers (SVF or fibrous glass) concentrations in indoor and outdoor dust samples at the same residential locations. SVF (PLM analysis) was detected in a larger number of indoor dust samples (26 of 57 or 46%) and at higher concentrations (range 2-35%) than asbestos. In outdoor dust at these properties, SVF was detected in 11 of 14 (79%) of samples (concentration range 15 - 72%).

...

[Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster, External Review Draft, 10/02, National Center for Environmental Assessment, Office of Research and Development, EPA, Publication Nos. NCEA - W -

1395, or EPA/600/P-2/002A, <http://www.epa.gov/ncea> or http://oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=36387]

10/22/01

At the same meeting [a public meeting at New York University], Dr. Jacqueline Moline of Mt. Sinai Medical Center reported that fiberglass is one of the main constituents in air and dust samples at Ground Zero. Fiberglass is a suspected carcinogen. It also causes significant irritation of the eyes, nose and throat.

In a telephone interview, Carrie Loewenherz, an industrial hygienist with the New York Committee on Occupational Health, explained that NYCOSH has found fiberglass to comprise five to 95 percent of the weight of outdoor samples taken in the area, and 30 to 50 percent of indoor samples taken from a Church Street location across from the World Trade Center. Loewenherz pointed out that there are no state or federal standards for levels of fiberglass or for fiberglass cleanup. "There are guidelines [for cleanup] by the American Conference of Governmental Industrial Hygienists . . .

. . .

[*Environmental Aftermath*, By Michael Burger, *Gotham Gazette*, 10/22/01, <http://www.gothamgazette.com/commentary/106.burger.shtml>]

Asthma is one illness likely to be caused by or exacerbated by fiberglass and other airborne particulates. The Centers for Disease Control (CDC) conducted a survey of residents living below 110th Street in Manhattan, an area including Ground Zero, but also extending far north.⁷⁴ They found increases in the incidence and severity of asthma.

In animal studies, fiberglass causes chronic inflammation, as well as the possibility of cancer:

The works of Stanton and Pott suggested that longer fibers including non-asbestos fibers have more carcinogenic potential than short fibers. Fraire [Fraire et al., 1994] studied the effects on the pleural surface induced by intrapleural injections of fiberglass. The fiberglass preparation was carefully sized and consisted of fibers with a mean length of 2.2µm and a width of 0.15 µm. The changes he observed ranged from chronic inflammation, fibrosis, and foreign body reaction to mesothelial hyperplasia and dysplasia. The most dramatic pathological event was the occurrence of mesothelioma in three of the twenty-five animals.

. . .

[*Accepted for publication in the American Journal of Industrial Medicine*, 4/28/03, *Asbestos Fiber Length as Related to Potential Pathogenicity: A Critical Review*, Ronald F. Dodson, Ph.D., FCCP, FAHA; Mark A.L. Atkinson, M.A., D.Phil.; and Jeffrey L. Levin, M.D., M.S.P.H., The University of Texas Health Center at Tyler, Tyler, TX]

Mercury

EPA's initial testing in the days after 9/11 omitted testing for mercury in both air and dusts. This is because the analytical methods for mercury is different from the method that can test for a

range other heavy metals like lead and chromium at the same time.

To this day, EPA has never tested for mercury in airborne dusts. All the air testing has been for mercury in the vapor state of the metal. It is likely that mercury could be present in suspended particulates as chemically bound species.

The following is press coverage on the mercury issue in residences. There is a lot more coverage of the problems with elevated mercury blood levels in police officers working as first responders at Ground Zero.

9/9/02

. . . "We all have been exposed to a host of toxic chemicals," says Todd, adding that tests of dust in her apartment turned up everything from asbestos to mercury to kaolin, a clay that causes skin irritation.

Many residents worry about what was in the dust they breathed or still breathe. Jared Cook, president of a tenants group for one of Battery Park City's buildings, two blocks south of Ground Zero, says many tenants wish the EPA would test indoor spaces for other contaminants besides asbestos, since mercury, lead and other heavy metals, PCBs and dioxins have turned up in independent tests.

Rather than protest, however, Cook says his group advocates that tenants take advantage of what the EPA is now offering. "We hope that letting EPA send in its certified contractors to test and clean for asbestos will most likely take care of most other contaminants as well," says Cook. Nevertheless he finds it unsettling that of the five or six residents who had themselves tested for exposure to heavy metals, all tested positive.

. . .

[Dusting off Manhattan: A year after 9/11, worries about toxic dust plague residents, 9/9/02, By Francesca Lyman MSNBC, <http://www.msnbc.com/news/803400.asp>]

6/6/02

A series of tests in lower Manhattan by an independent consultant found surprising mercury levels up to seven months after the Sept. 11 collapses. New Jersey-based consultant, Uday Singh, who has testified in court as an expert on trade center dust and has been doing environmental testing for more than a decade, took the readings in apartments and street locations, including City Hall Park, in March and April. "When compared with mercury concentrations observed in non-industrial urban environments, the mercury vapor concentrations in lower Manhattan were greater by a factor of 1,000 to 1 million," he said. "It points to a potential for chronic exposure, and it is important that further studies be undertaken immediately."

. . .

[Concern Over Mercury Tests show high levels near site, By Graham Rayman, Newsday, 6/6/02]

Dioxins

EPA dismissed levels of toxins such as dioxins as being “very low” or “below the detection limit” despite the fact that levels of dioxin measured in the air many blocks away from Ground Zero were the highest ever detected in outdoor air. The following is an excerpt of the EPA ORD draft health risk evaluation.

10/1/02

Dioxin Air Monitoring Data

...

The amount of time the monitor operates directly affects the amount of air that went through the monitors for dioxin collection: the Region 2/7 sampling captured dioxins contained in about 1000 m³ of air (i.e., about this much air was drawn into the sampler over 72 hours), whereas the EPA ERT sampling captured dioxins in about 7 m³ air. The majority of the EPA ERT samples simply did not contain enough mass of dioxins to be able to detect, much less quantify, the dioxin-like congeners in the sample.

...

The WTC and Church & Dey measurements from the first measurement day of September 23 through November 21 show unambiguous elevation, with concentrations ranging from about 10 to 170 pg TEQ/m³. [*TEQ is a toxicity equivalent to 2,3,7,8-tetrachlorodibenzo-p-dioxin*]

...

The 6 Park Row measurements between October 12 and October 29 averaged 5.6 pg TEQ/m³. These measurements are consistent with the mid- to late-October measurements at Church & Dey, which is slightly off-site from Ground Zero, of 10 to 20 pg TEQ/m³. Further, the Church & Dey measurements of 10 - 20 pg TEQ/m³ for mid to late October are consistent with the WTC measurements for that time period of 20 - 50 pg TEQ/m³. In other words, the highest measurements are onsite (WTC); the next highest measurements are slightly offsite (Church & Dey), and slightly lower concentrations are farther offsite (Park Row). This is strong evidence that emissions from the WTC site are the cause for elevated air concentrations within and near the WTC site.

...

Other measurements made in the United States and around the world can be used to put these measurements in perspective. As noted earlier, EPA's draft Dioxin Reassessment compiled urban and rural air monitoring studies and found average ambient concentrations of 0.12 pg TEQ/m³ for urban and 0.017 pg TEQ/m³ for rural settings. Higher concentrations have been identified in the literature, particularly near a known source of dioxin emissions. The highest TEQ concentration reported in the U.S. was > 1.0 pg/m³, downwind of an incinerator in Niagara Falls, NY. Concentrations in the plume of a solid waste incinerator in Columbus, OH, that was known to be emitting large amounts of dioxins were about 0.25 pg TEQ/m³. In this case, the stack was very tall (about 80 meters) and air measurements were taken about 2 kilometers away. Background air concentrations in Columbus were measured to be about 0.05 pg TEQ/m³.

...

Although none of these literature measurements can be assumed to represent New York levels, they provide some basis for perspective. Certainly, no reports in the literature could be found on similar circumstance where there is, what is essentially, an area

source at ground level continually emitting dioxins near to where individuals are exposed. It would be reasonable to conclude that the concentrations to which individuals could potentially be exposed, in the range 10.0 to 170.0 pg TEQ/m³ within and near the WTC site found through the latter part of November, are likely the highest ambient concentrations that have ever been reported.

...

[EXPOSURE AND HUMAN HEALTH EVALUATION OF AIRBORNE POLLUTION FROM THE WORLD TRADE CENTER DISASTER (EXTERNAL REVIEW DRAFT) 10/1/02
<http://cfpub.epa.gov/ncea/cfm/recorddisplay.cfm?deid=54667>]

High levels of dioxins also found in WTC dust

EPA should be testing for dioxins primarily in settled dusts with wipe samples. High levels were found by EPA in bulk dust from the WTC.

The EPA report EXPOSURE AND HUMAN HEALTH EVALUATION OF AIRBORNE POLLUTION FROM THE WORLD TRADE CENTER DISASTER (above) only considered airborne exposures when calculating risks to citizens in NYC. Dust levels were found to be high for dioxins (see below), but EPA did not take this into account in any risk assessments for citizens of NYC.

Table 1. CDD/CDF in Bulk Dust, Battery Pk and 2nd Pl; Sept 16, Units: pg/g (ppt)

CDD/CDF	Sample ID	Sample ID	Sample ID	Sample ID
	AO6354	AO6353	AO6355	AO6351
2378-TCDD	1.44	2.68	3.41	5.18
Total TCDD	102	109	167	325
Total PeCDD	64.2	66.7	135	189
Total HxCDD	72.4	79.2	156	224
Total HpCDD	125	360	445	696
OCDD	299	1890	2630	3170
2378-TCDF	10.7	20.6	23.9	43.8
Total TCDF	656	910	1170	2190
Total PeCDF	392	451	693	1110
Total HxCDF	233	241	373	579
Total HpCDF	136	154	232	356
OCDF	81.5	113	168	238

...

CONCLUSIONS AND RECOMMENDATIONS

Examination of the NYC Response Monitoring database and the results discussed here

suggest several important conclusions:

...

Several very high concentrations of many toxic compounds were detected in the bulk dust samples, including CDD/CDF [*chlorinated dibenzo dioxins/chlorinated dibenzo furans*], PCBs, PAHs, and metals.

...

[Special Investigative Audit #14: Environmental Data Trend Report, World Trade Center Disaster; Final Update - Trends for Data Collected 9/11/01 to 4/24/02 from Lower Manhattan, Prepared by IT Corporation for Office of Emergency and Remedial Response. (Draft Version - October 2001), posted at http://www.nycosh.org/WTCdraft2_102901.pdf]

Press accounts of dioxin problems from WTC fallout

The following are press accounts showing that dioxin contamination was and is an issue in the WTC cleanup.

12/13/02

Emission of dioxins in and around Ground Zero in the two months following the World Trade Center collapse were "likely the highest ambient concentrations that have ever been reported," according to a report released last week by the federal Environmental Protection Agency. This revelation is buried on page 77 of a 160-page report that the agency released last week.

Asked about the unusual timing, an EPA spokeswoman in Washington said: "This is a draft report. We really weren't trying to slide it under the door. The sooner the draft is released the more time there will be for public comment." EPA's press release and the media coverage over the weekend have focused on the report's most comforting conclusion - that most neighborhood people and office workers who returned to their homes and jobs after Sept. 17 were "unlikely to suffer short-term or adverse health effects" from contaminants in the air.

But the report also says that thousands of people who were caught in the huge dust clouds on Sept. 11, or who inhaled the air around Ground Zero in the first few days afterward, were "at risk for immediate acute [and possibly chronic] respiratory and other types of symptoms."

No immediate sampling

Health officials have no way of telling how toxic those initial clouds were, the report says, because major sampling of the Ground Zero environment did not begin for some toxics until Sept. 14 and for others until Sept. 23. As for dioxin, a product of uncontrolled combustion, unprecedented levels were even found several blocks beyond Ground Zero, in areas that were reopened to the public one week after the attack.

...

"Those air levels are outrageous," said Dr. David Carpenter one of the nation's top dioxin specialists and former dean of the School of Public Health at State University of New York at Albany. "There's a very significant health danger here."

...

[EPA Report Buries a Revelation, 12/13/02, By Juan Gonzalez, Daily News]

2/7/02

Environmental tests of Fiterman Hall, a 15- story building owned by Borough of Manhattan Community College and located just north of the World Trade Center site, have found troubling levels of cancer-causing dioxins, according to a private consultant hired by the college.

...

"We found unusually high levels of dioxin in dust samples throughout the building," Howard Bader, the consultant, said this week. "I'm talking about levels 20 to 90 orders of magnitude above results from other buildings where my firm has tested or cleaned in lower Manhattan."

...

An EPA toxicologist who reviewed Bader's results this week said yesterday that the EPA has no standards for dioxin in dust, but his analysis suggested that the levels in the building were "below EPA levels of concern."

...

[Note. Fiterman Hall is scheduled to be demolished]

[Dioxin Seen At College Downtown, by Juan Gonzales, 2/7/02, NY Daily News]

9/9/02

Many residents worry about what was in the dust they breathed or still breathe. Jared Cook, president of a tenants group for one of Battery Park City's buildings, two blocks south of Ground Zero, says many tenants wish the EPA would test indoor spaces for other contaminants besides asbestos, since mercury, lead and other heavy metals, PCBs and dioxins have turned up in independent tests.

...

[Dusting off Manhattan: A year after 9/11, worries about toxic dust plague residents, 9/9/02, By Francesca Lyman MSNBC, <http://www.msnbc.com/news/803400.asp>]

9/10/02

News of toxic substances other than asbestos being released into the air was not made public until Oct. 26, six weeks after the collapse of the towers, when the Daily News published my front-page column on the subject. My information had been gleaned from a quick review of nearly 800 pages of EPA test data, which the agency had been forced to release after Kupferman filed a Freedom of Information Act request. Only then did EPA officials concede that their testing had found elevated levels of other contaminants, including benzene, dioxins, PCBs, lead and chromium in the air and in water draining into the Hudson River from the Trade Center. However, agency officials insisted at a City Hall press conference that such high readings had occurred only as occasional "spikes"; that they were confined almost exclusively to the immediate vicinity of the debris pile; and that they would soon disappear following the extinguishing of the fires. The fires, however, turned out to be far more difficult to put out than anyone had initially predicted. They burned for nearly four months and even in late January were still smoldering below sections of the debris pile.

In the case of dioxins, among the most toxic substances known, the EPA repeatedly told the public that its test results showed very few readings above the agency's "removal action guidelines." In fact, the EPA has no standards for safe dioxin levels in air. Faced with high-level dioxin emissions around Ground Zero more typical of a volcanic eruption, the agency's top officials in the New York region simply asked their risk assessors to devise their own removal action guidelines. They then told the public that few of its tests had exceeded those guidelines, when in fact a substantial number of them had. EPA scientists in other parts of the country were shocked when they learned that the New York region was posting safety benchmarks for dioxin that had not gone through the agency's normal peer review process.

It wasn't until December that the agency began releasing results of ambient air tests it had conducted for dioxin outside of the actual Ground Zero site. Some of those tests showed high dioxin levels as far as half a mile away from the trade center. Other agency tests showed dangerous levels of PCBs in dust nearly a mile north of Ground Zero, in an area that had been reopened to the public on Sept. 17.

...

[Fallout, Fallout: The Hidden Environmental Consequences of 9/11, By Juan Gonzalez, In These Times, 9/10/02, <http://www.alternet.org/story.html?StoryID=14073> , quoted from the book: Fallout, The Environmental Consequences of the World Trade Center Collapse, by Juan Gonzales, published by The New York Press, NY, 2002]

PCB's (polychlorinated biphenyls)

PCB's are another toxic contaminant associated with the fires at the WTC, and also contained in the dust as well, or deposited as an oily film on surfaces near Ground Zero. There has not been enough testing to be sure of the extent of the problem. EPA should be performing extensive wipe samples for PCB's.

PCB's were associated with the transformers which burned in the WTC fires. The following are press accounts:

6/6/02

To the list of areas requiring an ongoing environmental cleanup around Ground Zero, add the site of Seven World Trade Center. The collapse of the 47-story tower there resulted in the release of 130,000 gallons of oil from the Consolidated Edison substation, while an unspecified amount of oil leaked from two damaged storage tanks formerly owned by Salomon Smith Barney, an environmental report says.

In addition to the oil residue, the ground underneath Seven World Trade Center housed conduits potentially containing asbestos and feeder lines wrapped in coal tar, which may contain PCBs (polychlorinated biphenyls), a toxic substance used in electrical equipment before 1977. The information is contained in an environmental impact report made public this week by the Empire State Development Corp.

Workers at the site are executing a two-phase cleanup program developed with the state Department of Environmental Conservation. The cleanup is part of the initial excavation

work at the site to prepare for the planned reconstruction of a Con Edison substation and an office tower there by 2005. In the first phase of the plan, workers will excavate and remove soil to a depth of at least 10 feet in the 1.33-acre site, the report said. In the second phase, the southern two-thirds of the site will be excavated an additional 17 feet for a total of 27 feet.

Some of the oil was recovered from trenches, manholes, areas adjacent to the project site and even the basement of the Verizon building, the report said. In December, Con Edison bored into the soil in nine spots and sank groundwater-monitoring wells, finding oil in those tests including two of the wells. One well contained three inches of oil, and the other Under the cleanup plan, any groundwater exposed during the excavation will have to be treated before it can be pumped into the sewage system for disposal.

The site also contained two 6,000-gallon underground diesel storage tanks, formerly operated by Salomon Smith Barney. In October, DEC officials determined that the tanks were breached in the collapses and a spill had resulted. The tanks were removed in early May, but petroleum had leaked into the soil by then. Workers are excavating the area around the tanks to remove the contaminated soil. Two 11,690-gallon diesel fuel tanks, operated by Silverstein Properties, also were in the structure. In February, DEC officials ordered Silverstein to close the tanks, and the tanks were removed in March and April, with no evidence of leakage present.

Steve Solomon, a spokesman for Silverstein Properties, did not return a phone call. Con Edison spokesman Mike Clendenin said low amounts of oil were found in groundwater wells, and an unknown quantity was burned and/or absorbed into the debris and previously removed.

[Oil Leaks Need Cleanup 2-stage plan already begun, 6/6/02, By Graham Rayman, Newsday]

2/1/02

When the World Trade Center crumbled, the spotlight was on its two majestic towers, not on 7 World Trade Center – a building that stood and collapsed in their shadows.

But 7 WTC was toxic. It housed two electrical substations owned by Con Edison. And they contained 109,000 gallons (413,000 liters) of oil and hundreds of pounds (kilograms) of potentially dangerous chemicals set loose when the building fell. Trace amounts of PCBs, a carcinogen, and larger quantities of sulfuric acid, a possible carcinogen and respiratory irritant, were among the hazards. Details about some of the pollutants are contained in reports Con Ed made to the state Department of Environmental Conservation beginning Sept. 11. The Associated Press recently obtained the documents from Con Ed.

...

The red granite edifice of 7 World Trade Center, once connected to the twin towers by two slender footbridges, tumbled to the ground in a chain reaction several hours after suicide hijackers crashed into the towers. The attacks sent flaming debris hailing down on nearby buildings, igniting 7 WTC in an unstoppable blaze that leveled it. The collapse crushed electrical equipment within.

...

The matter is a hot button because of public fears about PCBs, or polychlorinated biphenyls, a cancer-causing compound used as a fire retardant in the lubricating and insulating oil of electrical equipment built before 1977. The newer of Con Ed's two trade center substations was considered virtually PCB free, but the older one contained oil with trace amounts up to 50 parts per million according to the utility's environmental reports.

Under EPA regulations, that ratio isn't high enough to be a hazard. However, some environmentalists say even tiny amounts of PCBs can cause harm. Unleashed in the environment, the chemicals gradually accumulate in the fat of fish and animals and then move up the food chain to people. People who are exposed to too much can develop cancer.

...

As for the 109,000 gallons (413,000 liters) of oil, it's a smallish spill by some standards more than 11 million gallons (42 million liters) of crude oil came from the 1989 Exxon Valdez accident, and a recent accident off the Galapagos Islands spilled about 240,000 gallons.

...

[More chemicals feared at Trade Center site, 2/1/02, By SHARON L. CRENSON, Associated Press, http://www.enn.com/news/wire-stories/2002/02/02012002/ap_transformers_46283.asp]

Study shows PCB's were deposited in films on windows from WTC implosion/fires

The following are excerpts from a study showing that PCB's were released to the air from the WTC fires, and the airborne PCB's were deposited on building surfaces, probably as an oily film:

[A]n electricity substation, located underneath "7 World Trade Center", containing 492,000 liters of PCB contaminated transformer oil was destroyed.

Household and building fires are known to produce high concentrations of toxic gases, including PCB, PAH, chlorophenols and polychlorinated dibenzodioxins and furans^{2,3}. Surface wipes taken after household fires have measured very high contaminant concentrations, such as between 2.6 – 6.4 mg/m² for ΣPCB. [Σ means the sum of, or total PCB's.]

We now appreciate that surface films develop on the interior and exterior of surfaces. The composition of surface films is representative of the particulate-associated and gas-phase contaminants that comprise the complex mixture of urban air. This paper presents the polychlorinated biphenyl (PCB) concentrations found in organic films from exterior building surfaces, namely windows. Seven sites were sampled in Lower Manhattan, with three sites located within ~0.5 km of the WTC, in addition to a control site in Brooklyn.

...

Organic film samples were collected from the outside of windows by scrubbing the surfaces with pre-cleaned laboratory Kimwipes, soaked in HPLC grade isopropanol . . . Sampling was conducted between October 27 and October 29, 2001.

...

Eight samples were collected from seven sites in lower Manhattan and at one location in Brooklyn. Samples were collected from either ground level or second story windows.

Three sites (Church/Warren, WTC East and the paired Museum-North and Museum-South) were located within 0.5-0.75 km of the WTC and were expected to be most immediately impacted by the contaminant plume. The windows at these sites directly faced the WTC, with the exception of Museum-South that faced directly away. The remaining four Manhattan sites (Worth/ Broadway, Canal/Broadway, NYU and Union Square) were located along a north-south transect northward from the WTC. The furthest site, Union Square, was ~4 km from the WTC. The Brooklyn location, which served as a control site, was approximately 3.5 km away from the WTC. The last time of cleaning was before September 11, 2001.

...

Total PCB concentrations decreased with increasing distance from the WTC site (see Table 1) with the highest concentrations measured at the three sites near the WTC. The highest PCB concentrations were measured in the two samples from the Museum site, a building located just south of the WTC, the direction of prevailing winds for several days after September 11th. These concentrations were nearly three times greater than the Church/Warren site, which was located closer to the WTC than the Museum site, but to the north. Paired samples were collected on the north (Museum North Side) and south (Museum South Side) facing windows at the Museum site, corresponding to the sides of the building that directly face and face away from the WTC, respectively. The total PCB concentration on the Museum North windows were about 10 % greater than south facing windows. This is a minimal difference and indicates that the atmospheric plume was relatively well mixed at close range.

...

Location	[Total] PCB (ng/m ²)	Distance from WTC (km)
Museum North Side	1398	0.75
Museum South Side	1260	0.75
Church/Warren	404	0.5
Park Row/Spruce	105	0.75
Worth/Broadway Street	511	1
Canal/Broadway Street	107	1.5
NYU	10	2.75
Union Square	89	3.5
Brooklyn	82	4

...

[POLYCHLORINATED BIPHENYL (PCB) CONCENTRATIONS IN ATMOSPHERICALLY DERIVED ORGANIC FILMS FROM LOWER MANHATTAN AFTER SEPTEMBER 11, 2001, Craig M. Butt, Jennifer Truong, Miriam L. Diamond and Gary A. Stern, FORMATION AND SOURCES: FIELD CASES, ORGANOHALOGEN COMPOUNDS Vol. 59 (2002) 219]

EPA finds high PCB levels in dust, states concern in EPA report, then claims it was a typo

EPA's 9/02 peer review draft document, *Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks* was posted on the internet for public comment.⁷⁵ It discussed the levels of PCB's and other contaminants that EPA found in WTC dust as well as air.

It referenced another EPA document where test results for PCB's in dust were given. The document for the PCB in dust data is EPA's Special Audit 14. This EPA report gave extraordinarily high levels of PCB's in WTC dust, and expressed concern over the elevated levels in the conclusion section of the Special Audit 14. The date of EPA's *Special Audit 14* is October, 2001.

Polychlorinated Biphenyls (PCBs) in Bulk Dust and Air Samples

Aroclor 1254 and Aroclor 1260 results from the WTC database reveal high levels of Aroclor 1260 in several bulk dust samples from several sampling sites. Three (3) of the seven (7) samples listed in Table 2 were found to contain Aroclor 1260 at levels greater than 1000 mg/Kg (ppm). Aroclor 1254 results were generally lower or not detected. No PCB congener or Total PCB results for bulk dust samples have yet been found. PCB congener results for September 20 water samples were found but have not been evaluated.

Table 2. Aroclor 1260 and Aroclor 1254 Results, Sept. 16 Bulk Dust Samples, Units: mg/Kg (ppm)

Location	Aroclor 1254	Aroclor 1260
110 Greenwich Street	< 0.740	< 0.740
22 Cortlandt	0.550	1.20
600 Gateway Plaza	0.170	1.50
Albany St & West St (WTC)	not detected	1400
Battery Pk & 2nd Pl	not detected	1600
North End & Park Pl	not detected	1100
Park Place & West Broadway	not detected	159

...

CONCLUSIONS AND RECOMMENDATIONS

Examination of the NYC Response Monitoring database and the results discussed here suggest several important conclusions:

...

Several very high concentrations of many toxic compounds were detected in the bulk dust samples, including CDD/CDF, PCBs, PAHs, and metals.

...

[emphasis added] [Special Investigative Audit #14: Environmental Data Trend Report, World Trade Center Disaster; Final Update - Trends for Data Collected 9/11/01 to 4/24/02 from Lower Manhattan, Prepared by IT Corporation for Office of Emergency and Remedial Response. - (Draft Version - October 2001), posted at http://www.nycosh.org/WTCdraft2_102901.pdf]

In December, 2002, I distributed a copy of EPA's Special Audit 14 to many outside parties. At this time, EPA's Special Audit 14 was not in any way an internal document. EPA was confident enough in the results contained in *Special Audit 14* to make it an official supporting document for its 10/02 peer review draft, *Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks*, which was posted by EPA on the internet. EPA was well aware of the conclusion section of *Special Audit 14*, which stated a concern for the very high PCB concentrations.

After drawing public attention to the fact that EPA had found high PCB levels in WTC dust, EPA suddenly claimed that the high PCB levels were only typographical errors!!!

Regardless of whether the data was a typo or not, we were only made aware of the high PCB levels after seeing EPA's *Special Audit 14* when it became one of the supporting references for EPA's 10/02 draft *Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks* document. EPA had this data for over a year and did nothing. *Special Audit 14* discussed concern over the high PCB levels, and also discussed the fact that there were several other toxic constituents that were present in very high levels, like dioxins, PAH's, and metals. EPA is not claiming any typographical errors for these instances. But EPA has done nothing to either alert the public or conduct further testing.

Furthermore, EPA did not release the high PCB data for the sampling date of 9/16/01 to the NY Environmental Law and Justice Project (NYELJP) in 10/01, although it had released a large amount of other data for earlier and later dates. The NYELJP had posted all the data EPA provided in 10/01 on their website at www.NYenviroLAW.org, and all of this data is still posted at the NYELJP website. The 9/16/01 data was excluded by EPA.

To this day, EPA has not provided adequate proof that the high PCB data was in fact a typographical error. They did supply a summary data sheet which showed lower PCB levels, where a decimal point was transposed. However, this is not proof. EPA would need to supply all the original data as generated by the GC/MS itself, affidavits, and certifications from the laboratory as to the point in the chain of reports where the data was incorrectly transposed.

Even then, EPA's late day claim that some unidentified laboratory or other contractor made a typographical error is suspect.

Polynuclear Aromatic Hydrocarbons (PAH's)

PAH's (polynuclear aromatic hydrocarbons) inside buildings were sometimes above EPA levels of concern. For one apartment in EPA's 110 Liberty St. pilot cleaning study, PAH's were above EPA's benchmark.⁷⁶ The calculated toxicity equivalent factor (TEF) was 303.5 µg/m², above

EPA's primary clearance criterion of 300 µg/m².

EPA's *Special Audit 14* also concluded that PAH levels were very high in WTC dust:

CONCLUSIONS AND RECOMMENDATIONS

Examination of the NYC Response Monitoring database and the results discussed here suggest several important conclusions:

...

Several very high concentrations of many toxic compounds were detected in the bulk dust samples, including CDD/CDF, PCBs, PAHs, and metals.

...

[emphasis added] [Special Investigative Audit #14: Environmental Data Trend Report, World Trade Center Disaster; Final Update - Trends for Data Collected 9/11/01 to 4/24/02 from Lower Manhattan, Prepared by IT Corporation for Office of Emergency and Remedial Response. - (Draft Version - October 2001), posted at http://www.nycosh.org/WTCdraft2_102901.pdf]

Caustic

EPA withheld critical data about the caustic nature of WTC dust. On the "pH scale," WTC dust was as caustic as drain cleaner. The following are excerpts from Pulitzer Prize winning journalist Andrew Schneider, as well as another account:

2/9/02

Even as the dust from the collapsed World Trade Center was still settling, top government scientists were determining that the smoky gray mixture was highly corrosive and potentially a serious danger to health.

The U.S. Geological Survey team found that some of the dust was as caustic as liquid drain cleaner and alerted all government agencies involved in the emergency response.

But many of those on the front lines of protecting the health of the public and workers cleaning up the site say they never got the information.

"I'm supposed to be in the loop, and I've never heard any specific numbers on how caustic the dust actually was," said Dr. Robin Herbert, co-director of the Mount Sinai Center for Occupational and environmental Medicine. "There is a large segment of the population here whose physicians needed to know that information that USGS submitted. Exposure to dust with a high pH could impact everyone, but especially the very young, the very old and those with existing pulmonary disease."

Census data show large concentrations of young and elderly living near the World Trade Center site.

The EPA's office in New York said it repeatedly told the public that the dust was caustic because of tenement that was pulverized when the towers collapsed. But an examination of all the EPA's public and press statements made since Sept. 11 found nothing that

warned of the very high pH levels found by the Geological Survey scientists. Nor did the statements disclose the specific levels that the EPA's own testing found.

"We've not heard of EPA or anyone else releasing information on specific pH levels in the dust, and that's information that we all should have had," said Carrie Loewenherz, an industrial hygienist for the New York Committee for Occupational Safety and Health, which provides assistance to more than 250 unions.

"It's the specific numbers - those precise pH levels - that we need to make the appropriate safety decisions for the workers, and they were never released," Loewenherz said. "The dust, once it's in contact with moist tissue, the throat, the mouth, nasal passages, the eyes and even sweaty skin, it becomes corrosive and can cause severe burns."

Most of the samples taken by USGS' team had a pH of 9.5 to 10.5, about the same alkalinity as ammonia. Two samples that were taken inside a high-rise apartment and in a gymnasium across from the wreckage of the World Trade Center had a pH of 11.8 to 12.1 - equivalent to what would be found in liquid drain cleaner.

...

The Geological Survey's test results were posted Sept. 27 on a Web site restricted to government agencies.

The USGS findings were "evaluated by our technical experts and found to be consistent with the findings of EPA's Office of Research and Development," said Bonnie Bellow, the agency's spokeswoman in New York. "The USGS data was also discussed by an interagency group of scientists, epidemiologists and health officials," Bellow said.

But neither the EPA headquarters nor its New York office would comment on what came out of these discussions or which EPA results they were "consistent" with. The USGS data on pH levels were not released by the EPA, nor apparently were the environmental agency's own test results on the dust.

"It is extremely distressing to learn that the EPA knew how caustic samples of the dust were and didn't publicize the information immediately, or make sure that OSHA publicized it," said Joel Shufro, executive director of the New York Committee for Occupational Safety and Health.

"If we had known at the time exactly how caustic the dust could be, we would have been in a better position to make informed decisions about respiratory protection to recommend and about the urgency of ensuring that workers and residents followed those recommendations," Shufro said. "It is inexcusable for EPA to have kept silent for so long about such a potential hazard."

...

Dust weakens strapping youth

John Healy Jr. is 15, big, taller than his father. He looks as strong as a bull. But when he talks, wheezes and deep coughs punctuate his words. He and his father, John, live in an apartment overlooking what was the World Trade Center.

"Something is tearing him up, hitting his lungs hard," said his father. "He had asthma when he was younger, but he was fine until after Sept. 11. If I knew the dust was that caustic, there's no way I would have brought him back here."

...

"I can't understand why the government didn't tell us what was actually in the dust," Healy said. "Were they afraid we were going to panic? I needed that information to decide what was best for my son. needed it."

The teen's malady and other serious problems are being seen by physicians throughout New York. "What we're finding is incredible irritation to the lungs, throat and nasal passages," said Herbert, from Mount Sinai. "Some of the tissue is cherry red, vivid, bright, and we've never seen anything like it before."

"There are a large number of clinicians and public health specialists who are struggling to reconcile the health problems they're seeing with the exposure data they're being given," Herbert said. "The high pH in the dust may be a part of the answer. If the government had these pH readings of 11 and 12, the public and their physicians should have been told. "Any credible information the government had relating to health issues just should have been released," she said. "There is no justification for holding it. You don't conceal the information from those who need it."

A dubious honor

Mark Rushing and Tori Bunch have the debatable honor of having lived in one of the sites that USGS tested. In fact, their apartment on the 30th floor of a building overlooking the World Trade Center tied for highest pH - 12.1 - of the dozens of sites where samples were collected.

"It's obvious to those of us living here that the government - city, state and federal - wanted things to return to normal as quickly as possible. The economic losses were great," Rushing said. "But no matter how you view it, that's no excuse for the government, any government, to conceal hazards from the people they are charged with protecting."

...

Cate Jenkins, a senior environmental scientist in the hazardous materials division at the EPA headquarters, said: "The pH levels the USGS documented were far too high for EPA to ignore. They insisted that all the information regarding health and safety was being released to the public. Well, that's not true. There's nothing, internally or in public releases, that shows the agency ever disclosed specific pH levels."

Late Thursday, the EPA's Bellow told the Post-Dispatch: "We have no specific data on pH levels." Bellow added, "This is all the available information on the subject."

Late Friday, the EPA responded to the question of why it didn't collect its own pH numbers. "EPA had enough information about the alkalinity of the material from the World Trade Center without doing further analysis," Bellow said.

The question of why EPA didn't release the data it had had remains unanswered.

...

[Government withhold data on dangers in NYC dust, By Andrew Schneider. ST. LOUIS POST-DISPATCH, 2/9/02]

2/12/02

A US Geological Survey team found last September that some of the dust from the site was as caustic as drain cleaner, because of the high concentration of cement dust, an alkaline substance. The team's conclusion, which was reported Sunday in the St. Louis Post Dispatch, was sent to several government agencies in late September, but none of them made the finding public.

...

[Concerns intensify on ground zero dust, By Fred Kaplan, Boston Globe, 2/12/2002]

Beryllium and other toxic metals

As discussed earlier, EPA's *Special Audit 14* concluded that many metals were very high in WTC dust. Thus, logically, EPA should be testing for these in apartments and elsewhere. In addition, the expert peer panel convened by EPA recommended that metals should be tested by EPA in its voluntary residential cleanup program.

Another panel member noted that the document authors had considered dust resuspension in setting criteria, but based on this panelist's prior work, beryllium was consistently identified in settled dust. The panelist noted that this finding is supported by the concentrations of beryllium reported by Lioy et al. (2002) in bulk dust samples. The panelist further noted that if normalized on the basis of mass per unit surface area, then levels observed in the independent studies are slightly greater than the lower limit established in Department of Energy Guidelines (DOE, 1999). The panelist suggested that based on the concentrations observed and the inherent toxicity of beryllium; this metal should be included as a COPC. The panelist noted that beryllium might have been screened out due to the low frequency of detection. The panelist noted, however, that if additional apartments were being screened with analysis of a full suite of metals, then whether beryllium is a consistent problem would become apparent. Another panel member agreed that if beryllium were present it would warrant a closer look, although he noted some concerns about the specific calculation of risk values using the DOE methodology regarding transfer, but noted that other methods could be employed.

...

[World Trade Center (WTC) October 21-22, 2002, Peer Review Meeting Notes, 2/7/03, Prepared by: Toxicology Excellence for Risk Assessment, Prepared for: U.S. Environmental Protection Agency, <http://www.tera.org/peer/wtc/>]

T: FAILURE TO PROTECT PUBLIC AT 1 in 1 MILLION CANCER RISK LEVEL

NEED TO FACTOR IN IMPACT OF EARLY WTC EXPOSURES

“EPA’s conclusion that the air was safe is based on a 1 in 10,000 risk that someone will develop cancer from exposure to the WTC pollutants, and this was only for a limited set of POC’s *[pollutants of concern]*. Is this risk level a level that the public or regulators consider safe? For air toxics, EPA has traditionally used 1 in 1 million as the definition of acceptable risk (they do not use the term “safe”) and 1 in 100,000 as the action level when a regulated industry must undertake immediate corrective actions to abate health risks. (EPA allows cost considerations to influence controls chosen in between these two points).

...

“Health standards do not exist for cumulative impact of exposure to several pollutants at once – synergistic impact of air toxics unknown and little studied. EPA’s pronouncement did not address short-term health impacts.” *[1/27/03 EPA IG report]*

EPA failed to set cleanup levels for asbestos and other toxic substances in WTC fallout at a combined, aggregate one-in-a-million cancer risk level (10^{-6} risk level) as required. EPA also only considered one toxic constituent, asbestos, for making its risk calculations.

The EPA IG is incorrect in believing that EPA does not have a method for addressing cumulative impacts from exposure to more than one pollutant at once. Under the NCP, there is a required method for calculating the combined aggregate impact of all carcinogenic and other toxic constituents as a combined group. Whether this method is totally sound scientifically is irrelevant. The NCP method is very conservative, with the legal impact of the applicable binding NCP regulations.

EPA also ignored the early exposures to WTC dust in calculating their risks. Citizens were exposed to extremely high amounts during those first hours, weeks, and then for more than a year. EPA chose to ignore all these past exposures and just calculate risks for the time that a person would be living in an apartment after it was cleaned up. It is as though the person was never prior exposed to WTC dust, and never was exposed to any other toxic substance for their entire lives. EPA assumed a “clean slate” for prior toxic exposures when calculated how clean an apartment should be after EPA’s voluntary cleanup program.

As stated in the EPA IG report, this is against EPA policy and regulations. EPA has the

capability to test air and surfaces in apartments at lower levels of risk. Cost is not supposed to be a factor in the cleanup, according to the president.

Costs should not be consideration in the WTC cleanup, according to President Bush

The EPA IG report claimed that it was acceptable to consider costs as a factor in choosing not to cleanup to the 10^{-6} level:

For air toxics, EPA has traditionally used 1 in 1 million as the definition of acceptable risk (they do not use the term “safe”) and 1 in 100,000 as the action level when a regulated industry must undertake immediate corrective actions to abate health risks. (EPA allows cost considerations to influence controls chosen in between these two points).

. . . [EPA IG 1/27/03 report]

This justification does not apply to the WTC cleanup. President Bush has made it clear that costs are not to be a consideration in this instance. In her 9/13/01 speech in New York City, EPA Administrator Whitman stated:

“We’re getting in there and testing to make sure things are safe,” Whitman says. “Everything will be vacuumed that needs to be, air filters (in area buildings) will be cleaned, we’re not going to let anybody into a building that isn’t safe. And these buildings will be safe. The president has made it clear that we are to spare no expense on this one, and get this job done.”

. . .

[Newsweek, 9/14/01, Asbestos Alert, by David France and Erika Check, <http://msnbc.com/news/629268.asp?0sp=w12b2&cp1=1>]

"The President has said, 'Spare no expense, do everything you need to do to make sure the people of this city and down in Washington are safe as far as the environment is concerned,'" Whitman said.

The dangerous toxins have dissipated to low, nonthreatening levels, she said, but probably will rise again briefly as workers move more debris. But the air is not hazardous except for people with respiratory conditions.

. . .

[EPA CHIEF SAYS WATER, AIR ARE SAFE , New York Daily News; 9/14/01; SUSAN FERRARO]

This is a promise to the people of NYC. It is no less than their due. The costs of any cleanup of the interior of buildings is minuscule compared to what has already been spent on recovering the remains of those who died directly in the WTC collapse and other non-health related expenses. The FEMA documents provide an overview and context for comparison of the relatively small magnitude of the costs for the EPA voluntary residential cleanup and testing program.

8/29/02

In the nearly one year since the terrorist attack on the World Trade Center, the Federal Emergency Management Agency (FEMA) has approved more than \$4.5 billion to the state of New York through its public assistance program to reimburse state and city agencies for response and recover. Long-term recovery is expected to continue over the next several years, and FEMA anticipates that many additional project requests will be prepared and submitted for funding throughout this process.

...

The funding process, which involves several steps, begins at the city level with the development of project plans that qualify for public assistance funding. FEMA and SEMO work closely with the city's Office of Management and Budget throughout the process, which involves a multi-part review at the city level and a final review by FEMA.

Typically, the federal share of total eligible costs is 75 percent, with the state and local government providing 25 percent. In the case of the World Trade Center disaster, FEMA is funding 100 percent of costs eligible under the public assistance program, relieving the state of New York and New York City of any cost share.

Over 1,000 public assistance grants have been prepared to date, including:

Lower Manhattan Transportation Infrastructure

\$2.75 billion to revamp lower Manhattan transportation infrastructure (in addition to \$1.8 billion contributed by U.S. Department of Transportation for a total of \$4.55 billion)

Debris Removal

\$437 million for debris removal

\$90 million for landfill operations and debris disposal

\$96 million for costs associated with insurance coverage obtained for debris removal activities

Emergency Transportation

\$33 million for emergency ferry service

\$15 million for additional emergency train service

\$9.1 million for road repairs

\$5.2 million for temporary pedestrian bridge and walkway

\$1 million for emergency bus service

\$315,000 for emergency traffic operations

Cleaning and Air Monitoring

\$80 million for indoor residential cleaning

\$10 million for exterior building cleaning

\$2.9 million for air quality testing in schools (see Board of Education)

\$4.1 million for environmental cleaning in City schools (see Board of Education)

Fire Department of New York

\$105.6 million for Ground Zero overtime costs

\$28.3 million for destroyed vehicles and related equipment

\$103.9 million for death benefits

\$1.5 million for restoration of Engine 10 / Ladder 10 Firehouse

\$2.3 million for cleaning fire apparatus

New York Police Department

\$295.4 million in overtime at Ground Zero, Fresh Kills landfill, and incident command centers

\$5 million for destroyed vehicles

NYC Board of Education

\$2.9 million for air quality testing in schools

\$4.1 million for environmental cleaning in City schools

\$3.4 million for school relocation and transportation

\$716,000 for textbooks

Private Not-for-Profit

\$5.9 million for New York University for air monitoring, environmental cleaning and emergency educational supplies/services

\$400,000 for Pace University air quality testing, emergency supplies and equipment repair and materials

Port Authority of New York and New Jersey

\$28.8 million for overtime

\$4 million for replacement of destroyed rail cars

\$11.8 million for operating costs for emergency commuter ferry service

Other Direct Aid to New York City

\$56 million for DNA testing, forensic analysis, equipment, and other tools for victim identification

\$7.5 million for NYC Family Center

\$12.9 million for emergency supplies, equipment and services

\$2.6 million for pedestrian walkway, mold remediation, and emergency response

\$8 million to NYC for cancelled elections

\$43.8 million to NY State Police for Ground Zero security operations

\$20 million to NY State Military and Naval Affairs for activation of National Guard

\$17 million for temporary relocation of CUNY's Fitterman Hall

In addition to \$4.5 billion in Public Assistance funding for the World Trade Center recovery efforts, FEMA has provided \$317.3 million for emergency response activities, such as Urban Search and Rescue, and approved more than \$260 million in assistance for individuals and families. In all, \$5.5 billion has been approved to date for FEMA, SBA and New York state recovery assistance programs.

[emphasis added] [FEMA Public Assistance Program Rebuilds New York, Release No.: FEMA-1391-DR-NY-PR-145, 8/29/02, <http://www.fema.gov/diz01/d1391n145.shtml>]

10/24/02

The Federal Emergency Management Agency (FEMA) and the New York State Department of Labor announced today that the approval rate for those requesting financial aid through the state-administered Individual and Family Grant (IFG) program is just under 89 percent. Through October 24, the IFG program has received 95,147 applications for assistance as a result of the World Trade Center Disaster.

Approximately 89 percent of the cases have been approved for nearly \$24 million in assistance. Of the 84,583 cases approved, 24,427 have already received assistance. An additional 60,156 cases have been approved to receive assistance, pending the applicants' submission of receipts or other documents. The balance consists of ineligible or withdrawn applications (5,209), or cases that are currently being processed at IFG offices (5,355).

The IFG program is designed to help residents from federally declared disaster areas cover the costs of disaster-related necessary expenses or serious needs that are not covered by insurance or other assistance programs.

...

Under IFG guidelines for the World Trade Center (WTC) disaster, residents of New York City may apply for assistance for home repairs, replacement of personal property, and reimbursement for air quality equipment -- i.e. air purifiers, air filters, vacuum cleaners with HEPA filters, and repair or replacement of air conditioners. While a number of applicants who lived or worked near the WTC site have been reimbursed for home repairs and damaged or lost personal property, the vast majority of IFG applicants have requested assistance with the purchase of air quality equipment.

...

[emphasis added] [FEMA, Disaster Assistance Approval Rate Nears 89 Percent for IFG Program; FEMA Provides Support to Enhance New York State Efforts, Release No.: FEMA-1391-DR-NY-PR-163, 10/24/02, <http://www.fema.gov/diz01/d1391n163.shtm>]

12/17/02

FEMA Director Joe M. Allbaugh released funding projections for response and recovery costs associated with the World Trade Center today. The projections forecast how the \$8.8 billion allocated to FEMA will be spent as part of the \$20 billion allotted by President Bush and Congress in the days immediately after September 11.

The projected commitments include funds obligated for specific projects as well as amounts designated for pending projects. FEMA worked with the city and state of New York to finalize eligible projects and costs for federal reimbursement. "The projects and programs covered in these projected commitments may take several years to run the course, so it is important to set aside the appropriate funds now," said Allbaugh.

Based on the projected commitments, FEMA estimates that over \$4.2 billion will go towards public assistance projects that include debris removal, emergency protective measures and the repair or restoration of damaged public facilities. An additional \$2.75 billion has been approved to revamp Lower Manhattan's transportation infrastructure damaged during the World Trade Center attack. FEMA estimates that approximately \$500 million is being spent to provide assistance to individuals and families affected by the attack through such programs as FEMA's Mortgage and Rental Assistance, Individual and Family Grants, and Crisis Counseling.

...

[FEMA, FEMA Releases Projected Costs For World Trade Center Response And Recovery, Release No.: FEMA-1391-DR-NY-PR-183, 12/17/02, <http://www.fema.gov/diz01/d1391n183.shtm>]

5/15/03

The Federal Emergency Management Agency (FEMA) obligated an additional \$40,502,483 to the state of New York to help New York City continue its long-term recovery from the World Trade Center (WTC) attack. With the new grants announced today, the total funding obligated through FEMA's Public Assistance program is \$2.28 billion.

"New York City's response and recovery efforts after September 11th demonstrated a determination that inspired the entire nation," said Under Secretary Michael D. Brown of the U.S. Department of Homeland Security and FEMA. "FEMA is committed to fulfilling President Bush's pledge to support New York in its long-term recovery from the attack by providing funds to the city agencies that played such a critical role over the past 20 months."

The grantees in this round of federal funding include:

...

\$5,186,145 reimbursing the DOE for contracted services required to inspect, test and abate contaminated areas, including the ventilation system and auditorium, at Stuyvesant High School at Chambers and West Streets.

...

[emphasis added] [FEMA, FEMA Releases Grant Funds For World Trade Center Recovery Costs, Release No.: 1391-207, 5/15/03, <http://www.fema.gov/diz01/d1391n207.shtm>]

6/5/03

The Federal Emergency Management Agency (FEMA) obligated an additional \$46,935,242 today to the state of New York to assist the city of New York in the long-term recovery from the attack on the World Trade Center (WTC).

...

Port Authority of New York and New Jersey (PANYNJ)

\$10,806,970 for replacement of the voice telephone network that was lost when the Port Authority's headquarters were destroyed in the collapse of One World Trade Center.

\$9,576,139 for desktop computer systems, laptops and servers to replace equipment lost in the Port Authority's WTC headquarters.

\$4,435,923 reimbursing the Port Authority for overtime labor costs associated with performing emergency response activities.

\$2,459,895 for replacement of the Port Authority's 800 MHZ radio system and associated installation costs in locations around the metropolitan area.

\$2,146,563 reimbursing the Port Authority for costs related to the replacement of electronic office equipment such as photocopiers, printers, fax machines, document scanners, image projection equipment and associated supplies, all destroyed in the collapse of the World Trade Center.

\$1,142,093 for costs associated with the procurement of radio equipment used for emergency work, including handheld radios, mobile radios for Port Authority vehicles, batteries, chargers and other related items.

Fire Department of New York (FDNY)

\$3,810,674 for supplies needed to support disaster-related emergency work including firefighting, search and rescue, inspections and victim notification and identification.

\$3,424,453 for overtime and backfill for uniformed department members' disaster-related administrative duties.

\$1,130,989 for disaster-related overtime expenses incurred by FDNY employees performing emergency response activities at the WTC site, the Office of Chief Medical Examiner, and the Staten Island Landfill.

New York City Police Department (NYPD)

\$1,554,262 reimbursing the city for benefits paid to the families of uniformed police officers who died while responding to the attack on the World Trade Center.

New York City Department of Environmental Protection (DEP)

\$5,144,727 reimbursing the DEP for funds expended to date for the lower Manhattan residential clean-up program.

New York State Emergency Management Office (SEMO)

\$1,302,554 for disaster-related relocation expenses incurred by the Legal Aid Society. The society's centralized data hub, which was located at 90 Church St. in lower Manhattan, was extensively damaged in the 9/11 attack. A subsequent decision was made to create a new data hub in Lake Success, N.Y. The data hub serves 28 different Legal Aid Society sites in the greater New York metropolitan area.

...

[FEMA, FEMA Releases Additional \$46.9 Million To Assist In WTC Recovery Process In New York City, Release No.: 1391-208, 6/5/03, <http://www.fema.gov/diz01/d1391n208.shtm>]

10⁻⁴ risk level based on false premise that EPA could not test for 10⁻⁶ risk level

EPA set the 1 in 10,000 cancer risk level based on its alleged inability to test for asbestos in air at lower levels:

EPA is committed to setting the most stringent standards that can be technically achieved when testing residences for asbestos in air. We have set an initial risk-based clearance level for asbestos of 0.0009 fibers per cubic centimeter (f/cc). This means that if 10,000 people are exposed to this level of asbestos for 30 years, there may be one more case of cancer than if the group had not been exposed at all.

...

[EPA, Fact Sheets, Dust Cleanup Details, <http://www.epa.gov/wtc/factsheets/index.html>]

EPA will conduct followup testing for asbestos in the indoor air after the cleanups are completed. The Agency will assess the testing results using a federal health benchmark or level that assumes a thirty year exposure. This means that if a population of 10,000 people is exposed to a level of asbestos above the benchmark for a period of thirty years, there would be one additional case of cancer beyond what that population would normally expect to experience.

...

[Scroll to "Cleanup" on this EPA web page:]

<http://www.epa.gov/wtc/dustcleanup/factsheets/plan.html>

EPA's original rationale for abating only to the 10^{-4} risk level was testing difficulties

EPA prepared a document in conjunction with the Indoor Air Task Force including EPA, ATSDR, and other public sector environmental professionals, which described a rationale for only testing asbestos and other carcinogens at the 10^{-4} risk level (1 excess cancer per 10,000 exposed people). The rationale was that testing air for asbestos at the 10^{-6} level (1 in one million risk level) would be impractical, since it would require collecting an air sample 100 times the volume of a sample needed to measure the risk from asbestos at the 10^{-4} risk level.

This “practicality” rationale is the equivalent of saying that it would cost too much to test at the 10^{-6} risk level. As noted earlier, President Bush made the promise that no expense should be spared in the cleanup of NYC after the WTC attack.

This rationale was explained in detail in the 9/02 draft document for peer review “World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern, and Setting Health-Based Benchmarks”:

For carcinogenic compounds, the benchmarks were set so that a local resident's lifetime risk of developing cancer from exposure to WTC-related contaminants would not exceed a one-in-ten thousand probability (1×10^{-4}) above the resident's background risk without this exposure.

...

The cancer risk level (1×10^{-4}) employed herein reflects the upper bound of the acceptable risk range (10^{-4} to 10^{-6}) established in EPA's Superfund regulation [Federal Register, 1990]. Practical Quantitation Limits (PQLs, the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating procedures [EPA, 1992]) and anticipated background levels [ATSDR, 1995] dictated the selection of the risk level at 1×10^{-4} . A more detailed discussion of this subject can be found in Appendix C.

...

APPENDIX C Basis for Tier III screening level of $1 \text{ E-}04$ [10^{-4} risk level, or 1 in 10,000 cancer risk]

...

All protocols chosen are designed to reach the lowest level of detection that is reasonable for the established methods. For Dioxin, Asbestos and PAHs, the sampling and analytical protocols are designed to reach detection limits that represent risk estimate levels of $1 \text{ E-}04$. To reach risk estimates of $1 \text{ E-}06$, extraordinary modifications would have to be employed. These modifications would either have to be incorporated into the analytical protocols to increase the sensitivity of the required instrumentation, incorporated into the sampling protocols to achieve a larger sample, or a combination of both. For the Chemical of Potential Concern (COPC) list, the analytical protocols chosen are already incorporating the maximum sensitivity of the instrumentation. Therefore, the only legitimate mechanism to lower the overall limits of detection is to modify the sampling protocol. The two means of achieving this goal are to either run the sampling

equipment (pumps) at a higher flow rate, or for longer periods of time. For the COPC list modifying flow rates would involve operating the equipment to achieve flow rates on the order of 500 to 1000 liters per minute. The only equipment available to operate at such flow rates are large units that can not be brought inside a residence. Rates this high also present problems with creating excessive negative pressure for indoor environments, plus flow rates this high have not been tested using the sampling protocols, and there is high likelihood of having analyte breakthrough on the collection filters. Therefore, this is not practical. The other option is to run the equipment for long periods of time. Again with the list of Chemicals of Potential Concern, sampling periods of up to 800 hours (33 days of continuous operation) would be needed to reach the E-06 risk [10^{-6} risk level] detection levels.

...

[World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern, and Setting Health-Based Benchmarks, Prepared by the Contaminants of Potential Concern (COPC) Committee of the World Trade Center Indoor Air Taskforce Working Group, peer review draft, 9/02, <http://www.tera.org/peer/WTC/COPC%20-%20Final%20-%202009-12-02.pdf> .]

EPA peer panel provides EPA technique to overcome asbestos test problem, tandem testing

EPA convened a peer review panel of outside experts to review and advise it on the selection of the 10^{-4} risk level, testing, and other matters related to the WTC cleanup of indoor air. Citizens affected by the WTC disaster were given an opportunity to nominate candidates to sit on this peer review panel, and suggested candidates were included. The peer review panel process was managed by an outside non-profit group, TERA, and all reports can be found at www.tera.org/peer/WTC . A meeting of the peer review panel was held in NYC on 10/21 - 22/02, and the public was allowed to observe.

The peer review panel did not agree with EPA's rationale for the less protective 10^{-4} risk level for asbestos and other carcinogenic WTC constituents. The panelists suggested using more than one sampling device so as to avoid the problem of filter overload. This would be a sequential tandem testing strategy. If a filter contains too much particulate in addition to asbestos, because a larger volume of air is pulled through the filter, the laboratory analyst would be unable to detect asbestos fibers that are obscured by the other particulates. Using 2 or more different pumps would overcome this problem, since there would be 2 or more filters for the laboratory to count for asbestos fibers, which would be much less likely to be overloaded.

However, the formal meeting notes⁷⁷ did not include these discussions by the expert panel, for some unexplained reason.

EPA claims peer panel tandem test method for asbestos only “theoretically” possible

EPA responded to peer panel comments, claiming that the sequential “tandem testing” method was only theoretically possible:

Executive Summary . . .

[S]everal panel members disagreed with the rationale provided in the document (limitations in the sampling methods) for using an upper limit excess lifetime cancer risk level of 1×10^{-4} in calculating the criterion for each tier.

. . .

It was noted that the 1×10^{-4} criterion was based on limitations in the available sampling methods

. . .

The panel discussed the decision to use a 1×10^{-4} risk level for developing the risk-based criteria, noting that the rationale for this choice was apparently a limitation with air sampling approaches for asbestos. The panel suggested that this limitation would not preclude using a different risk level for the asbestos dust pathway or for other COPC. In addition, several panel members commented that the rationale provided in the document for the choice of a 1×10^{-4} risk level was not convincing.

. . .

Key recommendations regarding the Tier Criteria and Benchmarks included the following:

. . .

“Panel members disagreed with the rationale provided in the document for using an upper level excess lifetime cancer risk level of 1×10^{-4} in calculating the benchmarks for each tier. The panel noted that the sampling and analysis limitations described in the document for asbestos that limit the risk evaluation to a 1×10^{-4} risk level could be easily overcome and lower risk levels could be achieved for other COPC.”

Response:

The level of 10^{-4} lifetime risk was chosen on the basis of practical sampling limitations particular for asbestos. The level specified by the document, 0.0009 fibers/cc, is near the practical detection level given the large scope of the WTC Clean-up Program. The reviewers suggested that a somewhat lower risk, perhaps as low as 10^{-6} , might be achieved by compositing multiple samples. Measuring to a risk level of 10^{-6} requires 100 times more air volume per sample.

. . .

The authors acknowledge that running multiple pumps concurrently, in theory, might mitigate overloading potential and reduce total sample time. The WTC Clean-up Program was set up such that every room in a residential dwelling (with a minimum of three samples) would need to meet the clearance criteria before the residence was deemed effectively cleaned. Given that more than 6,000 individual residences signed up for the cleaning test only program, the prospect of running multiple pumps to obtain a single sample was determined to be beyond practical implementation.

. . .

[World Trade Center (WTC) October 21-22, 2002, Peer Review Meeting Notes, 2/7/03, Prepared by: Toxicology Excellence for Risk Assessment, Prepared for: U.S. Environmental Protection Agency, <http://www.tera.org/peer/wtc/>]

EPA deletes my comments showing EPA has previously successfully used “tandem testing” for asbestos in Libby

As part of this peer review process, EPA invited participation and comments from the public. I, as well as others, supplied extensive written comments. EPA included a compilation of these comments from the public as “Appendix C - Observer Comments” attached to the formal written notes of the 10/21-22/02 peer expert review meeting.⁷⁸ Only the cover email to my written comments, addressed to the peer review panel, were included in Appendix C - Observer Comments.

My comments supplied documentation that was not known by to the expert peer panel, namely that EPA had and was using already using this same sequential “tandem testing” multiple pump method to test for asbestos in homes at the Libby, MT Superfund site. I also suggested using the EPA protocol of indirect transfer, another established, published EPA method of overcoming the overloaded filter problem, and successfully used by other researchers for WTC-contaminated air.⁷⁹

EPA insured that my comments were omitted because they contradicted EPA’s claim that sequential tandem testing was only a theoretical possibility. The members of the expert panel, while having the right idea, were unaware of these EPA precedents for using tandem sampling.

10/22/02

For the Libby investigation, various methods were used to avoid the problem of low sensitivity and filter overload, which could prevent the reading of filter grid areas. A low flow rate (e.g., 0.5 L/min) pump was used in conjunction with collecting sequential samples to avoid filter overload. Sampling time was increased to several days if necessary in Libby, using a video monitor to insure that the sampling equipment was not tampered with, and checking the equipment every 4 hours to insure that the battery pack did not run out, etc. For some of the Libby air tests, 80,000 liters of air was sampled. (See Peronard, P. and C. Weis, US EPA (March 2001) Phase 2 Sampling and quality assurance project Plan, Revision 0 for Libby, Montana, Environmental monitoring for asbestos.)

There are other methods to increase asbestos air analytical sensitivity. The HP Environmental study used indirect transfer for heavily loaded samples to overcome the problem of filter overloading which could occur with high volume samples. The AHERA TEM sampling and analytical methodology includes both indirect and direct methods for air measurements, and the HP Environmental study demonstrated that the indirect method did not break up any asbestos structure to yield abnormally high readings for the already highly pulverized WTC fallout. (See Granger, R. H., McKee, T. R., Millette, J. R., Chmielinski, P., and Pineda, G. (October 2, 2001) Preliminary Health Hazard Assessment: World Trade Center, HP Environmental, Inc., 104 Elden St., Herndon, VA 20170. . . . [Jenkins, 10/22/02]

EPA statutes require a cleanup to the 10^{-6} risk level whenever feasible

As summarized in several of my earlier memoranda, EPA requires a cleanup under the NCP to the 10^{-6} risk level for the combined aggregate carcinogenic hazards of all carcinogens:

12/19/01

The EPA generally considers an upper-bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} as a safe range. A risk of 10^{-4} represents a probability that there may be one extra cancer case in a population of 10,000 (1 per 10,000). A 10^{-6} risk is the probability that there may be one extra cancer case in a population of one million people over a lifetime of exposure (1 per 1,000,000). The National Contingency Plan (NCP) (Superfund) requires that the 10^{-6} risk level should be the point of departure; the goal in any response by the EPA to ameliorate exposures to carcinogens from man-made sources. . . . [Jenkins, 2/19/01]

2/11/02

For carcinogens, the detection limit should be at or lower than the cancer risk at the 10^{-6} ("ten to the minus six") risk level. This corresponds to those levels found by EPA to be associated with a cancer risk of 1 in a million. It is EPA policy to evaluate human exposures to carcinogens at this level as "the point of departure" for any formal decision process for remediation that might justify exposing citizens to higher cancer risks, such as the 1 in 100,000 risk level (10^{-5} risk level); or the 1 in 10,000 risk level (10^{-4} risk level). At this point in time, the EPA has established no basis for justifying any higher risk level than the 1 in a million, or 10^{-6} risk level. Testing at this low level provides a greater degree of assurance that the substance is not present at levels where there would be health concerns. Furthermore, because several carcinogens are potentially present at levels of concern, it would not be sufficiently protective to test each carcinogen at the 1 in 10,000 risk level (10^{-4} risk level). This is because the carcinogenic risks of the all of the carcinogens could add up. If each is only tested 10^{-4} risk level, then the aggregate risk could be much higher than 1 in 10,000, which is always EPA's action level. For other hazardous substances, which are not carcinogens, the detection limit must be at or below the established EPA reference dose for humans (RfD), or the lowest observed effect level (LOEL) in any animal study divided by a safety factor of 10,000. . . . [Jenkins, 2/11/02]

3/11/02

In the event of contamination, it is the policy and goal of EPA to clean up the environment to protect citizens from any increased risk of cancer at the 1 in a million cancer risk level for a lifetime exposure. This is called the " 10^{-6} risk level," or the "ten to the minus six risk level."

Exposing citizens after a cleanup to anything less than the 10^{-6} risk level is never done by EPA without due public process with opportunity for public input and review. EPA would never even propose deciding that citizens be exposed to higher risk levels than one-in-a-million without extensive environmental monitoring, considering all feasible

options, considering whether or not there are relatively few citizens that would be exposed, etc. Regardless, in all cases, action by EPA is triggered by any risk greater than 1 in 10,000. . . . [Jenkins, 3/11/02]

EPA's 10^{-4} risk level for the WTC cleanup ignores past and concurrent exposures

Another problem with EPA's protecting citizens only at the 10^{-4} risk level (1 in 10,000 cancer risk) after the EPA cleanup is that it fails to take into account higher past exposures to WTC dust and to other lifetime exposures to other toxic substances. There would have been intense exposures for several hours to the initial dust cloud, and then higher exposures for the next weeks, days, and years before EPA finally cleaned up residences. Furthermore, it ignores any workplace exposures, whether in the past, present, or future.

The concentrations of asbestos in the initial intense dust clouds is unknown. The first attempts to measure asbestos and other tonics in air was by OSHA on 9/13. Then, Con Edison, the utility company, took extensive ambient air samples on 9/14. The first two days after 9/11 there were no air sampling measurements for asbestos at all. Then, any samples after this date were often meaningless, because the test filters became so overloaded that the laboratories were unable to count the asbestos fibers. When laboratories were able to determine air asbestos during this time period, it was only for air samples with the lowest concentrations of particulates. Thus, any test data results were highly biased to the low side.

Air monitoring in the days after 9/11 at Ground Zero also would not be representative of citizen exposures for several reasons. These measurements were in the open air, and after most of the pulverized asbestos and other debris had been dispersed over a large area surrounding Ground Zero. The dust and fumes during this time period right in Ground Zero were from the fires and not from the pulverized debris. On the other hand, citizens living and working in enclosed spaces containing the original WTC dust would be exposed to much higher levels of asbestos.

From EPA's 110 Liberty St. pilot cleaning study, it is probable that many of the apartments and offices had asbestos concentrations much higher than 0.01 f/cc (PCM), even after one professional cleaning. There is one apartment in Brooklyn Heights where air levels were over 0.01 f/cc (PCM) even after rigorous professional abatement. The Ground Zero Task Force study discussed elsewhere in this report found asbestos levels ranging from 0.048 to 0.063 f/cc PCM-equivalents in an apartment near Ground Zero under passive conditions with no human activities to stir up the dusts. The dust levels would have been described as "minimal" by EPA, since you could still see the writing on papers on a desk under the thin dust layer.

If it is assumed that a citizen is living or working in a contaminated office and residence with asbestos levels of 0.0155 f/cc (PCM), then they would already exceed EPA's 1 in 10,000 excess

cancer risk just for the period in which they waited for EPA's free voluntary cleanup. These risk levels are additive. Adding on the 30 year EPA risk level for living in the cleaned up apartment would be the equivalent of 2 excess cancers per 10,000. High exposures for the first hours and days after the WTC collapse would add on unknown, but additional incremental cancer risk.

Thus, EPA would not actually be protecting citizens at the 1 in 10,000 cancer risk level if they only cleaned up apartments nearly 2 years after 9/11 to a 10^{-4} risk level for only future exposures.

EPA and NYC DOH false claims that short term exposures do not lead to long term effects

The following are claims by both EPA and NYC Dept. of Health officials that short term exposures to asbestos and other toxic substances will not lead to any long term cancer risks. These claims serve to bolster EPA's desire that citizens should ignore their early exposures to asbestos and other tonics in the days and months after 9/11.

9/14/01

Nonetheless, the agency and outside medical experts stress that asbestos exposure is only dangerous when it is continuous over long periods of time. The elevated amounts of asbestos pose little danger to New Yorkers who are not working in the rescue effort, they say.

...

[Asbestos Alert. How much of the chemical does the World Trade Center wreckage contain? By David France and Erika Check, 9/14/01, NEWSWEEK WEB EXCLUSIVE, <http://msnbc.com/news/629268.asp?0sp=w12b2&cp1=1>]

9/17/01

In general, asbestos-related lung disease results only from intense asbestos exposure experienced over a period of many years, primarily as a consequence of occupational exposures. The risk of developing an asbestos-related illness following an exposure of short duration, even to high levels, is extremely low.

...

[NYC DOH, Recommendations for People Re-Occupying Commercial Buildings and Residents Re-Entering Their Homes, 9/17/01, <http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>]

10/19/01

But on Sept. 11, as with so many things, the EPA's world changed. Faced with a public health scare that could have sent thousands in Manhattan fleeing the city or jamming hospitals, the EPA decided to cough up the truth about asbestos. Its officials bent over backward to get out the message that asbestos was harmful only if breathed at high levels and over sustained periods of time. When reporters pointed out that some of the tests had exceeded the EPA's safety levels, the agency hurried to explain that this was a

"stringent standard based on long-term exposure" and repeated that the public was not at any real risk.

...

[The EPA Comes Clean on Asbestos, Federal officials stop chasing a phantom risk, Wall St. Journal, . BY KIMBERLEY A. STRASSEL, 10/19/01]

11/1/01

Although short-term irritant health effects may persist as long as smoke and dust are present near the site, levels of more hazardous contaminants in the air and dust in the nearby neighborhoods are not high enough or for long enough to cause long-term health effects.

...

[Jessica Leighton, Ph.D., Assistant Commissioner, Environmental Risk Assessment, NYC DOH, Before the NYC Committee on Environmental Protection, 11/1/01]

11/2/01

Jessica Leighton, an assistant commissioner at the city's Department of Health, said that while tests had recorded occasional spikes in the levels of various contaminants, including asbestos, at some locations at or near the site, long-term health risks are associated with consistent exposure over a 30-year period.

...

[Workers and Residents Are Safe, Officials Say, By DIANE CARDWELL, 11/2/01, New York Times]

11/2/01

A battery of government experts testified yesterday that environmental conditions around the destroyed World Trade Center pose no long-term health risks.

...

Assurances also came from Dr. Jessica Leighton, assistant city health commissioner for environmental risk assessment. Pressed by Council Speaker Peter Vallone (D-Queens), who asked if "people are safe at the present level," Leighton said: "As far as the science has shown us right now, that is absolutely correct."

...

[Pros: Safe to Breathe Near WTC, By FRANK LOMBARDI, NY Daily News, 11/2/01]

11/26/01

Asbestos exposure becomes a health concern when high concentrations of asbestos fibers are inhaled over a long period of time. Illness is very unlikely to result from a single, high-level exposure or from a short period of exposure to lower levels.

...

[Testimony of Kathleen Callahan, Acting Deputy Regional Administrator U.S. Environmental Protection Agency, Before the New York State Assembly, 11/26/01]⁸⁰

In general, asbestos-related lung disease results only from intense asbestos exposure experienced over a period of many years, primarily as a consequence of occupational exposures. The risk of developing an asbestos-related illness following an exposure of short duration, even to high levels, is extremely low.

...

[Unknown date, currently posted on EPA web site at:
<http://www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html>]

EPA official findings that short term exposures to asbestos cause cancer, contradicting EPA's claims after the WTC collapse

The EPA and NYC claims that short term exposures to asbestos are harmless contradict established EPA and other federal agency findings. The Agency for Toxic Substances and Disease Registry (ATSDR) found that even short term exposures to asbestos were of concern:

2001

While lung cancer and mesothelioma are generally associated with chronic exposure to asbestos, there are several studies that indicate that short-term exposures are also of concern. For example, it has been noted that workers exposed to asbestos for only 1 12 months had an increased risk of developing lung cancer a number of years later. In animals, mesotheliomas developed in two rats exposed to high concentrations of amosite or crocidolite for only 1 day. These data are not extensive enough to define the dose- or timedependency of health risks from short-term exposure to asbestos, but the data do indicate that short-term exposures should not be disregarded.

...

Acute-Duration Exposure. Only a few inhalation or oral studies have sought to determine the effects of short-term exposures to asbestos. There are no human data on noncancer effects after acute exposures, and no acute-duration MRLs have been derived. However, there is one study in animals in which a single exposure produced fibrosis of the lung (McGavran et al. 1989), and one study that suggests that a single high inhalation exposure might cause cancer (Wagner et al. 1974). This is a potentially important point, since some people might have one or two significant exposures to asbestos during their life.

...

Animal experiments could be designed to determine whether there are age-related differences in pulmonary responses to inhaled asbestos fibers (e.g., fibrosis, cell proliferation, gene expression, macrophage production of reactive chemicals). For example, adult rats have been shown to display, within 20 days, a range of dose-related changes in pulmonary inflammation indices, increases in pulmonary cell proliferation, and increases in the severity of pulmonary fibrosis in response to short-term inhalation exposure to asbestos concentrations of approximately 60 and 2,800 f/mL (Quinlan et al. 1994, 1995).

...

[TOXICOLOGICAL PROFILE FOR ASBESTOS, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service, Agency for Toxic Substances and Disease

Registry, September 2001, <http://www.atsdr.cdc.gov/toxprofiles/tp61.html>]

In 1986, EPA published a final rule under section 6(a) of the Toxic Substances Control Act (TSCA) controlling asbestos abatement projects. From the excerpt below, it is clear that EPA considers that even extremely brief exposures to asbestos can lead to cancer:

1986

Most occupational studies have been conducted on populations exposed to high airborne concentrations of asbestos for long periods of time. However, short-term occupational exposures, have also been shown to increase the risk of lung cancer and mesothelioma (Ref. 9). 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 (Ref. 4).

Direct evidence of adverse health effects from nonoccupational asbestos exposure also exists. Persons who lived in the household of asbestos workers have developed pleural mesothelioma and signs of asbestosis (Ref. 10). A number of mesotheliomas have also been documented among populations whose only identified exposure was from living near asbestos mining areas, asbestos product factories, or shipyards where asbestos use had been very heavy (Ref. 4).

...

Therefore, EPA finds that unregulated removal, enclosure, or encapsulation of friable asbestos material presents an unreasonable risk to human health and proposes to require that certain measures be taken to reduce the risk faced by asbestos abatement workers and persons using and visiting buildings during and after asbestos abatement activities. The finding is based on the following points:

1. The health effects from asbestos exposure are very serious. Asbestos is a demonstrated human carcinogen. The cancers caused by asbestos are usually fatal and cause much pain and suffering.

2. Available evidence supports the conclusion that there is no safe level of exposure to asbestos. This conclusion is consistent with present theory of cancer etiology and is further supported by the many documented cases where low or short-term exposure has been shown to cause asbestos-related disease.

...

[FEDERAL REGISTER Volume 51, page 15722, ENVIRONMENTAL PROTECTION AGENCY AGENCY: (EPA) CFR Part 763, Toxic Substances; Asbestos Abatement Projects [OPTS-62044A; FRL 2965-7], 51 FR 15722, April 25, 1986]

ATSDR and EPA have concluded that the total amount of asbestos inhaled, regardless of the time period, related to cancer risks

Rather than rephrasing what the ATSDR has concluded on short term asbestos exposures a second time, the following was contained in my 12/19/01 memorandum:

2/19/01

The Agency for Toxic Substances and Disease Registry (ATSDR) is part of the Centers for Disease Control. It develops toxicological profiles in response to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund). These profiles are subjected to extensive review by the most prestigious scientists as well as being reviewed and commented upon by affected industries and the public. The ATSDR found that the "cumulative exposure," or total dose, was valid for predicting the probability of suffering health effects from asbestos. There was no "threshold" or safe level.

A number of researchers have found that the occurrence of asbestosis and lung cancer correlates with cumulative exposure (that is, the product of concentration [PCM fibers/mL] multiplied by years of exposure). Therefore, human exposures are expressed below as PCM f-yr/mL.

...

[A] number of other studies indicate that lung cancer risk is linearly related to cumulative dose without any obvious threshold

In other words, it does not matter whether or not you got the same total dose over a short period of time at higher levels, or a long period of time at lower levels. The health effects will be the same.

...

A person would need to breath the following concentrations of asbestos for the following time periods to increase the risk by 1 in 10,000:

Total dose required to increase risk of mesothelioma by 1 in 10,000

fibers/milliliter	time period
1.616	1 week
0.124	3 months
0.062	6 months
0.031	1 year
0.0155	2 years
0.00062	50 years

The latest EPA Integrated Risk Information System (IRIS) report on asbestos⁸¹ also bases its risk level on the total amount of asbestos inhaled, regardless of the time period of the exposure. The reason is that once inhaled, the harmful asbestos fibers remain in the body. This concept is also the basis for the heightened concern over any children's exposure to asbestos, because they will have a longer time to develop cancer from the continued presence of asbestos body burdens.

Thus, when EPA and the NYC DOH claimed after the WTC that only long term exposures to asbestos can cause cancer, they are contradicting established and peer reviewed EPA and CDC ATSDR policies and official positions.

**10⁻⁴ risk level for asbestos alone ignores risk from other toxic WTC components –
NCP regulations require considerations of aggregate risk from all toxic constituents**

There are many other toxic substances in WTC dusts in addition to asbestos. EPA's use of a cleanup criterion only for asbestos ignores the synergistic effects of these other toxic substances.

Press coverage of the synergistic toxicity of multiple WTC constituents

The following are some early public statements about the other toxic constituents from the WTC disaster:

10/3/01

Although EPA has measured dioxin levels in and around the World Trade Center site that were at or above EPA's level for taking action, the risk from dioxin is based on long-term exposure. EPA and OSHA expect levels to diminish as soon as the remaining fires on the site are extinguished.

...

[EPA press release, 10/3/01, www.epa.gov]

10/26/01

The effects of exposure to any hazardous substance depend on dose, duration, how the person is exposed, personal traits and habits, and whether other chemicals are present, according to the Agency for Toxic Substances and Disease Registry, a branch of the Department of Health and Human Services.

...

Until now, public attention has focused largely on the potential hazards of asbestos in the air. But the EPA records reveal that the release of toxic chemicals from the collapse of the twin towers and the subsequent subterranean fires has been far more extensive than first believed. Among the findings contained in the EPA documents:

--- Water discharged into the Hudson River from a sewer pipe at Rector St. on Sept. 18 showed dioxin levels more than five times higher than any previously recorded in New York Harbor by the state Department of Environmental Conservation. Monitors also found PCBs and dioxin levels in river sediment that were several times higher than a previous study of the river done in 1993.

--- A test of toxic metals in water discharged into the Hudson showed chromium, copper, lead and zinc at levels "elevated to several orders of magnitude above ambient water-quality criteria for most metals," according to the state monitoring agent who conducted the test. Because it was not raining that day, the inspector noted that the discharge was small and appeared to dilute quickly in the river.

--- On Sept. 23, lead levels in the air at three sites in lower Manhattan – Barclay and West Sts., Church and Dey Sts. and at Ground Zero – registered above the EPA standard for ambient air quality. At Barclay and West, the level of lead in the air was

nearly three times the EPA standard. Exposure to lead can damage the central nervous system, kidneys and other organs.

--- On numerous days, sulfur dioxide readings in the air at a half-dozen sites in lower Manhattan have been far higher than the EPA's ambient air quality standards. High levels of sulfur dioxide can aggravate health problems for asthmatics or people with respiratory problems and trigger allergic reactions in others. On Sept. 18, sulfur dioxide levels were so high that, according to one industrial hygienist, they were above the EPA's standard for a classification of "hazardous."

...

"Yes, they are high," said EPA spokeswoman Mary Mears, when asked to comment on the hazardous-substance readings contained in her agency's documents. "But you get a little distance from the plume and they go dramatically down."

...

"What I've seen of the data is troubling," said Paul Bartlett, an expert on PCBs and dioxins at the Queens College Center for the Biology of Natural Systems. He added that in his opinion, whatever monitoring the EPA has conducted has been inadequate. "Their detection limits are aimed at threshold levels for occupational exposure," Bartlett said. "They aren't treating this as a disaster, so they're not asking what extent and how far are people being exposed or who is possibly being affected by the releases of chemicals. They're just checking what emissions are exceeding regulations."

"I'm most concerned about the soup effect of all these toxic chemicals," said Monona Rossol, an industrial hygienist who works with the Environmental Law and Justice Project. "No one's worrying about the combination of these things on the workers."

...

"When we are finding these readings that have some significant level to them, they are primarily within the work area," said EPA spokeswoman Mary Helen Cervantes. "As for the cumulative impact of these chemicals, that is an area of science and study and research that we really have not developed methodologies to do that kind of assessment."

[emphasis added]

...

[A Toxic Nightmare At Disaster Site Air, water, soil contaminated, by Juan Gonzales, NY Daily News, 10/26/01]

10/26/01

Dear Administrator Whitman:

There is no doubt that we will be dealing with the impact of the September 11 terrorist attacks for months and years to come. I am especially concerned about the ongoing effect that the attacks on the World Trade Center may be having on human health and the environment. I would like to meet with you as soon as possible to discuss these concerns and to determine ways in which we can work together to make certain that all possible measures are being taken to adequately protect human health and the environment in lower Manhattan, and to ensure that the public is provided with sound information about environmental quality around "Ground Zero."

I was deeply alarmed by a report in today's New York Daily News that Environmental

Protection Agency's own monitoring at, and around, Ground Zero has shown levels of benzene, lead, and sulfur dioxide in air samples that significantly exceed EPA and OSHA standards. The Daily News also reports that EPA has found high levels of dioxin, PCBs and metals in water being discharged into the Hudson River from the site. This is in addition to previous concerns regarding high levels of asbestos in air and dust samples at, and around, Ground Zero.

...

Sincerely,

Hillary Rodham Clinton

...

[letter from US Senator Clinton to EPA Administrator Whitman, 10/26/0, <http://clinton.senate.gov/news/2001/12/2001C05A41.html>]

EPA NCP regulations establish methodologies for calculating aggregate, synergistic risk

The remediation of the contaminants from the WTC collapse are under the regulatory authority of the National Contingency Plan (NCP). This is explained in greater detail in Section V. EPA Region 2 has claimed that its risk assessment methodologies adhere to NCP and CERCLA guidance and regulations for the WTC:

You asked for documents related to EPA's decision to establish a 10^{-4} risk over a thirty year period. This is within EPA's normal risk range of 10^{-4} to 10^{-6} . I have attached for your information a directive prepared by EPA's Office of Solid Waste and Emergency Response. This directive, entitled Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions, discusses the use of risk assessments in hazardous waste cleanups and the fact that it is acceptable under EPA policy to use risk ranges in the 10^{-4} range. Also, I am attaching a section of the National Contingency Plan (40 CFR Part 300 to 399) which further lays out that "acceptable exposure levels are generally concentration levels that represent an excess upper bound life-time cancer risk to an individual of between 10^{-4} to 10^{-6} ."

...

[letter from Mark Madeleine, EPA Toxicologist to Joel Kupferman, NY Environmental Law and Justice Project in response to a FOIA request, 6/12/02]

This letter from EPA's Madeleine conveniently fails to include the following language from the same document it cites, EPA's "Role of the Baseline Risk Assessment." as follows:

EPA uses the general 10^{-4} to 10^{-6} risk range as a "target range" within which the Agency strives to manage risks as part of a Superfund cleanup. Once a decision has been made to make an action, the Agency has expressed a reference for cleanups achieving the more protective end of the range (i.e., 10^{-6}), although waste management strategies achieving reductions in site risks anywhere within the risk range may be deemed acceptable by the EPA risk manager. . . .

[Role of the Baseline Risk Assessment. This document may be found at: <http://www.epa.gov/superfund/programs/risk/baseline.pdf>]

The following are excerpts from the NCP regulations, to which Maddaloni specifically refers to in his letter. The aggregate or cumulative carcinogenicity of all carcinogens must be calculated according to an established process under these NCP regulations. EPA Region 2 is violating the regulations by setting a risk level for an individual carcinogen like asbestos. The NCP regulations provide a strict protocol for calculating the aggregated carcinogenic risk of multiple carcinogens. This methodology is set forth in 40 CFR §300 Appendix A, Hazard Ranking System. These are EPA regulations, not guidance.

The methodology for multiple carcinogens under the NCP does not take into account whether or not different organ systems are the target of the carcinogenic action of multiple substances. This methodology under the NCP for addressing aggregate carcinogenicity is not mirrored in other EPA statutory authorities. It is not open to public debate given a particular remedial cleanup investigation. EPA statutes and regulations may be changed, but only through due process. EPA Region 2 is obligated under the law to implement the regulations as written.

40 CFR §300.430 Remedial investigation/feasibility study and selection of remedy.

(a) *General -- (1) Introduction.* The purpose of the remedy selection process is to implement remedies that eliminate, reduce, or control risks to human health and the environment. Remedial actions are to be implemented as soon as site data and information make it possible to do so. Accordingly, EPA has established the following program goal, expectations, and program management principles to assist in the identification and implementation of appropriate remedial actions.

...

(e) *Feasibility study.* (1) The primary objective of the feasibility study (FS) is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decisionmaker and an appropriate remedy selected. . . .

(2) Alternatives shall be developed that protect human health and the environment . . .

(i) Establish remedial action objectives specifying contaminants and media of concern, potential exposure pathways, and remediation goals. . . . Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment and shall be developed by considering the following:

(A) Applicable or relevant and appropriate requirements [ARAR's] under federal environmental or state environmental or facility siting laws, if available, and the following factors:

(1) For systemic toxicants, acceptable exposure levels shall represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety;

(2) For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. The

10⁻⁶ risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure; [emphasis added]

...

(D) In cases involving multiple contaminants or pathways where attainment of chemical-specific ARARs will result in cumulative risk in excess of 10⁻⁴, criteria in paragraph (e)(2)(i)(A) of this section may also be considered when determining the cleanup level to be attained. [emphasis added]

...

40 CFR §300 Appendix A, Hazard Ranking System. [provides more detail on exactly how the risk assessment is performed for multiple contaminants. For carcinogens, the risk is additive, regardless of whether or not the same organ system is the target for carcinogenic action.]

EPA expert panel recommended methodologies for assessing synergistic toxic constituents

EPA convened a peer review panel of outside experts. A meeting of the peer review panel was held in NYC on 10/21 - 22/02, and the panel suggested specific methodologies for EPA to address the synergistic effects of all WTC toxics. All reports can be found at www.tera.org/peer/WTC

Unfortunately, although well intentioned, these suggestions by the expert peer panel do not have the statutory and regulatory weight and obligatory burden of the NCP regulations for remedial risk assessments discussed above. The expert peer panel was undoubtedly unaware of the regulatory requirements under the NCP for multiple contaminants. Obviously, EPA was not motivated to educate them on this matter, because it would have been an admission that EPA had the legal requirement to address multiple toxic substances and calculate aggregate risk under the NCP.

The panel also discussed the issue of mixtures. One panelist commented that based on the spectrum of effects and target organs involved with the list of COPC, as well as the very low concentrations, mixture effects are almost certainly not an issue for this exposure scenario (e.g., inhabitants of homes or offices). However, the consideration of mixtures and the rationale for concluding that the hazard posed by mixtures is de minimus needs further discussion in the document. Another panel member noted, however, that several of the COPC were lung toxicants. Another panelist noted that EPA Guidelines for Mixtures Risk Assessment provide an approach to use for addressing these issues, and also that EPA's MIXTOX database could be used as a source of data on assessing the potential for interactions among the COPC. The panel agreed that the document should more clearly describe how mixture toxicology was considered.

...

[World Trade Center (WTC) October 21-22, 2002 Peer Review Meeting Notes, 2/7/03, Prepared by: Toxicology Excellence for Risk Assessment, <http://www.tera.org/peer/wtc/>]

U: EPA INITIATIVE TO DOWNGRADE ASBESTOS RISK CLASSIFICATION

The World Trade Center contamination zone is the asbestos industry's battleground. What happens here shapes future cleanups of other asbestos sites as well as litigation in the years to come. There is legislation in Congress at this very minute that would prevent anyone exposed to WTC dust from ever collecting any compensation after contracting asbestos induced mesothelioma or lung cancer, because their exposures were not "work place related."

Chrysotile asbestos is the predominant form of asbestos found in WTC dust. Asbestos is a natural mineral, which occurs in several mineralogical forms, including chrysotile. The following discussion from the USGS report on the WTC is helpful:

Chrysotile (includes the minerals clinochrysotile and orthochrysotile) is the only asbestos mineral of the serpentine group and has been the most widely used commercially. Chrysotile is a sheet silicate comprised of bundles of extremely small, tightly rolled sheets that form tubes or rods. Chrysotile has been more widely used than amphibole asbestos because it is usually more flexible, forms longer thinner fibers, and can easily be woven into cloth. Chrysotile is not as chemically inert as the asbestiform amphibole minerals.

All other asbestos belongs to the amphibole family of minerals. Amphiboles are chain silicates that include over fifty different minerals, most of which do not crystallize in asbestiform varieties. Of the few amphiboles recognized to crystallize in asbestiform varieties, those that have been used commercially are grouped into five materials that are referred to both in commercial and regulatory nomenclature as; amosite (includes the asbestiform varieties of the amphibole minerals cummingtonite and grunerite), crocidolite (asbestiform variety of the mineral riebeckite), tremolite (asbestiform variety of the mineral tremolite), actinolite (asbestiform variety of the mineral actinolite), and asbestiform anthophyllite. Other amphiboles can occur in asbestiform varieties, but these minerals have generally not been used in commercial products and are often not cited in the regulatory literature.

...

[US Geological Survey, Environmental Studies of the World Trade Center area after the September 11, 2001 attack, Open File Report OFR-01-0429 Version 1.1, <http://pubs.usgs.gov/of/2001/ofr-01-0429/>]

EPA has begun major initiatives to downgrade its current carcinogenicity rating for chrysotile asbestos. The initiative also would classify all fibers smaller than 5 μm as being non-carcinogenic.

The first step in this process was the CDC's Agency for Toxic Substances and Disease Registry (ATSDR) developing an expert panel report outside of the normal peer review and public comment process. Then, EPA convened its own expert panel, containing the same scientists. Reports are being produced by both the ATSDR and EPA representing the opinions of this small, select group of experts. It all looks legitimate and part of the normal process, but it is not. The following describes the violations of the federal statutes by EPA and the ATSDR that have already

occurred.

The ATSDR and EPA use of an expert panel for a preliminary report is not illegal in and of itself, but it did not adhere to the requirements of the Federal Advisory Committee Act (FACA) for sufficient public notice and comment, and it did not adhere to the impartiality and conflict of interest requirements of the U.S. Code. Thus, the resultant expert panel reports were highly biased and did not include any consideration whatsoever of a large body of scientific studies which supported an opposite conclusion.

It would be one thing if the expert panels had first discussed and reviewed these studies and gave some rationale why the omitted studies were invalid. What happened is entirely different. All of the studies which supported the opposite conclusion were simply ignored and never even mentioned. Unless the public and scientific community were very alert, they would never catch the errors, omissions, and misrepresentation until it was too late.

ATSDR and EPA violate impartiality and conflict of interest requirements

EPA and ATSDR did not allow for public input or comment on selection of their expert panels, failing to act with impartiality and avoid conflicts of interest

Both EPA and the ATSDR chose expert panelists essentially behind closed doors without any opportunity for public input into their selection.

Neither the EPA nor the ATSDR published full information on the panelists, and apparently did not aggressively ask the necessary questions of the panelists to determine whether there were conflicts of interest and bias. Looking at a scientist curriculum vitae is in no way adequate to determine whether a scientist serves solely and frequently as an expert witness for the asbestos industry, or whether a scientist's university department is funded by the asbestos industry, etc. Neither the EPA nor the ATSDR included experts who had conducted research and had developed independent evidence published in prestigious peer reviewed journals which supported alternative conclusions than those of the panelists who were chosen.

The following are *Federal Register* notices from both EPA and the ATSDR, which claim, but without any supporting documentation, that the experts they have chosen are representative of the scientific community on the asbestos fiber size and chrysotile questions. There are no justifications for ATSDR's claim that the scientists they chose in fact represented a "cross section."

ATSDR: 10/11/02

ATSDR is holding a panel discussion to review and discuss the current state-of-the-art understanding of health effects related to asbestos and synthetic vitreous fibers (SVFs),

especially those of less than 5 microns in length. ATSDR has invited a cross section of scientists with expertise in the fields of toxicology, epidemiology, pulmonology/pathology, and medicine to participate in 11.2 days of discussions on a variety of topics, including depositional patterns of fibers in the lung and mechanisms of toxic action, the relationship of fiber size to toxicity,

...

ATSDR will use the scientific input received from the discussions of each of the individuals to aid in developing scientifically defensible public health evaluations for human exposures to smaller-than-5-micron fibers

...

[emphasis added] [ATSDR, 10/11/02, Panel Discussion Health Effects of Asbestos and Synthetic Vitreous Fibers: The Influence of Fiber Length, 67 FR 198: 63431-2, <http://www.gpoaccess.gov/fr/index.html>]

EPA: 2/5/03

The purpose of the workshop is to discuss the scientific merit of the proposed methodology developed for EPA by Dr. Wayne Berman and Dr. Kenny Crump. The proposed methodology distinguishes carcinogenic potency by asbestos fiber size and asbestos fiber type and advocates use of a new exposure index to characterize carcinogenic risk.

...

Expert panelists will discuss many relevant technical issues at the workshop . . .

...

The experts will include scientists with extensive expertise in relevant fields, such as biostatistics, fiber identification, inhalation toxicology, and carcinogenic mechanisms. The panelists will be asked to respond to several charge questions that address key issues in the proposed methodology, including interpretations of epidemiology and toxicology literature, the proposed exposure index, and general topics. The product of the peer consultation workshop will be a report that summarizes the panelists' and observers' comments, conclusions, and recommendations on the proposed methodology.

...

[ENVIRONMENTAL PROTECTION AGENCY [FRL 7445 7] Peer Consultation Workshop on a Proposed Asbestos Cancer Risk Assessment: Notice of public meetings, 2/5/03, Federal Register, 68(24):5873, <http://www.gpoaccess.gov/fr/index.html>]

Comparison of TERA selection process for experts for EPA WTC constituent panel

The way ATSDR and EPA chose their panel members (essentially behind closed doors) is in marked contrast to the selection of the expert panel for the review of the EPA-lead initiative to evaluate a list of potential hazardous constituents of concern and health benchmarks for the WTC residential cleanup program. EPA retained the services of a non-profit organization, Toxicology Excellence for Risk Assessment (TERA) (www.tera.org) to select members for this expert panel.

For the TERA expert peer review panel selection, the full resumes of all panel members were distributed during the selection process and posted on the TERA web site, and the public was able

to review and research the appropriateness of service of each potential member. Criteria for participation on the peer panel were written and posted on the TERA website at the beginning of the process, which included conflict of interest exclusions. Panelists were asked specific questions through a questionnaire about associations with interests in the World Trade Towers, the cleanup, or other associated industries. TERA did not depend on a panelist voluntarily including such information in their resume.

Stakeholders in the WTC cleanup (citizens of NYC) were alerted to the expert panel review process, and were formally invited to submit names of other potential candidates for participation on the panel. Citizens did suggest names, and additional panel members were included. Details of the full panel selection process conducted by TERA may be found at <http://www.tera.org/peer/wtc/>

As discussed at the end of this section, one particular scientist serving on both the ATSDR and EPA expert panels apparently does have a conflict of interest. He actively testifies as an expert for defending asbestos-related industries, espousing the research claims of another scientist at the same institution, whose research was clearly funded by the asbestos industry.

Impartiality and conflict of interest requirements for official business

The following are the applicable statutes and regulations requiring the government and its employees not to give preferential treatment to industries affected by the action of the government. Federal employees receive training in these laws and regulations on an annual basis. Evidently neither EPA nor the ATSDR adhered to these impartiality requirements, and thus did not avoid conflicts of interest in their selection of their expert panels.

Section 101. Principles of Ethical Conduct. To ensure that every citizen can have complete confidence in the integrity of the Federal Government, each Federal employee shall respect and adhere to the fundamental principles of ethical service as implemented in regulations promulgated under sections 201 and 301 of this order:

(a) Public service is a public trust, requiring employees to place loyalty to the Constitution, the laws, and ethical principles above private gain.

...

(h) Employees shall act impartially and not give preferential treatment to any private organization or individual.

...

[Executive Order 12731 of October 17, 1990, PRINCIPLES OF ETHICAL CONDUCT FOR GOVERNMENT OFFICERS AND EMPLOYEES, http://www.usoge.gov/pages/laws_regs_fedreg_stats/lrfs_files/exeorders/eo12731.html]

Sec. 208. Acts affecting a personal financial interest

...

(b) hereof, whoever, being an officer or employee of the executive branch of the United States Government, or of any independent agency of the United States, a Federal Reserve bank director, officer, or employee, or an officer or employee of the District of Columbia, including a special Government employee, participates personally and substantially as a Government officer or employee, through decision, approval, disapproval, recommendation, the rendering of advice, investigation, or otherwise, in a judicial or other proceeding, application, request for a ruling or other determination, contract, claim, controversy, charge, accusation, arrest, or other particular matter in which, to his knowledge, he, his spouse, minor child, general partner, organization in which he is serving as officer, director, trustee, general partner or employee, or any person or organization with whom he is negotiating or has any arrangement concerning prospective employment, has a financial interest Shall be subject to the penalties set forth in section 216 of this title. . . .

ATSDR and EPA violations of Federal Advisory Committee Act

Both the ATSDR and EPA clearly violated the requirements of the Federal Advisory Committee Act (FACA) as well as the underlying concepts of the Administrative Procedures Act (APA) from which the FACA arose.

ATSDR gave inadequate notice to the public of expert panel meeting and failed to notify of opportunity for public comment

The ATSDR only gave the public two weeks notice of its expert panel meeting by way of a 10/11/02 notice in the *Federal Register*. People who receive their FR notices by mail will often have a two week delay between the publication date and the day it is delivered. This is grossly inadequate notice.

Below is the ATSDR notice published in the *Federal Register*. Not only was inadequate time given to reach all those who would have had an interest in attending, ATSDR severely limited the ability of any observers to comment. Only those who were able to physically attend, and who managed to obtain registration, and who managed to garner their allotted 5 minutes to speak at the meeting were allowed any input, according to the ATSDR announcement:

When it published the report of the meeting, the ATSDR did include some written comments submitted by observers as an appendix. However, the ATSDR never gave notice to the public that written submissions would be accepted. Thus, the inclusion of the limited number of written comments, and only from observers who were able to attend the meeting at such late notice, is not representative of all those who would have wished to participate.

Attending the Panel Discussion: The public is welcome to attend the panel discussions. There is no charge for attending the meeting; however, you must pre-register as seating is limited.

...

A limited amount of time will be set aside for members of the public to present brief oral comments regarding asbestos- and synthetic vitreous fiber related scientific issues. Oral presentations will be limited to 5 minutes, and the number of people giving oral comments may be limited by the time available. Opportunity for making oral comment will be provided on a first-come, first-served basis;

...

ATSDR will prepare a summary report that will capture the salient points of each of the panel members and observers.

...

[ATSDR, 10/11/02, Panel Discussion Health Effects of Asbestos and Synthetic Vitreous Fibers: The Influence of Fiber Length, 67 FR 198: 63431-2, <http://www.gpoaccess.gov/fr/index.html>]

EPA inadequate notice of meeting and failure to notify public of opportunity for comment

EPA held a similar meeting of essentially the same expert panel to draft its own asbestos risk reassessment. EPA also allowed less than 2 weeks from the date of publication in the *Federal Register* until the meeting, which, like the ATSDR, was inadequate notice. EPA only allowed for verbal input from observers who able to attend, and did not tell the public that they could submit any written comments.

The workshop will be held on February 25-27, 2003. . . . Observer comment periods are currently scheduled on Tuesday and Wednesday. ADDRESSES: The peer consultation workshop will be held . . . Francisco, California. . . There is no charge for attending this workshop as an observer, but observers are encouraged to register early as the number of seats will be limited. . . . Copies of the proposed asbestos cancer risk assessment methodology can be obtained prior to the meeting from the EPA, OERR web page (www.epa.gov.superfund).

Expert panelists will discuss many relevant technical issues at the workshop, and observers also will be invited to comment. . . . this report will be publicly available and become part of EPA's administrative record for IRIS. This meeting is being sponsored by EPA's Office of Solid Waste and Emergency Response and by EPA's Office of Research and Development.

...

[ENVIRONMENTAL PROTECTION AGENCY [FRL 7445-7] Peer Consultation Workshop on a Proposed Asbestos Cancer Risk Assessment: Notice of public meetings, 2/5/03, *Federal Register*, 68(24):5873, <http://www.gpoaccess.gov/fr/index.html>]

Abstracts of FACA and APA statutes

Both EPA's and the ATSDR's procedures in conducting this expert peer panel on fiber size is in clear violation of the Federal Advisory Committee Act (FACA), which requires adequate public notice of the meeting itself, and notice to the public that all comments by interested parties will be accepted, included, and considered. The following are excerpts from these acts.

Federal Advisory Committee Act
UNITED STATES CODE, TITLE 5. GOVERNMENT ORGANIZATION AND EMPLOYEES
APPENDIX 2. FEDERAL ADVISORY COMMITTEE ACT

§ 2. Findings and purpose

(a) The Congress finds that there are numerous committees, boards, commissions, councils, and similar groups which have been established to advise officers and agencies in the executive branch of the Federal Government . . .

...

§ 10. Advisory committee procedures; meetings; notice, publication in Federal Register; regulations; minutes; certification; annual report; Federal officer or employee, attendance

(a) (1) Each advisory committee meeting shall be open to the public.

(2) Except when the President determines otherwise for reasons of national security, timely notice of each such meeting shall be published in the Federal Register, and the Administrator shall prescribe regulations to provide for other types of public notice to insure that all interested persons are notified of such meeting prior thereto.

(3) Interested persons shall be permitted to attend, appear before, or file statements with any advisory committee, subject to such reasonable rules or regulations as the Administrator may prescribe.

...

(c) Detailed minutes of each meeting of each advisory committee shall be kept and shall contain a record of the persons present, a complete and accurate description of matters discussed and conclusions reached, and copies of all reports received, issued, or approved by the advisory committee. The accuracy of all minutes shall be certified to by the chairman of the advisory committee.

...

[Federal Advisory Committee Act, 5 U.S.C., App. 2,
http://www.archives.gov/federal_register/public_laws/acts.html]

Administrative Procedures Act Sec. 557. - Initial decisions; conclusiveness; review by agency; submissions by parties; contents of decisions; record

(c) Before a recommended, initial, or tentative decision, or a decision on agency review of the decision of subordinate employees, the parties are entitled to a reasonable opportunity to submit for the consideration of the employees participating in the decisions

(1) proposed findings and conclusions; or

(2) exceptions to the decisions or recommended decisions of subordinate employees or to tentative agency decisions; and

(3) supporting reasons for the exceptions or proposed findings or conclusions.

The record shall show the ruling on each finding, conclusion, or exception presented. All decisions, including initial, recommended, and tentative decisions, are a part of the record and shall include a statement of -

- (A) findings and conclusions, and the reasons or basis therefor, on all the material issues of fact, law, or discretion presented on the record; and
- (B) the appropriate rule, order, sanction, relief, or denial thereof.

...

*[Administrative Procedures Act, 5 U.S.C, Subchapter II,
http://www.archives.gov/federal_register/public_laws/acts.html]*

EPA and ATSDR expert panel reports based on biased, selective group of studies

As a result of not giving the public adequate notice or opportunity to comment, and having expert panelists who were biased, both the EPA and ATSDR reports ignored important peer reviewed studies which supported an opposite conclusion.

It would be one thing if the expert panels had first discussed and reviewed these omitted studies, and given some rationale why the conclusions of the omitted studies were invalid. Instead, all of the studies which supported the opposite conclusion were simply ignored and never even mentioned. Unless the public and scientific community were alert, it would never catch the errors and misrepresentation until it was too late.

Conclusions in the ATSDR expert panel report

The ATSDR expert panel report stated the following:

Seven expert panelists reviewed and discussed the state of the science on how fiber length relates to toxicity of asbestos and synthetic vitreous fibers (SVFs) an issue relevant to the Agency for Toxic Substances and Disease Registry's (ATSDR's) ongoing work at several sites where fiber contamination is found in or near residential neighborhoods. The expert panelists included epidemiologists, pathologists, physicians, hygienists, pulmonologists, and toxicologists. During a 2-day meeting in October 2002 in New York City, the panelists thoroughly discussed the physiological fate of structures less than 5 micrometers (μm) in length having aspect ratios greater than 3:1, health effects of asbestos and SVFs of the same dimensions, and research needs....

...

Cancer effects of short fibers. Given findings from epidemiologic studies, laboratory animal studies, and in vitro genotoxicity studies, combined with the lung's ability to clear short fibers, the panelists agreed that there is a strong weight of evidence that asbestos and SVFs shorter than 5 μm are unlikely to cause cancer in humans.

...

*[Report on the Expert Panel on Health Effects of Asbestos and
Synthetic Vitreous Fibers: The Influence of Fiber Length, Prepared for: Agency for Toxic
Substances and Disease Registry Division of Health Assessment and Consultation*

Atlanta, GA, Prepared by: Eastern Research Group, Inc. 110 Hartwell Avenue, Lexington, MA 02421 March 17, 2003, <http://www.atsdr.cdc.gov/HAC/asbestospanel/>]

Typical government toxicological assessments do not ignore relevant research

The preface of all ATSDR toxicological profiles contain the following statement. This statement typifies the intended process of any governmental review and assessment of toxicological studies, namely to review and evaluate all the relevant peer reviewed scientific evidence.

This profile reflects ATSDR's assessment of all relevant toxicological testing and information that has been peer-reviewed. Staff of the Centers for Disease Control and Prevention and other Federal scientists have also reviewed the profile. In addition, this profile has been peer-reviewed by a nongovernmental panel and was made available for public review. Final responsibility for the contents and views expressed in this toxicological profile resides with the ATSDR.

...

Legislative Background

The toxicological profiles are developed in response to the Superfund Amendments and Reauthorization Act (SARA) of 1986 (Public law 99-499) which amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund). This public law directed ATSDR to prepare toxicological profiles for hazardous substances most commonly found at facilities on the CERCLA National Priorities List and that pose the most significant potential threat to human health, as determined by ATSDR and the EPA.

...

[ATSDR (2001) TOXICOLOGICAL PROFILE FOR ASBESTOS,
<http://www.atsdr.cdc.gov/toxprofiles/tp61.html>]

Due notice given to EPA that key studies were omitted

Appendix 2 of this report lists those key studies which were omitted from both the ATSDR and EPA reports.

On 2/21/03, I forwarded this same list, also including extended abstracts of the omitted studies, to Richard Troast, the EPA person listed in EPA's *Federal Register* notice of 2/5/03. I was later contacted by another person in EPA working on the asbestos reassessment who wanted a full copy of the studies, which I submitted to her electronically. Thus, because of the date of my memorandum, several days before EPA's expert panel meeting, there is no reason that EPA should not formally consider each study. My cover memorandum to Troast stated the following:

In response to the February 5, 2003 *Federal Register* notice, announcing a peer consultation workshop on EPA's draft asbestos cancer risk reassessment based on fiber size and fiber type, I am sending you a compilation of studies that are relevant to the issue. See attachment.

The draft EPA asbestos re-assessment left out, missed, neglected, or omitted these important studies. Even if eventually found irrelevant or not compelling, they should be included and discussed fully during the risk reassessment process. Not including these studies serves only to bias the outcome of the risk reassessment. . . . [Jenkins, 2/21/03]

Role of omitted studies in EPA asbestos reassessment

Issues regarding fiber length and chrysotile carcinogenicity – central to EPA reassessment

Currently, EPA considers all mineralogical forms of asbestos to have the same carcinogenic potency. EPA does not differentiate and say that it is safer to have higher exposures to chrysotile than to the amphibole types of asbestos.

But this may change as a result of the WTC collapse. It is important for the asbestos industry to have EPA say that chrysotile asbestos is not as toxic as other types of asbestos. If the industry is lucky, it may even get EPA to say that chrysotile asbestos cannot cause cancer at all.

Industry is also eager for EPA to say that asbestos fibers shorter than 5 micrometers (5 μm , the same as 5 microns), no matter whether they are in the chrysotile or amphibole types, do not cause cancer. The theory is that fibers this small can be cleared from the lung and the rest of the body by macrophages. Thus, they do not remain in the body long enough to cause cancer. Chrysotile asbestos usually has much shorter fibers than amphibole asbestos. Furthermore, the asbestos from the WTC collapse (mostly chrysotile) is so finely pulverized, that a higher fraction than usual contains fibers shorter than 5 μm .

But there is another school of scientific opinion that believes that it is the ratio of the length to the width of the asbestos fibers that is more important in deciding whether they are carcinogenic. This is the aspect” ratio. In other words, even fibers shorter than 5 μm are carcinogenic if they are thin.

Even if the body can clear the extremely small fibers under normal conditions, under high exposures, there will be overload.⁸² The clearance mechanisms are overwhelmed, and the lungs and tissues in the thorax (mesothelial tissues) retain the fibers. This was the case for WTC exposures in those first hours and days.

Furthermore, it is irrelevant whether or not the lung can clear fibers that are smaller than 5 μm . Asbestos causes cancer in other parts of the body, namely the mesothelial linings of tissues in the body cavities. The rate of mesothelioma is 10 times that of lung cancer from asbestos exposure. Research shows that the majority of the fibers that reach extrapulmonary sites (outside of the lung) are shorter than 5 μm .

- a. **The lung tends to retain the longer fibers since they are more difficult to clear. Nevertheless, there is still a predominance of short fibers as the major component in the lung.**
- b. **The short fibers more easily migrate out of the lung to the extrapulmonary sites where asbestos diseases occur.**

It is obvious that if a major concern is mesothelioma, then the longer fibers that are retained by the lung are not causing mesothelioma.

This chain of events, short fibers migrating out of the lung to cause mesothelioma, was established by a study in 1980, followed by many more studies based on autopsies of human mesothelioma cases:

As has been extensively documented, the pleura is often the target organ for asbestos exposure. . . . A possible explanation could be that very active asbestos fibres are accumulated within the pleural tissues after their translocation from the lung. In order to verify this idea, asbestos fibres were assessed in pleural [*thorax, mesothelial*] and parenchymal [*lung*] tissues from several autopsy cases [*of mesothelioma*].

. . .

There was no evident correlation between numerical concentrations of fibres in lung parenchyma and those in parietal pleura.

The study has shown that characteristics of asbestos retention in parietal pleura cannot be derived from measurements in lung parenchyma. On the basis of the cases analyzed here, who were exposed to mixed types of asbestos dust, chrysotile seems to be the asbestos type retained almost exclusively in parietal pleural tissues. These findings might be taken into account when assessing the risk of pleural diseases (especially mesothelioma) attributable to each type of asbestos fibre.

. . .

[Sebastien P, Janson X, Gaudichet A, Hirsch A, Bignon J. (1980) *Asbestos retention in human respiratory tissues: comparative measurements in lung parenchyma and in parietal pleura. IARC Sci Publ* 1980;(30):237-46.]

Review article of many of the key studies omitted by EPA and ATSDR

A review article of many of these same studies omitted by EPA and the ATSDR has recently been accepted for publication. Extended abstracts of that review are given below:

The review considers experimental models that have been used to assess the response to various lengths of fibers in animal models in addition to data obtained from studies of human materials. The review also emphasizes the importance in defining the method by which a sample is categorized.

Results: Data are offered which support the potential for longer fibers as well as shorter fibers to contribute to pathological responses.

Conclusions: The data presented argue that asbestos fibers of all lengths induce pathological responses and that caution should be exerted when an attempt is made to exclude any population of inhaled fibers, based on their length, from being contributors to the potential for development of asbestos-related diseases.

...

In contrast to Stanton's concept that longer fibers are more active carcinogens, Pott and colleagues [Pott et al., 1974] found that fibers shorter than 10µm in length could induce tumors. In one set of experiments they used milled chrysotile, which contained few fibers longer than 10µm in length and with 99.8% of the fibers shorter than 5µm in length. Thirty percent of the animals in this group developed tumors.

...

More to the point Davis [Davis et al., 1991] found that all tremolite samples, irrespective of morphological form or length (including those which were morphologically consistent with cleavage fragments), possessed some potential to produce mesothelioma after being injected into the peritoneal cavity. This included some samples with thicker fibers as well as a sample defined as having "relatively few asbestiform fibers" which "nevertheless produced tumors in 70% of rats". Thus while not a "regulated fiber" these structures may well pose significant health risks.

The works of Stanton and Pott suggested that longer fibers including non-asbestos fibers have more carcinogenic potential than short fibers. Fraire [Fraire et al., 1994] studied the effects on the pleural surface induced by intrapleural injections of fiberglass. The fiberglass preparation was carefully sized and consisted of fibers with a mean length of 2.2µm and a width of 0.15 µm. The changes he observed ranged from chronic inflammation, fibrosis, and foreign body reaction to mesothelial hyperplasia and dysplasia. The most dramatic pathological event was the occurrence of mesothelioma in three of the twenty-five animals.

Lippmann [Lippmann, 1990] used data from humans to further refine this concept of a correlation between fiber length and the potential for inducing disease. He concluded that asbestosis was most correlated to the number of fibers longer than 2µm and thicker than 0.15 µm; mesothelioma to the number of fibers longer than "about" 5µm and thinner than "about" 0.1 µm; and lung cancer to the number of fibers longer than "about" 10µm and thicker than "about" 0.15 µm.

By contrast Dr. Andrew Churg, who has contributed appreciably to the understanding of the connection between the tissue burden of asbestos and resulting diseases, concluded from a study involving individuals heavily exposed to amosite and chrysotile that "except for pleural plaques, the association of fiber size and disease remains uncertain" [Churg and Vedal, 1994]. Furthermore these authors concluded that in their study "mesotheliomas are not associated with long fibers and in fact are probably associated with lower-aspect-ratio fibers than found in subjects without asbestos-related disease". McDonald [McDonald et al., 2001] reviewed the asbestos tissue burden of a series of individuals with mesothelioma who were 50 years of age or younger at the time of diagnosis.

...

A study of lung tissue from 55 mesothelioma cases using analytical transmission electron microscopy in our laboratory revealed some of the pitfalls associated with extrapolating data from fiber burden. First, it is imperative that the study clearly define the counting procedure, the techniques used, the magnification of the count and finally a clear definition of what is included in the count (so that the reader is able to determine what is not included) [Dodson et al, 1997]. For example, in our transmission electron microscopy

study, 48% of the amosite fibers fit the Stanton hypothesis. However, if one used a light microscope, only 33 % would meet the criteria due to the different detection limit. This difference is even more dramatic for chrysotile. Thirty-nine percent of the chrysotile fibers met the Stanton definition ($>8\mu\text{m}$ in length and $<0.25\mu\text{m}$ in diameter), but by light microscopy only 1.4% would have been detected due to the thin diameter of the fibers.

...

There are indeed many other contributing issues, which have now been identified as associated with fibrous particulates and their potential for inducing cell damage. Just a few of these include the generation of active oxygen species [Churg, 1996; Mossman and Churg, 1998; Jaurand, 1997; Mossman et al., 1986a; Mossman et al., 1986b] surface properties of the different types of asbestos, [Bonneau et al., 1986a; Bonneau et al., 1986b] and charge characteristics [Hamilton, 1983; Valerio et al., 1987]. Xu [Xu et al., 2002] studied the mutagenicity of short crocidolite (average length of $3.2\mu\text{m}$) asbestos evaluated via response of mammalian cells. They concluded that the mutagenicity of these short fibers was mediated by reactive oxygen species. These are surface specific and the only relationship to variations in fiber dimensions occur in the changes of available areas for reactive surfaces. However, the mass of shorter fibers which result in their greater abundance in any inhalation situation would suggest that in total these together could pose a greater overall opportunity for surface reactivity in the lung or other tissues than on the smaller numbers of fibers which make up the longer population.

...

Sebastien [Sebastien et al., 1980] reviewed samples of lung and parietal pleura from 29 cases *[of lung cancer]* . . . They noted when the pleural samples were positive for asbestos the type was “almost all” chrysotile. The mean length of fibers in the lung was $4.9\mu\text{m}$ and of those in the pleura was $2.3\mu\text{m}$. They also concluded that “lung parenchymal retention is not a good indicator of pleural concentrations”,

...

A study comparing fiber burden in lung, thoracic lymph nodes, and pleural plaques from occupationally exposed individuals was carried out in our lab [Dodson et al., 1990]. The average length of asbestos fibers, both chrysotile and amphibole fibers, found in the lung was longer than lengths for the same fibers obtained from the lymph nodes or plaques. However, the majority of asbestos fibers in all three sites were short fibers ($<5\mu\text{m}$) with only 4% of the chrysotile in the lung $>10\mu\text{m}$ and none were detected within the parameters of the analysis which were $>10\mu\text{m}$ in the pleural plaques or lymph nodes.

...

Suzuki and Yuen [Suzuki and Yuen, 2001][Suzuki and Yuen, 2002] compared the asbestos burden in lung and mesothelial tissues from individuals with mesothelioma from the aspects of fiber burden, fiber types, and fiber dimensions. They found that the majority of fibers in both the lung and mesothelial tissues were less than $5\mu\text{m}$ in length. They also reported that only 4% of the fibers fit Stanton’s hypothetical dimensions of $>8\mu\text{m}$ in length and thinner than $0.25\mu\text{m}$ in diameter. The majority of the fibers they found were shorter and thinner than these parameters.

...

We believe that it is difficult to exclude fibers of a particular dimension from a role in causing disease within the lung or extrapulmonary sites when one accepts that both the exposure and tissue burden have fibers of varying lengths and widths. . . . A telling point remains that when the appropriate analytical techniques are utilized it becomes apparent that in most tissues the overwhelming majority of the asbestos fibers are less than $5\mu\text{m}$ in length.

...

[emphasis added] [Accepted for publication in the American Journal of Industrial Medicine, 4/28/03, Asbestos Fiber Length as Related to Potential Pathogenicity: A Critical Review, Ronald F. Dodson, Ph.D., FCCP, FAHA; Mark A.L. Atkinson, M.A., D.Phil.; and Jeffrey L. Levin, M.D., M.S.P.H., The University of Texas Health Center at Tyler, Tyler, TX]

Potential conflicts, bias in scientist on both ATSDR and EPA expert panels

Dr. Bruce Case at McGill University in Canada has made the following categorical statement that there was a consensus in the scientific community that chrysotile asbestos did not cause cancer. He made these statements in the *New England Journal of Medicine* and as an expert witness for asbestos-related companies. Case made these assertions based on studies funded by the Quebec Asbestos Mining Association (QAMA). Case utilized the research of another member of the faculty at McGill University, McDonald, to support the contention that chrysotile asbestos, the type of asbestos found in WTC dust, is not carcinogenic, who was funded by QAMA.

Statements and expert testimony by Case that chrysotile asbestos is not carcinogenic

In an affidavit prepared for an asbestos-related industry, Case stated the following:

The first formal epidemiological investigation of the question of tremolite genesis of mesothelioma in chrysotile workers was published in SCIENCE in 1995; a preliminary study . . . As seen below, the definitive proof was to follow two years later.

. . .

The 1997 report on mesothelioma (McDonald AD, Case BW, Churg A et al. 1997) established that chrysotile was not the cause of the mesothelioma reported, just as vermiculite was not the cause of that disease in the Libby Montana vermiculite miners . . . Rather what, in the earlier literature, had been reasonably assumed to be “chrysotile-related” mesothelioma (and was cited as such by Dr. Lemen as late as 1996) from Quebec was in these reports (especially McDonald AD, Case BW, Churg A et al. 1997) shown to occur as a result of exposure either to tremolite in mining and milling areas . . .

. . .

[emphasis added] [Affidavit of Bruce W. Case. MD, 6/20/01,
http://www.brown.edu/Courses/Bio_Community_Health168C/canada/case_Affadavit.pdf]

In another instance, Case said the same thing in a letter in the *New England Journal of Medicine*. The Editor of that prestigious journal added the comment at the end that Case had served as an expert witness for the asbestos industry during the five preceding years. Case’s letter elicited several responses, one of them from Dr. Phil Landrigan, which is also abstracted below:

Bruce W. Case, M.D. McGill University Montreal, QC H3A 2B4, Canada
To the Editor: Landrigan is wrong in concluding that “a more than sevenfold mortality rate... from pleural cancer in mining areas, as compared with non mining areas,

corroborates an enormous body of literature showing that Canadian chrysotile... is a potent carcinogen." This mortality rate (seven cases) is entirely explained by the few cases among women in the area who had occupational exposure to amphiboles in the manufacture of gas masks, (Ref. 1) the repair of burlap bags that contained imported fibers, (Ref. 2) and possibly, in one case, the tremolite brought home on miners' clothes. (Ref. 2) Seven such women received workers' compensation in Quebec during the period of the study by Camus et al. Indeed, there is now a scientific consensus that chrysotile asbestos is not a cause of malignant mesothelioma, even among chrysotile-asbestos miners and millers. [emphasis added]

...

Editor's note: Dr. Case has served as an expert witness in asbestos litigation during the past five years.

...

Letter 009, Philip J. Landrigan, M.D. Mount Sinai School of Medicine, New York, NY 10029

...

Case is inaccurate in his claim that chrysotile asbestos from Canada is not a cause of mesothelioma, and his assertion that there is a scientific consensus on this point is not true. (Ref. 5) Also, he is disingenuous in his one-sided quest for factors other than chrysotile that would explain away the observed sevenfold excess of mesotheliomas among women in the chrysotile-asbestos-mining areas of Quebec. Experimental as well as epidemiologic studies have shown conclusively that Canadian chrysotile is fully capable of causing malignant mesothelioma, (Ref. 5) and the International Agency for Research on Cancer acknowledges that chrysotile is a cause of mesothelioma. (Ref. 3)

...

[Letters 006 and 009, *The New England Journal of Medicine*, Oct 1, 1998, Volume: 339, Number: 14, Page: 999-1002, *Nonoccupational Exposure to Chrysotile Asbestos and the Risk of Lung Cancer (Correspondence)* Churg, Andrew; Demiroglu, Haluk; Sokas, Rosemary K.; Costas, Eduardo; Garrido, Amando; Goyanes, Vicente J.; Langer, Arthur M.; Case, Bruce W.; Morgan, Robert W.; Goodman, Michael; Camus, Michel; Siemiatycki, Jack; Landrigan, Philip J.]

In deposition testimony as an expert witness on behalf of UNITED STATES GYPSUM COMPANY, defendants, Case testified as follows:

Q. Is it your opinion, Doctor Case, that chrysotile never causes mesothelioma in human beings?

A. It's my opinion that, given the current state of medical knowledge, chrysotile is not a cause of malignant mesothelioma.

Q. So you agree that, it is your opinion that chrysotile has never caused mesothelioma in human beings?

Mr. ERIC K. FALK: Objection, asked and answered. Go ahead.

THE WITNESS: A. My opinion is that given the current state of medical knowledge, chrysotile is not a cause of malignant mesothelioma.

...

Q. So, how long does an asbestos fiber have to be present in somebody's body to initiate

the change in a cell that eventually leads to cancer of the pleura?

A. Well, first of all, it has to be an amphibole fiber not a chrysotile fiber, but having said that, the answer is nobody knows because we don't know the mechanisms of production of disease . . .

. . .

[emphasis added] [Bruce W. Case, 8/22/01, IN THE DISTRICT COURT IN AND FOR THE COUNTY OF BOULDER, STATE OF COLORADO, CASE NO: 2000, CV 2035, DAVID ALBER and JOYCE ALBER, as Husband and Wife, Plaintiffs, vs. UNITED STATES GYPSUM COMPANY, et al., Defendants, http://www.brown.edu/Courses/Bio_Community_Health168C/canada/case200b.txt]

McDonald studies and other research at McGill University funded by the asbestos industry

The asbestos industry funded a series of research efforts at McGill University, including the series of studies by McDonald on a particular worker group at a mine in Quebec. The following are minutes from asbestos trade industry associations talking first about setting up and funding its own research programs at McGill, and then about approving and funding the research of McDonald on the mine workers.

Minutes of the Asbestos Textile Institute, General Meeting, 6/4/65, Hotel Le Provence, Thetford Mines, Canada

President Brown then introduced Mr. Karl V. Lindell, Chairman, Canadian Johns-Manville Co., Ltd., who expressed his pleasure at having the opportunity to attend this meeting, and said that he would like to have Mr. Ivan Savourin, M. C., attorney for the Q.A.M.A. *[Quebec Asbestos Mining Association]* tell us about the . . . Q.A.M.A. program for Research in Mining Pathology for *[illegible]* of Respiratory Diseases as related to Chrysotile asbestos.

. . .

Explained that the Q.A.M.A. program is still in the formative stage. They seek alliance with some university, such as McGill, for example, as that authoritative background for publicity can be had. The program will start modestly, with competent men coming into it men with a vast background of actual experience. They recognize the need to consolidate experiences, and also having traveled widely in other countries, they find that research units are usually located adjacent to a large, well equipped hospital. Frequently, the worker has a condition that is not attributable to association with asbestos, discovered through cooperation with the hospital staff. . . . *[emphasis added]*

Minutes of the 95th meeting of the Quebec Asbestos Mining Association, 11/29/65

A first and unanimous recommendation was the carrying out of the epidemiological survey proposed by Dr. McDonald. The consensus of opinion serves to point out that the QAMA should take into its hands the ways and means to conduct the necessary research instead of doing it through universities or letting it fall in the hands of the Government. As an example, it was recalled that the tobacco industry launched its own program and it now

knows where it stands. Industry is always well advised to look after its own problems. . . .
[emphasis added]

Quebec Asbestos Mining Association, Special summer meeting Manor Ric helieu,
Murray Bay, P.G., August 8 - 11, 1967, Public Relations Committee Report

Asbestos Health We c ontinue to receive an extremely bad press concerning the question of asbestos and health. Not only has Dr. Selikoff's latest paper been given wide publicity across Canada concerning the alleged relationship between smoking, asbestos and lung cancer, but the financial post recently had an article on asbestos insulation in British railway coaches which seems almost actionable.

The Public Relations Committee is strongly of the opinion that the time has come for us to produce some rebuttal ourselves, either in a general way or medically substantiated to the extent possible at this time, and we are anxious to meet with the Scientific Committee of the Occupational & Environmental Health Committee with a view to discussing the possibilities of providing some counter propaganda, as agreed at the Jasper meeting last Summer. . . . [emphasis added]

The following are excerpts from a book by Paul Brodeur where the same researcher, McDonald, first denies any association with the asbestos industry. McDonald then admits it when confronted with a copy of his own research paper that states the project was funded by the Quebec Asbestos Mining Association:

According to Dr. Wright, a recent study conducted by Dr. John Corbett McDonald, of the Department of Epidemiology and Health at McGill University, in Montreal, furnished . . . proof that mesothelioma was virtually absent in people who were exposed only to chrysotile asbestos a type of t he mineral that accounts for ninety-five per cent of the world's production, and the type that Johns-Manville mines, uses, and sells almost exclusively. "Mesothelioma appears to be predominantly linked with exposure to crocidolite or amosite." Dr. Wright declared. "Therefore, both of these types of asbestos should be controlled more stringently than is chrysotile."

. . .

[T]he seat at the witness table was taken by Dr. McDonald, who stated at the outset that he was a professor of epidemiology and the chairman of the Department of Epidemiology and Health of McGill University, and that he had specialized in epidemiology for twenty-four years. "I would now like to add one or two pints not in my written submission, in order to clarify my position here," Dr. McDonald continued. "The first point is that I am a full-time employee at McGill University, and an independent research worker. I do not work, nor am I associated, with any asbestos producer or manufacturer. The research I shall be describing is supported by grants, not to me but to McGill University, from a number of sources the Institute of Occupational and Environmental Health, the Canadian government, the British Medical Research Council, and the United States Public Health Service. I am not here to support the testimony or position of Johns-Manville or any other body affect by the proposed regulations."

. . .

After receiving permission from Goldberg to address Dr. McDonald, I reminded him that in his opening remarks he had declared that all his research had been performed

independently. “That is correct,” Dr. McDonald replied. “All things are relative.”

I then reminded Dr. McDonald that John Jobe had testified at the morning session that his company was supporting research on asbestos disease, and asked him if that was research other than what he had performed. “I guess what Mr. Jobe is referring to is the fact that Johns-Manville, together with other mining companies, helps support the Institute of Occupational and Environmental Health, which is a granting body that receives research applications, and which therefore indirectly supports our research,” Dr. McDonald replied. “Now, it is a very indirect relationship.”

I then pointed out to Dr. McDonald that at the end of his article in the Archives of Environmental Health, a credit was listed in small type: “This work was undertaken with the assistance of a grant from the Institute of Occupational and Environmental Health of the Quebec Asbestos Mining Association.” “That is correct,” Dr. McDonald said.

With that, I took my seat. Dr. McDonald had just indirectly admitted that Johns-Manville, together with other asbestos-mining companies, supported the Institute of Occupational and Environmental Health, and that institute, in turn, had helped support his study. Moreover, the credits at the end of his article, which listed no financial support other than that supplied by the institute, and given the full and correct title of this organization the Institute of Occupational and Environmental Health of the Quebec Asbestos Mining Association.

...

[Expendable America, by Paul Brodeur, 1973, pp. 126 - 134]

The following are excerpts from study by another McGill scientist that claims chrysotile asbestos was not the cause of the lung changes (pleural thickening) in asbestos workers, but instead some other mineral associated with chrysotile. This research also was funded by the asbestos industry.

Etiology of Pleural Calcification: A Study of Quebec Chrysotile Asbestos Miners and Millers

...

This distribution of pleural calcification in this Quebec industry suggests that it is related to some characteristic of airborne dust or mineral closely associated with the chrysotile that is encountered during mining in Thetford Mines but not in other mining areas. Possible minerals include mica, talc, and breunnerite. . . . The extremely local geographical and occupational clumping of men with pleural calcification suggested that exposure to some agent (probably dust) associated with certain mines and jobs was responsible. The identification of this agent depends on demonstration that exposure to a particular mineral in Thetford Mines did not occur to a large degree elsewhere . . . It appears highly unlikely that chrysotile asbestos itself is responsible for the pleural calcification, but rather a mineral closely associated with it.

...


I wish to thank . . . the management and employees of the Quebec Asbestos Mining Industry for their invaluable cooperation. The research was supported by a grant from the Institute of Occupational and Environmental Health of the Quebec Asbestos Mining Association. . . . Reprints of this article may be obtained from: Dr. Graham W. Gibbs, Department of Epidemiology and Health, McGill University . . . *[emphasis added]*

...

[Gibbs, GW (1979) Archives of Environmental Health, March/April, p. 76]

V: NATIONAL CONTINGENCY PLAN (NCP) DENIED AND VIOLATED

“EPA appears to have correctly followed the Federal Response Plan (FRP) which provides for Federal agencies to supplement a local authority’s response and not take over control. However, questions remain about EPA’s obligation to press for greater control over indoor air issues if it is determined that NYC was not doing an adequate job in addressing indoor air issues. Also, FEMA’s decision to implement FRP (ESF#10) did not preclude or prevent EPA from implementing the NCP. EPA considered implementing the NCP but choose not to . . .” [1/27/03 EPA IG report]



The EPA IG report of 1/27/03 is incorrect in making the following claim about EPA implementing the Federal Response Plan (FRP):

EPA appears to have correctly followed the Federal Response Plan (FRP) which provides for Federal agencies to supplement a local authority's response and not take over control. However, questions remain about EPA's obligation to press for greater control over indoor air issues if it is determined that NYC was not doing an adequate job in addressing indoor air issues. Also, FEMA's decision to implement FRP (ESF#10) did not preclude or prevent EPA from implementing the NCP. EPA considered implementing the NCP but choose not to. . . .

By making this statement, the EPA IG is actually claiming the following, which is totally false:

EPA can follow the FRP without following the NCP. The FRP and the NCP are two separate statutory authorities, one administered by FEMA, and the other by EPA. EPA has the option of invoking the NCP, whether or not the FRP has already been invoked. ESF #10 (Emergency Response Function #10) has nothing to do with the NCP and does not mention the NCP.

In fact, the FRP requires that EPA invoke and follow the NCP whenever it is pulled under the FRP umbrella. The FRP specifically states that EPA’s role is to sit as the chair for all the different governmental entities when there have been releases of hazardous materials, and utilize the NCP as its statutory authority, legal framework, and guiding regulations in all actions for hazardous material removal and remediation. The FRP very specifically states that in invoking ESF #10, EPA must invoke the NCP.

It is disconcerting that the EPA IG report of 1/27/03 missed this point. It may be that the EPA IG is being disingenuous in its claims, or attempting to obfuscate the fact that EPA actually did invoke the NCP.

Even if the FRP had been vague about the specific statutory authority under which EPA would operate, the EPA regulations and the guidance EPA developed for how it would respond to either terrorist bombings or chemical/biological agents are not vague. The NCP regulations and EPA terrorism planning clearly state that the NCP will be invoked, as well as EPA's response to natural disasters.

If that is not enough, Administrator Whitman testified that EPA's response to the WTC disaster was pursuant to the NCP.

Furthermore, Region 2 had assigned "On Scene Coordinators" (OSCs) as late as October, 2002 for WTC duties. OSCs are job functions under no other EPA statutory authority other than CERCLA and the NCP.

What is the FRP and the NCP?

The Federal Response Plan (FRP) means the agreement signed by 27 federal departments and agencies, including the Red Cross, under the Stafford Disaster Relief Act of 1988. The FRP is administered by the Federal Emergency Management Administration (FEMA) which is now part of the Homeland Security Administration.

The following is from the FEMA website:

President Carter's 1979 executive order merged many of the separate disaster-related responsibilities into a new Federal Emergency Management Agency (FEMA). Among other agencies, FEMA absorbed: the Federal Insurance Administration, the National Fire Prevention and Control Administration, the National Weather Service Community Preparedness Program, the Federal Preparedness Agency of the General Services Administration and the Federal Disaster Assistance Administration activities from HUD. Civil defense responsibilities were also transferred to the new agency from the Defense Department's Defense Civil Preparedness Agency.

...

In March 2003, FEMA joined 22 other federal agencies, programs and offices in becoming the Department of Homeland Security. . . . Today, FEMA is one of four major branches of DHS.

...

[<http://www.fema.gov/about/history.shtm>]

EPA describes the National Contingency Plan (NCP) as follows:

The National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the National Contingency Plan or NCP, is the federal government's blueprint for responding to both oil spills and hazardous substance releases. The National Contingency Plan is the result of our country's efforts to develop a national response capability and promote overall coordination among the hierarchy of responders and contingency plans. .

.. [www.epa.gov/oilspill/ncpover.htm]

The NCP has been incorporated into the newer broader CERCLA statute, which includes Superfund as well. CERCLA is the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. Cleanups (called either “removals” or “remediations”) under the CERCLA use the same objective criteria and methods for either Superfund or non-Superfund (NCP) “spills” or “releases” of hazardous substances.

FRP and EPA regulations require EPA to invoke NCP for terrorism and disasters

FRP requirements for EPA to invoke the NCP whenever ESF # 10 invoked

A defining sentence from the FRP is given below, and more extensive excerpts later:

If the FRP is invoked and there are hazardous materials releases necessitating the activation of this ESF [Emergency Support Function #10], the NRT/RRTs would carry out their duties and responsibilities as put forth in the NCP and agency implementing procedures.

The EPA IG report set forth the theory that if FEMA ESF #10 is implemented, then there is no need for any action under the NCP. The contrary is true. By activating ESF #10, the NCP is explicitly invoked.

After the WTC disaster, EPA became part of the FRP operations umbrella. ESF #10 was invoked, otherwise EPA could not have participated. The following are relevant portions of the FRP from the FEMA website at <http://www.fema.gov/rrr/frp/> describing EPA’s function. Emphasis has been added.

The FRP also may be implemented in response to the consequences of terrorism, in accordance with Presidential Decision Directive (PDD)-39 and PDD-62 that set forth U.S. counterterrorism policies. The FRP Terrorism Incident Annex describes the concept of operations for a unified response to a terrorism incident involving two or more of the following plans: the FRP, the Federal Bureau of Investigation (FBI) Weapons of Mass Destruction (WMD) Incident Contingency Plan, the Department of Health and Human Services (HHS) Health and Medical Services Support Plan for the Federal Response to Acts of Chemical/Biological Terrorism, the NCP, and the FRERP.

...

Emergency Support Function #10 Hazardous Materials Annex
Primary Agency: Environmental Protection Agency

I. Introduction

A. Purpose

Emergency Support Function (ESF) #10 Hazardous Materials provides Federal

support to State and local governments in response to an actual or potential discharge and/or release of hazardous materials following a major disaster or emergency.

...

A Presidential declaration does not automatically activate ESF #10. DHS will determine, in consultation with affected States, the Environmental Protection Agency (EPA), and the U.S. Coast Guard (USCG), if appropriate, if such activation is required to supplement the efforts of State and local governments. (The USCG will be consulted in a disaster or emergency where the predominant damage is within its jurisdiction. As primary agency for the ESF, EPA also will be consulted in such cases.) Within the context of this ESF, the term “hazardous materials” is defined broadly to include oil; hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended; pollutants and contaminants defined under Section 101(33) of CERCLA; and certain chemical, biological, and other weapons of mass destruction (WMD). Federal response to releases of “hazardous materials” is carried out under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) 300).

...

3. EPA will serve as the National Chair and lead agency for each activation of ESF #10, with close coordination with the USCG in geographic locations under USCG jurisdiction. EPA will be the ESF #10 Regional Chair in preparedness and for ESF #10 activations in response to a disaster or emergency affecting areas under EPA jurisdiction. The USCG will be the ESF #10 Regional Incident Chair for a disaster or emergency affecting only the areas under USCG jurisdiction. (Precise jurisdictional boundaries have been determined by EPA/USCG agreements and are described in the NCP as well as in greater detail in the Regional Oil and Hazardous Pollution Contingency Plans (RCPs).) The USCG will receive mission assignments directly from DHS for such responses.

(To provide a smooth interface with the response structure established under the NCP, regional incident-specific lead for ESF #10 may be transferred from one regional chair to the other if circumstances dictate.) In the event that an incident involves both EPA and USCG jurisdictions, EPA will assume the ESF #10 Incident Chair role, with the USCG serving as Vice Chair. Each agency will have the option of transferring the lead agency or specific tasks role to the other; however, the Incident Chair will retain responsibility for effectively addressing the ESF #10 tasks, both NCP and non-NCP.

B. Scope

1. ESF #10 provides for a coordinated response to actual or potential discharges and/or releases of hazardous materials by placing the response mechanisms of the NCP within the FRP coordination structure that ensures the most efficient and effective use of Federal resources. The ESF includes the appropriate response actions to prevent, minimize, or mitigate a threat to public health, welfare, or the environment caused by actual or potential hazardous materials incidents.

2. This ESF establishes the lead coordination roles, the division and specification of responsibilities among Federal agencies, and the national and onsite response organization that may be brought to bear in response actions, including description of the organizations, response personnel, and resources that are available. This ESF is applicable to all Federal departments and agencies with responsibilities and assets to support State and local response to actual or potential discharges and/or releases of hazardous materials.

3. Response to oil discharges and hazardous substance releases will be carried out in accordance with the NCP. The NCP effectuates the response powers and responsibilities created by CERCLA, and the authorities established by Section 311 of the Clean Water Act (CWA), as amended by the Oil Pollution Act (OPA). Under the NCP, an On-Scene Coordinator (OSC), designated by EPA, the USCG, Department of Defense (DOD), or Department of Energy (DOE), would undertake Federal response actions. Appropriate response actions under the NCP include efforts to detect, identify, contain, clean up, or dispose of released hazardous materials. The actions can include stabilization of berms, dikes, or impoundments; capping of contaminated soils or sludge; use of chemicals and other materials to contain or retard the spread of the release or to mitigate its effects; drainage controls; fences, warning signs, or other security or site control precautions; removal of highly contaminated soils from drainage areas; removal of drums, barrels, tanks, or other bulk containers that contain hazardous substances; and other measures as deemed necessary.

4. In addition, ESF #10 may respond to actual or threatened releases of hazardous materials not typically responded to under the NCP but that, as a result of the disaster or emergency, pose a threat to public health or welfare or to the environment. Appropriate ESF #10 response activities to such hazardous materials incidents include, but are not limited to, household hazardous waste collection, permitting and monitoring of debris disposal, water quality monitoring and protection, air quality sampling and monitoring, and protection of natural resources.

C. Relation to Existing Response under the National Contingency Plan, the National Response System, and the National and Regional Response Teams

1. Coordination of response actions carried out under this ESF is in accordance and does not conflict with the NCP duties and responsibilities of the National Response Team (NRT) and Regional Response Teams (RRTs) as carried out through the National Oil and Hazardous Substances Response System (NRS). The NRS is a highly organized network of agencies, programs, and resources with authorities and responsibilities in hazardous materials response. Key components of the NRS include the NCP, the NRT/RRTs, the National Response Center (NRC), and Area Contingency Plans. States participate in the NRS at the regional level.

2. The NRT, comprised of 16 Federal agencies with major environmental and public health responsibilities for oil and hazardous substance releases, is the primary vehicle for coordinating Federal agency activities under the NCP. The NRT carries out national planning and response coordination and oversees the NRS. EPA chairs the NRT, while the USCG serves as Vice Chair. At the headquarters (HQ) level, activities under this ESF provide a bridge between the NRT and the Catastrophic Disaster Response Group (CDRG). The NRT participates in FRP-activation preparedness activities under this ESF and is expected to be closely involved in response activities if this ESF is activated. EPA is the Regional Chair of ESF #10 for incidents within its jurisdiction. For disasters that occur where the USCG has jurisdiction, the USCG is the Regional Incident Chair of ESF #10. (EPA would remain the National Chair with active USCG participation and support at the CDRG.)

3. The RRTs comprise regional representatives of the Federal agencies on the NRT as well as a representative from each State within the region and are co-chaired by EPA and the USCG. The RRTs serve as planning and preparedness bodies before a response. During a response, RRTs marshal their respective agency response resources and

provide coordination and advice to the Federal OSC(s). Each RRT participates in preparedness activities under this ESF and is expected to be closely involved in response activities if this ESF is activated. At the regional level, activities under this ESF provide a bridge between the on-site OSC-directed NCP response (with RRT support) and the overall FRP disaster response activities carried out at the Disaster Field Office (DFO) and managed by a Federal Coordinating Officer (FCO). The OSCs will carry out their responsibilities under the NCP to coordinate, integrate, and manage the Federal effort to detect, identify, contain, clean up, or dispose of or minimize releases of oil or hazardous substances, or prevent, mitigate, or minimize the threat of potential releases. Their efforts will be coordinated under the direction of the ESF Regional Incident Chair, who is also the EPA or USCG RRT Co-Chair.

4. If the FRP is invoked and there are hazardous materials releases necessitating the activation of this ESF, the NRT/RRTs would carry out their duties and responsibilities as put forth in the NCP and agency implementing procedures.

Those efforts will focus largely on specific oil and hazardous substances releases that may occur throughout the affected geographic area. There is a need, however, for a single coordination mechanism for the Federal hazardous materials response as provided through this ESF because:

...

II. Policies

A. National Contingency Plan

The NCP serves as the basis for planning and use of Federal resources for responding to releases or threats of releases of oil or hazardous substances. Response actions under this ESF will follow the policies, procedures, directives, and guidance developed to carry out provisions in the NCP.

...

IV. Concept of Operations

A. Scope

1. EPA will serve as the National Chair and lead agency for each activation of ESF #10, with close coordination with the USCG in geographic locations under USCG jurisdiction. EPA will be the ESF #10 Regional Chair in preparedness and for ESF #10 activations in response to a disaster or emergency affecting areas under EPA jurisdiction. The USCG will be the ESF #10 Regional Incident Chair for a disaster or emergency affecting only areas under USCG jurisdiction.

2. The operational response prescribed in the NCP and any agency implementing procedures that contribute to response will be coordinated through this ESF.

...

B. Organization

Figure ESF #10-1 depicts the national and regional organizational structure for this ESF for situations in which oil and/or hazardous substance incidents occur and the NCP is implemented.

...

1. National-Level Response Support Structure

...

e. Policies and procedures in the NCP will be adhered to in carrying out an oil/ hazardous substance response. In certain circumstances, some administrative procedures in the NCP can be streamlined during the immediate response phase. The ESF Chair will

consult the NRT for advice and assistance in carrying out activities under this ESF. Likewise, the ESF Regional Chair will consult the RRT for such advice or assistance.

f. In some cases (see Sections I.B and III.A), ESF #10 may respond to releases or threatened releases of hazardous materials not typically responded to under the NCP. Applicable policies and procedures in the NCP will be adhered to in carrying out these hazardous materials responses.

...

2. Regional-Level Response Structure

...

j. The OSC directs oil and hazardous substance response efforts and coordinates all other Federal efforts at the scene of a discharge or release. Specific response efforts are noted in the NCP and include actions taken as soon as possible to prevent, minimize, or mitigate a threat to public health or welfare, or the environment.

...

[Emphasis has been added. Text above starts at page 3, and then page 120 of the PDF version of the FRP posted at the FEMA website, <http://www.fema.gov/rrr/frp/>]

EPA regulations also require EPA to invoke and follow the NCP in declared disasters

The following EPA regulations under the NCP also show that EPA has no recourse but to invoke the NCP whenever there is a release of hazardous materials in a disaster:

Subpart B -- Responsibility and Organization for Response

...

§300.105 General organization concepts.

(a) Federal agencies should:

- (1) Plan for emergencies and develop procedures for addressing oil discharges and releases of hazardous substances, pollutants, or contaminants;
- (2) Coordinate their planning, preparedness, and response activities with one another;
- (3) Coordinate their planning, preparedness, and response activities with affected states, local governments, and private entities; and
- (4) Make available those facilities or resources that may be useful in a response situation, consistent with agency authorities and capabilities.

(b) Three fundamental kinds of activities are performed pursuant to the NCP:

- (1) Preparedness planning and coordination for response to a discharge of oil or release of a hazardous substance, pollutant, or contaminant;
- (2) Notification and communications; and
- (3) Response operations at the scene of a discharge or release.

...

§300.125 Notification and communications.

(a) The National Response Center (NRC), located at USCG Headquarters, is the national communications center, continuously manned for handling activities related to response actions. . . . The NRC receives and immediately relays telephone notices of discharges or releases to the appropriate predesignated federal OSC. The telephone report is distributed to any interested NRT member agency or federal entity that has established a written agreement or understanding with the NRC. The NRC evaluates incoming

information and immediately advises FEMA of a potential major disaster situation.

§300.130 Determinations to initiate response and special conditions.

...

(h) If the situation is beyond the capability of state and local governments and the statutory authority of federal agencies, the President may, under the Disaster Relief Act of 1974, act upon a request by the governor and declare a major disaster or emergency and appoint a Federal Coordinating Officer (FCO) to coordinate all federal disaster assistance activities. In such cases, the OSC/RPM would continue to carry out OSC/RPM responsibilities under the NCP, but would coordinate those activities with the FCO to ensure consistency with other federal disaster assistance activities.

(i) In the event of a declaration of a major disaster by the President, the FEMA may activate the Federal Response Plan (FRP). A FCO, designated by the President, may implement the FRP and coordinate and direct emergency assistance and disaster relief of impacted individuals, business, and public services under the Robert T. Stafford Disaster Relief Act. Delivery of federal assistance is facilitated through twelve functional annexes to the FRP known as Emergency Support Functions (ESFs). EPA coordinates activities under ESF #10 -- Hazardous Materials, which addresses preparedness and response to hazardous materials and oil incidents caused by a natural disaster or other catastrophic event. In such cases, the OSC/RPM should coordinate response activities with the FCO, through the incident-specific ESF #10 Chair, to ensure consistency with federal disaster assistance activities.

...

4.3 Relation to others plans.

4.3.1 Federal response plans. In the event of a declaration of a major disaster by the President, the FEMA may activate the Federal Response Plan (FRP). A Federal Coordinating Officer (FCO), designated by the President, may implement the FRP and coordinate and direct emergency assistance and disaster relief of impacted individuals, business, and public services under the Robert T. Stafford Disaster Relief Act. Delivery of federal assistance is facilitated through twelve functional annexes to the FRP known as Emergency Support Functions (ESFs). EPA coordinates activities under ESF #10 -- Hazardous Materials, which addresses preparedness and response to hazardous materials and oil incidents caused by a natural disaster or other catastrophic event. In such cases, the OSC should coordinate response activities with the FCO, through the incident-specific ESF #10 Chair, to ensure consistency with federal disaster assistance activities.

...

[emphasis added] [Title 40 of the Code of Federal Regulations, Part 300 (40 CFR §300, <http://www.epa.gov/epahome/cfr40.htm>]

EPA publications state that EPA will invoke the NCP after terrorism events

The following brochure, prepared more than a year before 9/11/01, specifies that EPA will respond to releases of hazardous substances from terrorism events under the NCP authority.

The U.S. Environmental Protection Agency (EPA) has statutory authorities and responsibilities to prepare for and respond to emergencies involving oil and hazardous substances, pollutants or contaminants, which include chemical, biological and

radiological materials that could also be components of a weapon of mass destruction (WMD). A WMD is defined as a weapon, device, or large conventional explosive that produces catastrophic loss of life or property. EPA carries out its preparedness and response efforts primarily under the mandate of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the Radiological Response Program. EPA provides technical support, response coordination and management, and resource assistance to local and state first responders under the National Response System (NRS). The NRS is the federal government's mechanism for emergency response to releases of hazardous substances, pollutants, and contaminants and discharges of oil that threaten human health and the environment. The NRS is fully described in the NCP at 40 CFR Part 300.

Additional EPA Responsibilities In recognition of EPA's responsibilities, capabilities and experience, Presidential Decision Directive (PDD) #39 assigned EPA the task of assisting the FBI in threat assessments and determining the type of hazards associated with releases or potential releases of materials in a terrorist incident. EPA is also assigned to assist the Federal Emergency Management Agency (FEMA) with environmental monitoring, decontamination, and long-term site cleanup. EPA is the lead agency for hazardous materials response under Emergency Support Function (ESF) #10 of the Federal Response Plan (FRP). PDD #62 reinforces EPA's mission to enhance the nation's capability to prevent and respond to terrorist events involving WMD. PDD #63, which addresses the protection of America's critical infrastructure, named EPA the lead agency for the Water Supply Sector. Under these and other Federal authorities, EPA may participate during the crisis and consequence management phases of a terrorist incident response and may prevent and prepare for deliberate releases resulting from terrorist incidents.

...

Federal On-Scene Coordinators (OSCs) The Federal OSC is the primary federal representative at responses conducted under the NRS. Federal OSCs work with State, local, and private responders to protect human health and the environment. The Federal OSC is the point of contact for the coordination of federal efforts with the local response community. EPA OSCs possess the authority to manage all response efforts at the scene of an incident, and can call upon a variety of specialized equipment and highly trained personnel.

...

[EPA CAPABILITIES: RESPONDING TO NUCLEAR-BIOLOGICAL-CHEMICAL (NBC) TERRORISM, 5/02, EPA Publication No. EPA 550-F-00-008, [http://yosemite.epa.gov/R10/CLEANUP.NSF/9f3c21896330b4898825687b007a0f33/c8bfff6f309e0ad2888256aa4006ae05d/\\$FILE/terrorism2000.pdf](http://yosemite.epa.gov/R10/CLEANUP.NSF/9f3c21896330b4898825687b007a0f33/c8bfff6f309e0ad2888256aa4006ae05d/$FILE/terrorism2000.pdf)]

Essentially the same information provided in the brochure above was also provided in a 1997 EPA publication titled: "EPA Capabilities: Responding to Nuclear-Biological-Chemical (NBC) Terrorism, EPA OIL AND HAZARDOUS SUBSTANCES RESPONSE CAPABILITIES," which may be found at the following web site: <http://www.epa.gov/swercepp/pubs/cntr-ter.html>.

The following is from a 1997 document, where EPA set forth its terrorism planning in response to the Oklahoma City bombing and the Sarin gas attacks in Tokyo. The invocation of the NCP for such events is spelled out in detail. The important thing about this particular document is that it specifies that EPA will invoke the NCP authority for terrorism events like bombings, not just for

weapons of mass destruction (anthrax, poisonous gas, dirty bombs).

As a result of several recent terrorist incidents, including the Sarin gas incident in Tokyo and the bombing of the Murrah building in Oklahoma City in 1995, federal attention and resources dedicated to counter-terrorism (CT) have grown significantly

...

The majority of EPA Headquarter's CT activities in FY97 involved participation in the federal-wide CT [counter terrorism] initiatives. EPA has been participating in several interagency federal groups to ensure the inclusion of the National Response System (NRS) in CT efforts. EPA has also been working to internally improve readiness in the CT arena.

...

In FY97 EPA HQ conducted the following interagency and intra-Agency coordination activities: Provided numerous briefings to both internal and external audiences to ensure that parties understood EPA's role and responsibilities under the National Contingency Plan (NCP) and the implications for Counter-Terrorism activities.

...

Several regions also conducted outreach activities to promote coordination among key players (e.g., SERCs/LEPCs and FEMA). . . . Several regions have met with staff from federal agencies to discuss their respective roles in CT operations (e.g., Region 1 with FEMA, the FBI, and USCG).

...

[FISCAL YEAR 1997 REPORT: EPA'S COUNTER-TERRORISM ACTIVITIES AND ACCOMPLISHMENTS, CHEMICAL EMERGENCY PREPAREDNESS & PREVENTION OFFICE, OFFICE OF SOLID WASTE & EMERGENCY RESPONSE, U.S. ENVIRONMENTAL PROTECTION AGENCY, <http://www.epa.gov/swercepp/pubs/execsum.pdf>]

EPA admits operating under the NCP for the WTC disaster

For over a year after 9/11/01, EPA did not admit that it was operating under the NCP in the WTC evaluation and cleanup. It did not deny it, either, but obfuscated the fact very carefully.

The following is Administrator Whitman's 9/24/02 testimony before the Senate Committee on Environment and Public Works which makes it clear that EPA was operating under the NCP:

EPA accomplished a remarkable achievement in responding to three national incidents during the same time period; the attacks on the World Trade Center and Pentagon, and anthrax contaminated buildings. Drawing upon the many years of EPA experience in responding to the release of hazardous substances, and the technical and scientific expertise found within the Agency, the outstanding men and woman of EPA performed unprecedented tasks.

...

Today, my testimony will discuss EPA's role in homeland security, how the Agency responded to the attacks of last year, the lessons learned, and how EPA plans to address homeland security issues.

...

EPA has led the National Response System (NRS) for over 30 years. The NRS is the system by which our local, state and Federal responders address hazardous material and oil spill emergencies. These contaminants can include chemical, biological, and radiological materials that also could be components of Weapons of Mass Destruction (WMD). The Agency's basis for its emergency response program is outlined under the National Oil and Hazardous Substances Pollution Contingency Plan. The NRS was originally authorized under the Clean Water Act and supplemented by the authorities of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), and is codified by the National Contingency Plan (NCP). The National Response Team (NRT), established by the NCP, consists of 16 Federal agencies with responsibilities, interests, and expertise in various aspects of emergency response to pollution incidents. The EPA serves as chair and the Coast Guard serves as vice chair of the NRT.

...

The NRT also completed Anthrax and World Trade Center / Pentagon Lessons Learned Documents for use by member agencies and developed Anthrax clean-up technical assistance documents for use by planners and responders at all levels of government.

...

EPA has important roles in U.S. counterterrorism activities. . . . EPA, as the lead agency for Hazardous Materials Response under Emergency Support Function (ESF) #10 of the Federal Response Plan, also assists the Federal Emergency Management Agency, during consequence management with environmental monitoring, decontamination, and long-term site cleanup.

...

EPA RESPONSE AT WORLD TRADE CENTER

As soon as the first plane hit the North Tower, EPA activated its emergency response personnel from its Regional office in lower Manhattan. Before anyone knew the tragic consequences of the attack, EPA's responders were headed to the site to monitor the cloud of smoke and dust.

...

[emphasis added] [STATEMENT OF GOVERNOR CHRISTINE TODD WHITMAN ADMINISTRATOR U.S. ENVIRONMENTAL PROTECTION AGENCY BEFORE THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS 9/24/02, <http://www.epa.gov/ocirpage/hearings/testimony/092402ctw.PDF>]

EPA responds to disaster under NCP by appointing “On Scene Coordinators” – EPA still using OSC’s as of October, 2002

EPA only uses OSC’s under CERCLA/NCP

EPA began its disaster response effort by appointing an “On Scene Coordinator,” a formal title under the CERCLA/NCP authority. This title is not used under any other EPA statutory authorities such as the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, etc. See the following from the CERCLA/NCP regulations:

40 CFR §300.120 On-scene coordinators and remedial project managers: general responsibilities.

(a) The OSC/RPM directs response efforts and coordinates all other efforts at the scene of a discharge or release. As part of the planning and preparedness for response, OSCs shall be predesignated by the regional or district head of the lead agency. EPA and the USCG shall predesignate OSCs for all areas in each region, except as provided in paragraphs (c) and (d) of this section. RPMs shall be assigned by the lead agency to manage remedial or other response actions at NPL sites, except as provided in paragraphs (c) and (d) of this section.

...

(e) The OSC is responsible for overseeing development of the ACP [*area contingency plan*] in the area of the OSC's responsibility. ACPs shall, as appropriate, be accomplished in cooperation with the RRT [*rapid response team*], and designated state and local representatives. In contingency planning and removal, the OSC coordinates, directs, and reviews the work of other agencies, Area Committees, responsible parties, and contractors to assure compliance with the NCP, decision document, consent decree, administrative order, and lead agency-approved plans applicable to the response.

...

(2) Federal-lead non-Fund-financed response: The RPM coordinates, directs, and reviews the work of other agencies, responsible parties, and contractors to assure compliance with the NCP, Record of Decision (ROD), consent decree, administrative order, and lead agency-approved plans applicable to the response. Based upon the reports of these parties, the RPM shall recommend action for decisions by lead agency officials. The RPM's period of responsibility begins prior to initiation of the RI/FS, described in §300.430, and continues through design and remedial action and the CERCLA cost recovery activity. The OSC and RPM shall ensure orderly transition of responsibilities from one to the other.

(3) The RPM shall participate in all decision-making processes necessary to ensure compliance with the NCP, including, as appropriate, agreements between EPA or other federal agencies and the state. The RPM may also review responses where EPA has preauthorized a person to file a claim for reimbursement to determine that the response was consistent with the terms of such preauthorization in cases where claims are filed for reimbursement.

...

(g)(1) Where a support agency has been identified through a cooperative agreement, Superfund Memorandum of Agreement (SMOA), or other agreement, that agency may designate a support agency coordinator (SAC) to provide assistance, as requested, by the OSC/RPM. The SAC is the prime representative of the support agency for response actions.

(2) The SAC's responsibilities may include:

- (i) Providing and reviewing data and documents as requested by the OSC/RPM during the planning, design, and cleanup activities of the response action; and
- (ii) Providing other assistance as requested.

(h)(1) The lead agency should provide appropriate training for its OSCs, RPMs, and other response personnel to carry out their responsibilities under the NCP.

(2) OSCs/RPMs should ensure that persons designated to act as their on-scene representatives are adequately trained and prepared to carry out actions under the NCP,

to the extent practicable.

EPA appointed OSC's before any formal FEMA involvement

In the initial period after 9/11, the EPA On Scene Coordinator (OSC) was highly visible at Ground Zero. A draft timeline prepared by EPA gives the following sequence of events, including the appointment of an OSC:

08:50 Headquarters EOC activated
09:01 Began coordination conference call between
HQ and Region 2
09:10 Established conference call bridge using
GETS system w/ Regions 1-4
10:00 Coordination began between EPA and New York and Virginia

[9/11/01 afternoon events]

Region 2
Deployed 4 On-Scene Coordinators (OSCs) to NY
Began 24-hour operations in Edison, NJ
Collected 4 dust samples in vicinity of WTC
Initiated daily ambient air monitoring program downwind from WTC
Coordinated with NYC and OSHA

Region 3
Deployed 4 OSCs: VA EOC, DC EOC, FEMA ROC, Ft. Meade
Deployed 4 START with OSC to Ft. Meade

Headquarters
Began 24-hour operation at Emergency Operations Center
Prepared for Continuity of Operations Plan (COOP) activation
Removed EPA's website to protect against hackers & secure data (OEI)
Staffed FEMA Emergency Support Team (EST)
Staffed FBI Strategic Information Operations Center (SIOC)
Took precautions to ensure payroll for all EPA employees
Discussion of permitting issues for air and waste with Regions 2 and 3

Administrator
Held 3 conference calls with all AAs and RAs
Sent 2 voicemail updates to all employees

President issues major disaster declaration for WTC - 7:30 pm
FEMA-1391-DR-NY

...

*[EPA Timeline: Response to Events of September 11, 2001, Draft - 10/12/01, posted on
EPA internal web pages]*

EPA was still using OSC's as of October, 2002

The duties of an EPA OSC are broad, as seen from the earlier excerpts of the CERCLA/NCP regulations describing OSC's. It is documented that EPA was still using an OSC for its 110 Liberty St. pilot cleaning study in October of the year 2002, over a year after the disaster:

After the initial cleaning of each unit, the OSC reviewed the established cleanup criteria, reviewed the analytical results, and provided direction as to which units required additional cleaning.

. . .

[Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, p. 8, http://epa.gov/wtc/confirmation_clean_study.htm]

It might be a good subject of a Freedom of Information Act request to obtain all documentation on the assignment and activities thereby of EPA Region 2 "On Scene Coordinators" after the WTC disaster.

Violation of statutory authority if EPA is not operating under the NCP

If EPA is not operating under the NCP, then it is operating outside of its statutory authority in the assessment of hazards and cleanup of WTC fallout. The interagency agreement between EPA and other federal agencies, the Federal Response Plan (FRP) described earlier, does not give EPA any additional statutory authority under which to act.

No federal agency can take any action unless it has the legal authority to do so. It would be like the Department of Defense declaring war all by itself, without having the President declare war first. EPA can't just do things related to the environment as it sees fit. For cleanups of spills and other releases of hazardous materials in the absence of currently controlling responsible parties, that statutory authority is under the CERCLA, which includes the NCP.

The following is from the Administrative Procedures Act (APA). If an agency acts outside of its legal mandate, then the agency can be sued for taking action "in excess of statutory jurisdiction, authority, or limitations."

5 U.S.C. § 706. Scope of review

To the extent necessary to decision and when presented, the reviewing court shall decide all relevant questions of law, interpret constitutional and statutory provisions, and determine the meaning or applicability of the terms of an agency action. The reviewing court shall -

- (1) compel agency action unlawfully withheld or unreasonably delayed; and
- (2) hold unlawful and set aside agency action, findings, and conclusions found to be -
 - (A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

- (B) contrary to constitutional right, power, privilege, or immunity;
- (C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right;
- (D) without observance of procedure required by law;
- (E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute; or
- (F) unwarranted by the facts to the extent that the facts are subject to trial de novo by the reviewing court. In making the foregoing determinations, the court shall review the whole record or those parts of it cited by a party, and due account shall be taken of the rule of prejudicial error.

...

[<http://www4.law.comell.edu/uscode/5/plch5schII.html>]

The following is from the CERCLA statute itself:

U.S. Code TITLE 42--THE PUBLIC HEALTH AND WELFARE
CHAPTER 103--COMPREHENSIVE ENVIRONMENTAL RESPONSE,
COMPENSATION, AND LIABILITY
SUBCHAPTER III--MISCELLANEOUS PROVISIONS
Sec. 9659. Citizens suits

(a) Authority to bring civil actions

Except as provided in subsections (d) and (e) of this section and in section 9613(h) of this title (relating to timing of judicial review), any person may commence a civil action on his own behalf

(1) against any person (including the United States and any other governmental instrumentality or agency, to the extent permitted by the eleventh amendment to the Constitution) who is alleged to be in violation of any standard, regulation, condition, requirement, or order which has become effective pursuant to this chapter (including any provision of an agreement under section 9620 of this title, relating to Federal facilities); or

(2) against the President or any other officer of the United States (including the Administrator of the Environmental Protection Agency and the Administrator of the ATSDR) where there is alleged a failure of the President or of such other officer to perform any act or duty under this chapter, including an act or duty under section 9620 of this title (relating to Federal facilities), which is not discretionary with the President or such other officer.

...

(c) Relief

The district court shall have jurisdiction in actions brought under subsection (a)(1) of this section to enforce the standard, regulation, condition, requirement, or order concerned (including any provision of an agreement under section 9620 of this title), to order such action as may be necessary to correct the violation, and to impose any civil penalty provided for the violation. The district court shall have jurisdiction in actions brought under subsection (a)(2) of this section to order the President or other officer to perform the act or duty concerned.

...

[From the U.S. Code Online via GPO Access, www.wais.access.gpo.gov , Laws in effect as of January 23, 2000 [CITE: 42USC9659]]

Congressman Nadler critical of EPA violation of law if not using NCP

By allowing indoor air quality in residential and commercial buildings to be handled by the City of New York, and by not properly exercising its oversight authority pursuant to the National Contingency Plan (NCP), the EPA violated federal law.

...

The EPA must act in accordance with the NCP, and take action immediately to systematically and properly test and remediate all downtown buildings affected by the World Trade Center tragedy, using properly trained personnel and the best-available equipment and methods tied to genuine, established health-based standards.

...

By allowing indoor air quality in residential and commercial buildings to be handled by the City of New York, and by not properly exercising its oversight authority, the EPA violated federal law. The EPA has the clear authority to respond to the release of hazardous substances that may present an imminent and substantial danger to public health. The National Contingency Plan (NCP), which is administered by the EPA and authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), is the federal plan for responding to such a release. The NCP lays out specific procedures and guidelines, including the designation of an On-Scene Coordinator (OSC) who is responsible for directing response efforts and coordinating all other efforts at the scene of a discharge or release. The federal regulations make clear that the EPA has the authority to respond to the release of hazardous substances pursuant to the NCP, and that this authority is carried out by EPA On-Scene Coordinators.

...

However, EPA's statement that it is merely following FEMA and the Federal Response Plan, and its characterization of this plan, is misleading for a number of reasons. First, the Stafford Act does not supercede the EPA statutes. All activities under FEMA must comply with national environmental policies. The Federal Response Plan also clearly states that other federal emergency response plans cannot be disregarded, but rather implemented concurrently when there is an incident involving hazardous substances. The FRP specifically lists the NCP as one such emergency response plan. Second, and most importantly, the FRP actually triggers the National Contingency Plan. According to the Code of Federal Regulations, "the NCP applies to and is in effect when the Federal Response Plan and some or all its Emergency Support Functions (ESFs) are activated." Therefore, if the EPA is not acting pursuant to the National Contingency Plan, it is in clear violation of the law.

...

[U.S. CONGRESSMAN JERROLD NADLER, WHITE PAPER, LOWER MANHATTAN AIR QUALITY, Last Updated, April 12, 2002,
http://www.nyenvirolaw.org/PDF/EPA%20White%20Paper%20Final%204_121.pdf
or <http://www.911digitalarchive.org/objects/112.pdf>]

EPA has obfuscated fact that its operations are under the NCP

By either not publically admitting, or denying outright that it is operating under the NCP, EPA gains several advantages:

- a. Public oversight of its activities is more difficult. The public will more likely believe EPA when it claims that indoor air issues could be delegated or left up to NYC, and that EPA had no authority over NYC to force them to follow through or have indoor air standards as stringent as EPA.
- b. A Superfund-like stigmatization is avoided. The NCP is part of the same umbrella EPA statute, CERCLA, that includes Superfund. Although an NCP cleanup is not necessarily a Superfund cleanup, it could be or could become one. People equate the CERCLA statute with Superfund, even though CERCLA includes more. If you do a search of the EPA web site, you will even see that EPA uses the phrase “CERCLA, or Superfund” almost 200 times, although this phrase is not strictly correct.
- c. By not admitting to acting under the NCP authority, EPA was able to claim that the unsafe AHERA air standard applied, instead of using an air level for asbestos based on safety at the one in a million risk level as required by the NCP.
- d. By not admitting to acting under the NCP, EPA was able to point to the Clean Air Act asbestos NESHAP guidance of 1% asbestos in settled dust as a controlling action level. Asbestos risk evaluations under the NCP never use this 1% level, but instead always use a calculation of risk from exposure, which is much lower than 1% for asbestos in buildings.
- e. Public comparison with other NCP cleanups is avoided. A prime example is the cleanup of the Libby, Montana site where asbestos was being removed from residences under the NCP long before the Libby site was designated a Superfund site.

Obfuscation of fact that EPA was operating under the NCP by EPA Region 2 Counsel

EPA never made any statements to the press or on its website that it was acting under the NCP/CERCLA authority. In contrast, EPA clearly stated that it was acting under the authority of the NCP in the cleanup of the Hart Senate Office Building. See my memorandum of 2/7/02 as well as the EPA web page at www.epa.gov/epahome/hi-anthrax.htm .

It appears EPA’s obfuscation worked so well that even EPA’s own Office of the Inspector General was unaware that EPA was operating under the NCP in the WTC investigation and cleanup, as seen from their 1/27/03 report. Alternatively, the EPA IG may be intentionally perpetuating the myth that EPA is not operating under the NCP in the WTC disaster.

In a 2/22/02 letter to Congressman Nadler, Administrator Whitman described EPA’s role in the WTC testing and cleanup as follows. Although she admitted that several of the FRP Emergency Support Functions were activated (presumable ESF #10 included), she walked around the issue that FEMA had assigned all environmental matters to EPA, and that EPA was operating under the

NCP. Congressman Nadler replied to this letter from Whitman on 3/7/02, asking specifically about the NCP, but apparently received no reply from Whitman.

Our Agency's personnel were on the scene almost immediately, and have been working closely with the Federal Emergency Management Agency (FEMA) since President Bush's declaration of a federal disaster at the World Trade Center. The President's declaration triggered the Federal Response Plan and directed FEMA to coordinate various federal, state, and local agencies and the American Red Cross in carrying out thirteen distinct Emergency Support Functions. The Environmental Protection Agency (EPA) has served in a supporting role to the City of New York and the State of New York, consistent with the Federal Response Plan and mission assignments from FEMA.

In response to your concerns that authority was not properly delegated to the City of New York, it is important to note that under the Federal Response Plan local governments have primary responsibility for responding to an event. Those governments however, can turn to the federal government for assistance where they need it. In this event, the City of New York asked, through FEMA, that EPA assume lead responsibility for monitoring the outdoor conditions at and around the site of the event and for decontaminating the streets and other outdoor public areas. As explained in the enclosed Summary of Current Actions from October 6, the City assumed responsibility for indoor testing and the reoccupancy of buildings.

. . .

All this being said, I believe that Congress and the Administration need to revisit the issue of authority and responsibility for indoor environmental conditions in the wake of a terrorist attack. . . . Until such determinations are made, however, we will continue to offer our full support to the City of New York and stand ready to assist with any further requests they may make for our assistance in dealing with indoor environmental issues.

. . .

[letter, Administrator Whitman to US Representative Jerrold Nadler, 2/22/02, posted at the NY Environmental Law and Justice website at www.NYenviroLAW.org]

The following is from a speech by EPA Region 2 Counsel, which also shows how EPA was obfuscating their operations under the NCP. Regional Counsel Walter Mugdan described only two sets of regulations relevant to asbestos in the WTC collapse, namely the Clean Air Act and the AHERA asbestos in schools act. He omitted the third and most important regulatory authority over asbestos, namely the NCP and the encompassing CERCLA statute.

EPA has two sets of regulations that deal with asbestos . . . neither set of regulations is directly applicable to the conditions in the wake of the WTC disaster . . . The first set of asbestos-related regulations are part of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) . . . pursuant to . . . the Clean Air Act . . . The second set of regulations are those promulgated by EPA pursuant to the Asbestos Hazard Emergency Response Act (AHERA) . . . The AHERA regulations also include a "clearance" standard for inside air in school buildings to be used after asbestos abatement work has been completed, in order to ensure that the space is safe for re-entry by children, teachers and other employees. . . .

. . .

[Mugdan, Walter E., Esq. (January 25, 2002) Environmental law issues raised by terrorist events in 2001. Speech before the NY Bar Association.]

EPA can delegate, but has preemption over local and state authorities

EPA delegated all indoor air matters to NYC, who then made individual citizens responsible:

The controversy harks back to a decision by the Federal Emergency Management Agency in the days after Sept. 11. FEMA assigned the EPA the task of cleaning up and testing for toxic chemicals in outdoor areas around ground zero. EPA then gave New York City control over indoor areas, including apartments. The city, in turn, delegated to building owners and residents the job of doing the actual cleanup and testing.

...

[AFTERMATH OF TERROR, Bureaucratic Buck-Passing Delayed Asbestos Cleanup After 9/11 Attacks, By JIM CARLTON, 5/9/02, THE WALL STREET JOURNAL]

FEMA assigned all environmental matters to EPA

FEMA assigned all environmental matters to EPA, as it was required to do by law, since the FRP makes EPA the chair and overseer of all environmental matters. FEMA did not parse responsibilities, saying that EPA should address only some of the environmental matters. EPA and its operational statute, the NCP, were the authorities, and any local or state ordinances were preempted by EPA.

The following is a statement from FEMA:

FEMA assigned the U.S. Army Corp of Engineers to NYC and Virginia to assess and remove the more than one million tons of debris. EPA Regions in NYC and Boston were assigned responsibility to address air quality issues at ground zero and the surrounding area and asbestos removal. Disaster medical and mortuary teams were deployed to New York and the Pentagon. Generators were supplied to Con Edison to restore power and, with it, communications. More than 6,500 federal personnel were deployed to respond to and coordinate the federal response including 1,544 from FEMA and its US&R task forces.

...

[The FEMA Story, http://www.fema.gov/doc/ofm/5fema508_story.doc]

Under the NCP, if EPA delegates to a state or local entity through a cooperative agreement, EPA is required to insure that the entity taking over the task use standards at least and protective as EPA's

The EPA NCP regulations set forth how states and local entities will fit into the umbrella structure of any response to a disaster, such as terrorism. Once a state or local body participates in the disaster response effort, it no longer has complete autonomy. The EPA regulations make it clear that the state or local authority must conduct all actions consistent with the federal NCP. The

EPA NCP regulations also make it clear that EPA is responsible for insuring that any state or local response is at least as protective, or more protective, than EPA standards.

Emphasis has been added in the following excerpts.

§300.175 Federal agencies: additional responsibilities and assistance.

(a) During preparedness planning or in an actual response, various federal agencies may be called upon to provide assistance in their respective areas of expertise, as indicated in paragraph (b) of this section, consistent with agency legal authorities and capabilities.

...

(2) EPA chairs the NRT [*National Response Team*]

...

§300.180 State and local participation in response.

...

(b) Appropriate local and state officials (including Indian tribes) will participate as part of the response structure as provided in the ACP.

(c) In addition to meeting the requirements for local emergency plans under SARA section 303, state and local government agencies are encouraged to include contingency planning for responses, consistent with the NCP, RCP, and ACP in all emergency and disaster planning.

...

(f) Because state and local public safety organizations would normally be the first government representatives at the scene of a discharge or release, they are expected to initiate public safety measures that are necessary to protect public health and welfare and that are consistent with containment and cleanup requirements in the NCP, and are responsible for directing evacuations pursuant to existing state or local procedures.

...

§300.400 General.

...

(g) *Identification of applicable or relevant and appropriate requirements. [ARAR]*

(1) The lead and support agencies shall identify requirements applicable to the release or remedial action contemplated based upon an objective determination of whether the requirement specifically addresses a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site.

...

(4) Only those state standards that are promulgated, are identified by the state in a timely manner, and are more stringent than federal requirements may be applicable or relevant and appropriate. For purposes of identification and notification of promulgated state standards, the term *promulgated* means that the standards are of general applicability and are legally enforceable.

[emphasis added]

...

[Title 40 of the Code of Federal Regulations, Part 300 (40 CFR §300, <http://www.epa.gov/epahome/cfr40.htm>]

The New York City Committee on Environmental Protection found that NYC environmental authority was preempted by EPA in the WTC disaster

The New York City July 4, 2003 Council Committee on Environmental Protection recognized that their standards and authority under the NYC Department of Environmental Protection was preempted by EPA after the disaster. The following are statements of Council Member Sabini:

Based on the information we garnered at last week's hearing, we understand what the City law is and what protocol is under the City law. However, last week when I asked EPA if they were conducting wipe tests in buildings that had been evacuated that are now being reoccupied, or air sampling, they said no.

I was a little amazed to hear that. Based on your knowledge, wouldn't you think that the stewards of the last, court of last appeal for public health, in this case, EPA would want to be doing that and requiring that?

...

Well, the reason I say EPA is that they're the ultimate arbitrators and we're all preempted by them, so if they were to make the determination, that would be the final determination.

...

[emphasis added] [Transcript of the minutes of the Committee on Environmental Protection, City Council, City of New York, 11/8/01, Council Member Sabini, pp. 53-54.]

EPA demonstrated its preemption authority when reversing the NYC DOH decision to return WTC contaminated cars to owners

EPA constantly protested in letters, testimony, and press statements that it had no jurisdiction over indoor air issues. EPA said that the NYC DOH had that authority, not they. See a compendium of these denial statements later in this section.

However, EPA demonstrated its authority to override any decisions by the NYC DOH, and willingness to do so, in the case of automobiles contaminated with WTC dust. Exposures of citizens to WTC dust in their automobiles is an indoor air issue, just like exposure in residences and offices.

The NYC DOH had decided that it was safe to return these vehicles to owners if the owners performed a do-it-yourself cleaning operation. The NYC DOH prepared do-it-yourself cleaning instructions similar in all aspects to the NYC DOH do-it-yourself cleanup guidelines for residences and offices contaminated with WTC dust (see Section E). But EPA decided that this would be unsafe, and that the automobiles could not be cleaned safely, and should be condemned instead. EPA stepped in and preempted the NYC DOH over the automobile issue.

See the news stories below, and more details in Section D on EPA's admission of hazards from citizen exposures to WTC dust.

New York City officials have reversed a decision made in December and announced that owners of cars and trucks recovered from the World Trade Center would be permitted to retrieve their vehicles. Earlier, the city's health commissioner said the vehicles were potentially contaminated with asbestos and therefore unsafe to return to their owners. Why the turnaround? "Since the fall, data has been presented to the health department collected by a number of agencies, including the FDNY, NYPD, FBI and EPA, and those samples indicated that there were undetectable to low levels of asbestos found in samples taken from the cars," says Greg Butler, a spokesman for the New York City Department of Health.

...

[*Newsweek, FALLOUT, Driving With Dangerous WTC Dust? 2/18/02*]

FOR WEEKS, local, state and federal officials have squabbled over whether the vehicles – most of which are coated with fine powder of World Trade Center debris – are safe. "We know the dust contains lead, zinc, mercury, asbestos, not to mention organic materials," says New York Congressman Jerrold Nadler. "To release cars to owners is highly irresponsible." On Thursday, Nadler wrote a letter to the Environmental Protection Agency's Christie Todd Whitman urging her to file an emergency injunction against the city to prevent their release. On Friday, the EPA asked the city to meet with its officials before releasing the cars.

The New York City Department of Health told Newsweek it will honor the EPA's request, but that its decision to release the autos was based on careful review of numerous environmental tests. "The data indicates that there is no significant risk to human health," says Kelly McKinney, the NYC Department of Health's Associate Commissioner for Environmental Health. "The fundamental way we work is to gather as much data as we can, to look at that data, compare it with whatever standards are available, compare it with our knowledge of the issues, and that's what we did with this issue as we have with every World Trade Center issue."

...

[*What To Do With An Auto Graveyard, At the last minute, the EPA prevents the return of cars damaged in the World Trade Center collapse, By Julie Scelfo, NEWSWEEK WEB EXCLUSIVE, 3/15/02, <http://www.msnbc.com/news/724974.asp>*]

Under NCP, EPA has right of access to cleanup indoor air or other contamination

The following are the relevant parts of the NCP regulations contained in Title 40 of the Code of Federal Regulations, Part 300. Not only does EPA have the authority over indoor air and other hazards, it also has the authority for entry without the consent of the building owner.

§300.400 General.

(a) This subpart establishes methods and criteria for determining the appropriate extent of response authorized by CERCLA and CWA section 311(c):

...

(d) Entry and access.

(1) For purposes of determining the need for response, or choosing or taking a response

action, or otherwise enforcing the provisions of CERCLA, EPA, or the appropriate federal agency, and a state or political subdivision operating pursuant to a contract or cooperative agreement under CERCLA section 104(d)(1), has the authority to enter any vessel, facility, establishment or other place, property, or location described in paragraph (d)(2) of this section and conduct, complete, operate, and maintain any response actions authorized by CERCLA or these regulations.

...

[Title 40 of the Code of Federal Regulations, Part 300 (40 CFR §300,
<http://www.epa.gov/epahome/cfr40.htm>]

In 1993, EPA reiterated and clarified its authority for access to the interiors of buildings under the NCP/CERCLA authority by an interpretive memorandum, which stated:

This directive transmits guidance on the use of authority under §104(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, to conduct response actions to address releases of hazardous substances, pollutants, or contaminants that are found within buildings.

...

There are currently a number of sites throughout the nation where buildings are contaminated with hazardous substances, pollutants, or contaminants, and where the release or threat of release of these substances may pose a substantial threat to human health.

...

Another situation involving indoor contamination may be contamination that is the direct result of a release into the environment from a non-natural source that migrates into a building or structure. For example, contamination in a yard may be tracked into a building on the feet of the residents or workers, or may migrate into the building through an open window or basement walls. In this situation, a release into the environment is occurring and has caused a building to become contaminated with the hazardous substance, pollutant, or contaminant.

...

[Response Actions at Sites with Contamination Inside Buildings, 8/12/93, From: Henry L. Longest II, Director /s/ Office of Emergency and Remedial Response, To: [EPA Regional Directors], <http://www.epa.gov/superfund/resources/remedy/pdf/93-60312-s.pdf>]

“A public health emergency before forced entry” – false EPA claim

From the above, it is clear that EPA’s Mary Mears is making false statements when claiming there would have to be a public health emergency before EPA can gain involuntary access to clean up interiors of buildings:

Mears, the EPA spokeswoman ... said. "In order for us to demand access to people's homes, it would have to be a public health emergency," Mears said. "We don't think that is the situation we have here at all."

...

[LA Times, 9/4/02 - A Toxic Legacy Lingers as Cleanup Efforts Fall Short, By Maggie Farley, Los Angeles Times Staff Writer, September 4, 2002,
<http://www.latimes.com/news/specials/911/la-na-poison4sep04.story?null>]

EPA admissions of responsibility for indoor air – disaster/terrorism/otherwise

Whitman's 11/28/01 testimony admits to authority over indoor air in terrorism events

EPA Administrator Whitman provided the following testimony on 11/28/01, two months after the WTC disaster. Note that she refers to EPA's role under the Federal Response Plan (FRP), Emergency Support Function 10 (ESF #10), under the NCP in assessing and cleaning up indoor environments either as a result of terrorism or any other disaster. Excerpts from the FRP (which the EPA IG 1/27/03 report says that EPA used) were given earlier in this section, and also refer to the same Presidential Decision Directive (PDD) 62 and Emergency Response Function (ESF) #10 that Whitman does in her speech.

There are several Presidential Decision Directives (PDDs) that specify a role for EPA in counter terrorism activities. PDD 39 assigned EPA the task of assisting the FBI during crisis management in threat assessments and determining the type of hazards associated with releases or potential releases of materials in a terrorist incident. EPA, as the lead agency for Hazardous Materials Response under Emergency Support Function (ESF) 10 of the Federal Response Plan, is also assigned to assist the Federal Emergency Management Agency, during consequence management with environmental monitoring, decontamination, and long-term site cleanup. PDD 62 reinforces our mission to enhance the nation's capabilities to respond to terrorist events. PDD 63 which addresses the protection of America's critical infrastructure, named EPA the lead agency for the Water Supply Sector.

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.

...

EPA established and maintains a National Incident Coordination Team (NICT) to assure full agency coordination of all emergency preparedness and response activities including counter terrorism. In the regions, the Agency's first responders are the On-Scene Coordinators (or OSCs). The OSCs have been actively involved with local, state, and federal authorities in preparing for and responding to threats of terrorism.

...

[Statement of Governor Christine Todd Whitman before the Subcommittee on VA, HUD and Independent Agencies of the Committee on Appropriations, 11/28/01, <http://yosemite.epa.gov/administrator/speeches.nsf/0/1758d470f63c8b2085256b13004cb3e1?OpenDocument>]

EPA Assistant Administrator's 1/6/03 testimony also states EPA has jurisdiction over indoor air in disaster situations like terrorism

EPA Assistant Administrator Marianne Horinko also confirmed that EPA was responsible for indoor air and operating under the NCP in the event of terrorism or a disaster.. The following is part of a press release from US Representative Jerrold Nadler:

For more than a year, the EPA has maintained that the City Department of Environmental Protection (DEP) is in charge when it comes to cleaning up indoor workspaces. But, in sworn testimony given last month, the Assistant Administrator of EPA, Marianne Horinko, admitted that Presidential Decision Directive (PDD) 62, which dictates how the federal agencies are to respond to an act of terrorism, mandates that EPA must clean up inside buildings. The transcript from that deposition (Hugh B. Kaufman v. US EPA, Jan. 6 2003) is as follows:

Question: Who in EPA, who is the individual who has the ultimate lead for the cleanup of interiors? Is it you?

Answer: Ultimately I suppose it would be Governor Whitman as the administrator. Since I do report to her, I am certainly the lead on emergency response.

Question: Is cleaning up the interiors an emergency response?

Answer: Yes, it is.

...

[NYC WORKFORCE MAY FACE SERIOUS HEALTH RISK, 2/10/03, Rep. Nadler Exposes Bungling of World Trade Center Contaminant Clean-up in Workspaces, Presents New Evidence That EPA Illegally Delegated Authority and Then Lied about Knowledge of the Law, http://www.house.gov/nadler/EPA_021003.htm]

EPA's 2002 Strategic Plan for terrorism, with preface by Whitman, addresses indoor air

EPA's strategic planning document for terrorism, with a preface signed by Administrator Whitman, describes EPA's authority over indoor air after a terrorism event:

The terrorist attacks of September 11 and the threat of further harm to U.S. interests have illustrated the necessity for action by the Federal government to prepare and protect the public against the myriad threats posed by terrorism.

...

Critical Infrastructure Protection

EPA has unique programmatic responsibilities and expertise related to the water and wastewater industries; the use, handling, storage, release, and disposal of chemicals and chemical wastes at industrial facilities; and indoor air quality. In these areas, EPA is committed to assessing and reducing vulnerabilities and strengthening detection and response capabilities for critical infrastructures. In addition, EPA will contribute to similar efforts led by other Federal agencies addressing food, transportation, and energy

industries, and will provide environmental expertise to support Federal law enforcement activities.

...

[emphasis added] [EPA's Strategic Goals in Homeland Security I. CRITICAL INFRASTRUCTURE PROTECTION Strategic Goals, Tactical Action Initiatives, and Benchmarks, http://www.epa.gov/epahome/downloads/epa_homeland_security_strategic_plan.pdf]

Whitman's speech in Libby, Montana admitted EPA cleanup authority over indoor air in businesses as well as residences under the NCP

Administrator Whitman also stated, just 4 days before the WTC disaster, that EPA had the authority to clean up asbestos in homes as well as businesses in the town of Libby, Montana, whether or not the town was listed as a Superfund site (the equivalent of an National Priorities List listing):

And because we share that goal I want to assure you of something else. It has never been our plan to look to you to pay for any part of this clean-up, including the clean-up of residential properties.

That is why I am pleased to announce today that EPA is taking an unusual legal step to protect you from future liability, whether or not we end up listing Libby on the NPL *[National Priorities List, or Superfund]*. We will be providing homeowners with legal guarantees called "A No Action Assurance" that will protect them from EPA's ever seeking to have them assume the costs of cleanup. Similarly, local businesses in Libby that did not know about the hazards of vermiculite before November 1999, and that did not profit from its use, will also receive this guarantee.

...

[Remarks of Governor Christine Todd Whitman, Administrator of the U.S. Environmental Protection Agency, at a Town Hall Meeting, Libby, Montana, 9/7/01, <http://www.epa.gov/newsroom/>]

Whitman presides over EPA awards ceremony for indoor air cleanups from hazardous waste releases

In the summer of 2001, Administrator Whitman presided over an awards ceremony for regional enforcement and cleanup of indoor air in residences and business.

In her welcoming remarks, Administrator Christine Todd Whitman noted: "It is fitting that we meet during Earth Week to recognize those regional staffers who are out there in the field every day making a real difference in the lives and health and countless Americans." She also commented on the "leadership, creativity, and hard work of EPA Regional and HQ staff and our State partners in implementing the RCRA cleanup reforms. Whitman quipped, "As I looked over the list of today's winners, I couldn't help but think that maybe I don't have the toughest job at EPA after all... even though there are times we have messes to clean up, they're nothing like the messes you find out in the field!" Whitman expressed the Agency's appreciation to the award winners:

...

"When it comes to cleaning up a contaminated site, those who live nearby think it can never be done fast or cheaply enough. We would think the same thing if we were in their shoes."

...

[EPA Cleanup News, Issue No. 7, Summer 2001, Office of Site Remediation, EPA Publication No. EPA 300-N-01-007, <http://www.epa.gov/compliance/resources/newsletters/cleanup/cleanup7.pdf>]

Several of the winners of EPA awards concerned the testing or prevention of indoor air exposures to toxic substances from hazardous wastes, as described below. Of particular note is the fact that EPA worked with the states and local authorities and exercised oversight over them, but did not delegate any authority or "wash their hands" of the matter as EPA Region 2 did for indoor air after the WTC collapse.

Outstanding Stakeholder Involvement, Diane Sanelli, Region 8

...

Alliant Tech systems site, a data-storage device manufacturer has solvent-contaminated groundwater which spread to an upscale suburban neighborhood. At the Hamilton Sundstrand and Alliant sites, the initial focus has been to determine whether there may be an immediate health threat from vapors in homes and, if so, to install ventilation systems.

... Diane worked with each homeowner individually to explain why information needed to be gathered, how data would be used, and what would be done if there was a problem. While the type of sampling was the same in every household, Diane arranged for the timing of the sampling and location of the sampling device to be negotiated with each homeowner. She was instrumental in ventilation systems being installed quickly once a problem was identified in a home.

...

The Alliant site is located in an affluent suburban area, where residents, some environmental professionals, were highly educated, well connected politically, and felt the company had not been forthcoming with information and had moved too slowly. Because they were concerned about property values and distrusted the company, some initially resisted the plan to sample indoor air. Diane recognized residents desire to be more active in the design of the sampling plan so she put all existing data in the public information center, and met with residents to discuss the draft plan so, if needed, adjustments could be made. Diane also recognized the need to reach out to several business owners and their employees. She arranged meetings with owners and employees so that their issues could be the focus of the discussion.

The Ensign Bickford site, a former explosives plant, which is located in a primarily undeveloped area, is an industrial park, a historic company town, and has a few scattered new homes. While there was no evidence that the contamination has spread beyond the site, the fact that the waste is related to explosives manufacturing had the potential for causing considerable alarm. ... Diane was careful to bring the local health department and county officials into the planning process so that they were in agreement with the indoor air sampling plans. She included the local school district, the Tri County Health Department, Adams County officials, state legislators and the Congressional delegation.

...

Outstanding Use of Environmental Indicators, William Lowe, Region 7

William (Bill) Lowe currently manages 10 EPA-lead corrective action facilities, provides key technical support on an additional 15 facilities, and coaches/mentors seven other project managers in RCAP

...

Sherwin Williams' groundwater sampling indicated an apparent release of metals so Bill worked with them to change their method to a "low flow" minimal disturbance technique. . . . As part of this monitoring plan, trigger levels in groundwater were established for potential indoor air exposure concerns.

...

Outstanding Faster, Focused, More Flexible Cleanup Team of the Year, Indoor Air Action Team, Region 8, Felix Flechas, Mary Wu, Thomas Aalto, Randall Breeden

...

Due to a resources shortfall at the Colorado Department of Public Health and Environment, Region 8 assumed responsibility for corrective action activities at two Denver area sites where solvent VOC groundwater plumes that had migrated under residential areas Alliant Technologies, Inc. (ATK), and Hamilton Sundstrand, Inc., (HS). . . . Environmental investigations revealed that both soil and ground water was contaminated with VOCs at levels several orders of magnitude above MCLs, and that contamination had migrated into the ground water beneath a residential subdivision. EPA reviewed the existing data to evaluate if public health was impacted by residential indoor air exposure due to groundwater contamination which showed public health was potentially impacted but not at an imminent endangerment level.

...

Extensive subsurface contamination was found in the ground water plume which was subsequently found to have migrated off-site beneath a residential area at levels of several orders of magnitude above MCLs. Based on a preliminary EI investigation, it was determined that an interim measure needed to be implemented, so a ground water barrier system was installed along the facility boundary to mitigate the flow of contaminated ground water to the residential area. . . . Due to the very rapid manner in which ventilation systems have been installed in homes, HS may already be close to achieving the EI for human health in the residential area, and as a result of the interim measure, the contaminants in groundwater have been reduced to approximately one order of magnitude over their respective MCL values. . . . The Team worked with the state to evaluate environmental conditions at the facilities, modeled all existing data to determine appropriate Federal authorities to use, and coordinated development of EPA orders with the state.

...

[RCRA Corrective Action Award Recipients, 2001,
<http://www.epa.gov/superfund/new/awards/rcra/index.htm#correct>]

EPA denials of authority over indoor air after the WTC collapse

Despite the clear authority of EPA over indoor air under the NCP, and admissions by EPA that it has authority over contamination of the interiors of buildings, EPA took every opportunity to deny this authority after the WTC disaster.

If EPA believed that it was misquoted in the press, it did nothing to correct these misconceptions.

EPA had the ability to set the record straight by the simple mechanism of issuing a press release. Press releases are posted on the EPA website at www.epa.gov for both Headquarters and Region 2, and a complete archive is maintained. No press release was ever issued disclaiming reports in the media quoting EPA as saying they had no authority over indoor air after the WTC disaster.

By intentionally giving the false impression that EPA had no responsibility for indoor air, EPA placed the burden on common citizens to attempt the unfamiliar and traumatic tasks of testing for themselves, and then for either do-it-yourself cleanups using the NYC DOH guidelines (as recommended by EPA), or paying for professional abatement of uncertain quality, or choosing whether to relocate and violate leases, or fight court battles with landlords over abatements.

People either feared for their own health, or worried about their children's risk if not their own. Citizens suffered the immediate effects of asthma, reactive airway disease, and cardiovascular problems after making the knowing choice to follow EPA's advice and remain in contaminated surroundings. And there will be cases of mesothelioma and lung cancer in the future, where WTC exposures cannot be ruled out as the causative factor.

All this trauma and compromised health, if not also a large financial burden, for no reason other than EPA denials it had the authority over indoor air, also claiming there were no hazards, washing their hands of the matter. If at least EPA had admitted that it had the option of exercising its authority under the NCP over indoor air, and admitted that all its WTC actions were pursuant to the NCP, then elected officials and others could have more effectively lobbied EPA for a more prompt response to the needs of the living victims of the WTC.

Compendium of denials by EPA of authority over indoor air after the WTC

The following compendium is where EPA denied it has authority over indoor air issues after the WTC collapse, emphasis added.

Good Afternoon,

Per our conversation this morning, below is the information we discussed earlier today including web pages to enable you to obtain additional information.

Since you work very close to the World Trade Center (WTC), it is important to discuss the effects of both the ambient (outside) and indoor air quality on the health of you and your family. ... presentation made by the Acting Deputy Regional Administrator, Ms. Kathleen Callahan, on November 1st. ...

Indoor Air Quality (IAQ)

The EPA does not have jurisdiction or oversight of indoor air quality or indoor cleanups. New York City (NYC) has the primary authority and responsibility for re-occupancy of buildings and health issues.

...

[boiler-plate form follow-up letter from Region 2 to residents who inquired. Unknown date, but at least after the 11/1/01 speech by Callahan. Made available by EPA in response to

a FOIA request from the NY Environmental Law and Justice Project]

11/27/01

Dr. Jenkins further asserts that EPA should have taken steps to “require” the NYCDOH guidelines to be changed “to be as strict as the EPA national regulations.” EPA has no authority to do so.

[Refers to the unsafe do-it-yourself cleanup guidelines for residences and offices issued by the NYC Dept. of Health, described in greater detail in Section E on cleaning.]

...

[DRAFT: November 27, 2001, ATTORNEY WORK PRODUCT, ATTORNEY-CLIENT COMMUNICATION, signed by Walter Mugdan, EPA Region 2 Counsel. ⁸³]

1/11/02

As to whether that money could be used to help in cleanup of homes and offices, however, Martyak notes, “indoor air is beyond EPA’s jurisdiction.”

...

[MSNBC, 1/11/02 -Yearning to breathe in a toxic zone, by Francesca Lyman]

1/13/02

None of the thousands of tests that the EPA cites as showing the asbestos risk is minimal were taken inside the buildings and rooms where people live, study and work.

“That’s just not our job, and we have no policies or procedures for doing that type of testing,” said Bonnie Bellow, spokeswoman for the EPA’s region II office in New York. “We’ve never had to worry about asbestos in houses before.”

...

[NY officials underestimate danger, by Andrew Schneider, Published in the A-section of the St. Louis Post-Dispatch on Sunday, January 13, 2002. Updated article on 1/13/03 posted at

<http://www.stltoday.com/stltoday/news/stories.nsf/news/85C8BC166AC08DEE86256CAF00051C2E?OpenDocument&highlight=2%2Cworld%2Ctrade%2Ccenter%2Cattack%2Casbestos&headline=World+trade+center+attack+asbestos+health+threat>]

1/22/02

An EPA Region II spokesperson went a step further later in January and stated the EPA had taken no responsibility for indoor air quality and was, in fact, satisfied by the City’s work. That spokesperson stated, “The EPA’s job was to monitor outdoor air. Monitoring indoors--that wasn’t our job. That’s what the city took care of.” According to the article, she added “that she felt the city did a good job of testing and monitoring indoor air.”

...

[Rogers, Josh, “Nadler says EPA is Passing the Buck Downtown,” Downtown Express, January 22, 2002, as cited by U.S. CONGRESSMAN JERROLD NADLER, WHITE

PAPER, LOWER MANHATTAN AIR QUALITY, Last Updated, April 12, 2002,
http://www.nyenvirolaw.org/PDF/EPA%20White%20Paper%20Final%204_121.pdf
or <http://www.911digitalarchive.org/objects/112.pdf>]

2/12/02

As you may recall, in the days immediately following September 11th, the City of New York assumed responsibility for indoor environmental quality. . . . Despite the City's best efforts to address indoor environmental issues, it is apparent that many concerns and challenges remain. I am committed to providing additional assistance to the City and its residents and stand ready to do so. In addition, as you suggested yesterday, I will be working with our local, state, and federal partners to establish a Task Force on Indoor Air in Lower Manhattan, so that we can move as quickly as possible to address the remaining concerns we all share.

. . .

[Administrator Whitman to Senator Clinton, letter dated 2/12/02, one day after US Senate hearing on indoor air]

5/28/02

But Mears countered that cleanup efforts are the responsibility of business owners, not the EPA. "According to OSHA standards, worker safety must be provided and financed by employers," she said.

Will Insurance Pay? "Most businesses have insurance to pay for professional cleaning," she added. "Our program is directed towards concerned citizens who may not have the money to ensure that their homes are truly free of contaminants."

. . .

*[Poisons from Towers Crash Still Loose in Manhattan, Rep. Nadler Says, Calling EPA a 'Disgrace,' By Kent Vander Wal, 5/28/03,
<http://www.columbia.edu/cu/libraries/indexes/cq-homeland-sec.html>]*

REFERENCES

1. Data for Con Ed, NYC Dept. of Env. Protection, OSHA, NY State Department of Environmental Conservation, NY State Dept. of Labor Public Employee Safety and Health Bureau test data was supplied on 11/13/01 from the NYS Dept. of Environmental Conservation to the NY Environmental Law and Justice Project in response to a Freedom of Law request, and is posted at www.NYenviroLAW.org .

2. Data for Con Ed, NYC Dept. of Env. Protection, OSHA, NY State Department of Environmental Conservation, NY State Dept. of Labor Public Employee Safety and Health Bureau test data was supplied on 11/13/01 from the NYS Dept. of Environmental Conservation to the NY Environmental Law and Justice Project in response to a Freedom of Law request, and is posted at www.NYenviroLAW.org .

3. **Gramercy Park, NYC 1989 – Con Edison steam pipe explosion.** Negative air pressure, segregating abatement areas, etc., was strictly followed for large apartment buildings after the explosion of a Con Edison steam pipe in Gramercy Park, NYC in 1989. I have photographs of whole apartment buildings swathed in Tyvek sheeting. The amount of asbestos released in the 1989 Con Ed steam pipe explosion was only 200 pounds. For the World Trade Center, from 400 to 1000 tons of asbestos was released.



<http://www.bumc.bu.edu/SPH/Gallery/preface.html>

[See this web site for photo of buildings swathed in Tyvek]

Gramercy Park, New York City , New York Times Friday December 17, 1993, "Con Edison is Indicted in 1989 Cover-up in Asbestos Blast,... Two Ex-officials Indicted."

New York Times Tuesday November 1, 1994, "Con Edison Admits to Conspiracy to Cover-up Asbestos in Blast."

<http://es.epa.gov/oeca/accomplish/appendix/criminal.html>

United States v. Con Edison: On August 19, 1989, an explosion of a Con Edison steam pipe in the Gramercy Park area of Manhattan released approximately 200 pounds of asbestos into the air. Many people had to be evacuated from their homes during the ensuing cleanup operation. In 1993, Con Edison and two corporate officers were indicted on various charges including conspiracy to conceal the release of asbestos in violation of CERCLA and EPCRA and Title 18, failure to notify the United States of the release in violation of EPCRA, failure to notify the community emergency coordinator and the state emergency planning commission in violation of EPCRA, and giving false statements and causing others to give false statements in violation of Title 18. After commencement of trial in October 1994, Con Edison and Constantine Papakrasas,

an Assistant Vice President in charge of Con Edison's Steam Operations Division, pled guilty. Con Edison pled to four counts, including conspiracy, EPCRA failure-to-notify, and two violations of Title 18. Con Edison was sentenced to three years of probation under the supervision of a court-appointed monitor, and fined \$2 million. Due in part to his failing health, Mr. Papakrasas was fined \$5,000.

<http://www.bumc.bu.edu/SPH/Gallery/preface.html>

Gramercy Park, New York City. New York Times Friday December 17, 1993 "Con Edison is Indicted in 1989 Cover-up in Asbestos Blast,... Two Ex-officials Indicted.

New York Times Tuesday November 1, 1994 "Con Edison Admits to Conspiracy to Cover-up Asbestos in Blast."

<http://www.ucc.org/disaster/d011502.htm>

"Some ten years ago in Gramercy Park we had a huge event where a ventilation shaft exploded and sent a cloud of asbestos up all over the area," he said. "When that happened, the city came in, evacuated everyone, sealed off the area, and cleaned it all up. It was declared a public health emergency by the Department of Health."

http://sdf.lonestar.org/~benaaron/2001_09_01_blogarc.html

One weekend afternoon in 1989, I was home in New York, mucking around. Home was a fifteenth-floor room in a flophouse that was officially classified as a Single-Room Occupancy Hotel. The occupants were old people who were too poor to move, and struggling Gen-Xers like me. My window, which faced south toward Gramercy Park a few blocks away, was open. Abruptly there was an airplane whoosh overhead, a full-bodied grey engine noise that went on for an unnaturally long time, as if a plane were trying to land in Gramercy Park, which is smaller than a football field and enclosed by iron gates to which only residents of the surrounding luxury buildings have keys. And the plane kept landing. For five, ten, fifteen minutes, the plane kept landing.

Emergency sirens everywhere. The plane was still landing. I turned on the all-news radio and they already had the story of what was causing the noise: a steam pipe had burst next to Gramercy Park. Steam is a utility that runs under the streets of New York City. You can see it sometimes wisping out of grates and manhole covers. At this moment there was a scalding geyser in the street a few blocks south of me; I couldn't see it because Baruch College was in the way. All the front rooms in the building next to the geyser were boiled.

It was a nice day and most people had gone out. Only one of the residents died, a woman who had gone into the front room to change her baby (who I suppose died too, but I no longer remember the details). A few Con Ed workers who had been working on the steam pipe died. Two Brat Pack writers who lived in the building lost all their work because their computers were in their front room. The neighborhood was covered in asbestos for a while. Lawsuits were filed. It all seemed like a terribly big deal at the time. . . . posted by Diana 9/18/2001 07:24:30 AM

http://www.urbanlogic.org/site/hist_tx.htm

On a hot summer day in the middle of August 1989, the asphalt covering an ancient steam pipe in underneath 20th Street at Third Avenue in the Gramercy Park area of Manhattan exploded in a geyser of steam that showered the historic neighborhood with 220 pounds of asbestos wrapping. Several people died in the explosion, the neighborhood was reconfigured as a quarantined war zone and the residents were turned into nomads, separated from their comfortable urban surroundings, possessions and lifestyles.

<http://www.corporatepredators.org/top100.html>

Consolidated Edison Company Type of Crime: Environmental Criminal Fine: \$2 million
Corporate Crime Reporter 46(5), November 28, 1994 Consolidated Edison Company pled guilty to four environmental crime counts in connection with the release of 200 pounds of asbestos after an August 1989 steam manhole explosion in the Gramercy Park section of Manhattan.

<http://college3.nytimes.com/guests/articles/2001/12/26/891318.xml>

For a time, Con Ed lurched from one crisis to another: blackouts in 1965 and 1977, with a near-bankruptcy in between; an explosion in 1989 in Gramercy Park that killed several workers and spewed asbestos onto homes; a string of accidents and mishaps at its Indian Point 2 nuclear plant, which was sold in September to the Entergy Corporation (news/quote).

http://www.isip.msstate.edu/publications/courses/ece_8463/projects/1998_spring/data/lm_training/ws93_074.text

THE COMPANY DID NOT COOPERATE WITH OUR INVESTIGATION IN ANY MEANINGFUL WAY SAID US ATTORNEY MARY JO WHITE AT A NEWS CONFERENCE ALL THREE DEFENDANTS WERE ALSO CHARGED WITH MAKING FALSE STATEMENTS TO THE FEDERAL GOVERNMENT

4. The NYC DOH told residents that their do-it-yourself cleanup guidelines of 9/17/01 only applied to apartments and offices south of Warren St. and west of Broadway.
5. EPA's comments on draft FEMA report, included as Appendix H in: FEMA's Delivery of Individual Assistance Programs: New York - September 11, 2001, dated: December, 2002, p. 65, <http://www.fema.gov/ig/iaprograms.shtm> contains a description of these meetings.
6. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project responsive to the questions of what EPA told citizens.
7. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project responsive to the questions of what EPA told citizens.

8. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project. The FOIA requested documentation of advice to citizens on using professional abatement, assumption that dust contained asbestos, and how EPA defined “minimal dust layers” or “significant dust layers.

9. From: News and Views, City Beat, Tuesday, November 20, 2001, NY Daily News, Feds, City Ignore Asbestos Cleanup Rules, Says EPA Vet

A veteran scientist at the federal Environmental Protection Agency is charging that her agency and the city Health Department are ignoring federal asbestos-abatement law in buildings around the World Trade Center disaster site.

In a scathing memo circulated last week within the agency, Cate Jenkins, a 22-year EPA employee, charged that top brass have "effectively waived" the EPA's "strict national regulations for removal and disposal of asbestos contaminated dust" by recommending that residents and commercial building managers in lower Manhattan follow the "extremely lenient (and arguably illegal) asbestos guidelines of the New York City Department of Health."

In her memo, a copy of which was obtained by the Daily News, Jenkins noted that the EPA's testing had identified at least 30 locations, some five to seven blocks from Ground Zero, where asbestos levels in dust samples were above the 1% "action level" cited in the federal

Clean Air Act.

That law requires elaborate and strict procedures for asbestos removal to be followed and the use of trained asbestos cleanup companies.

"We haven't waived any regulations," said Walter Mugdan, the agency's regional counsel, who insisted Jenkins was misreading the law.

"She [Jenkins] assumes that they [the regulations] apply to the cleaning up of dust in residential or office buildings in lower Manhattan. "When they were written, they were never intended to apply to something like a terrorist act. These regulations apply to owners and operators of a facility who are carrying out a demolition or renovation. They were never contemplated to apply to someone cleaning an apartment," Mugdan said.

"This is not an academic or scientific argument," Jenkins said yesterday. "Our regulations are very specific. They don't allow you to do this. We've had a breakdown where the federal EPA and the city are scrambling to get everything back to normal, and they're ignoring the law."

Jenkins, who has a Ph.D. in chemistry and works for the agency's Washington-based Hazardous Waste Identification Division in the Office of Solid Waste, said she believes her colleagues "are afraid to say anything."

"Ludicrous" Advice

Some of the advice the Health Department has posted for people on how to remove dust in their apartments, Jenkins said, is "ludicrous." One example, from the department's Web site: "If curtains need to be taken down, take them down slowly to keep dust from circulating."

"EPA regulations do not allow anyone to oversee and perform . . . asbestos removal, such as a resident in an apartment building or a building owner," Jenkins said. EPA administrator Christie Whitman and other top agency officials have repeatedly stressed that a few dozen of more than 1,300 air monitoring tests the agency has done since Sept. 11 have shown asbestos levels above federal safety levels.

"Of course, individual samples represent only a snapshot at a moment in time, not the environmental conditions that would determine whether federal standards have been exceeded," Whitman wrote in an Oct. 31 Op-Ed piece in *The News*.

In addition, federal and city officials have stressed that the main danger of cancer or asbestosis comes from long-term exposure to the mineral fibers.

The Health Department did not immediately respond to calls seeking comment. But on its Web site, the department says "some asbestos was found in a few of the dust and debris samples taken from the blast site." Still, the city notes: "Most of the air samples taken have been below levels of concern. . . . The risk of developing an asbestos-related illness following an exposure of short durations, even to high levels, is extremely low."

The Danger Indoors

But Jenkins noted that outdoor readings could be lower than asbestos readings indoors, where fibers stay unless they are professionally removed.

At least two independent studies of commercial and residential buildings near Ground Zero appear to support her statement. One of those reports was released yesterday by the Ground Zero Task Force, a coalition of elected officials who represent lower Manhattan. Those tests, conducted Sept. 18 in two residential buildings near Ground Zero by Cincinnati-based Environmental Quality Management, found asbestos levels far exceeding the federal safety limit. The other study, conducted in late September by Virginia-based HP Environmental, found that seven of 11 air samples taken from two office buildings within three blocks of Ground Zero exceeded federal standards.

10. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project. The FOIA requested documentation of advice to citizens on using professional abatement, assumption that dust contained asbestos, and how EPA defined "minimal dust layers" or "significant dust layers.

11. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project. The FOIA requested documentation of advice to citizens on using professional abatement, assumption that dust contained asbestos, and how EPA defined "minimal dust layers" or "significant dust layers.

12. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project. The FOIA requested documentation of advice to citizens on using professional abatement, assumption that dust contained asbestos, and how EPA defined "minimal dust layers" or "significant dust layers.

13. Example of official agency request for documentation from the regulated public:

Dear _____ :

The U.S. Environmental Protection Agency's Office of Solid Waste (EPA/OSW), as directed by Congress in the Hazardous and Solid Waste Act of 1984 (HSWA), is undertaking an investigation of _____. This investigation is being conducted pursuant to a 1991 settlement agreement between EPA and _____. The settlement agreement identifies _____. (See Attachment for _____.) The purpose of this project is to determine whether, _____

_____. Your facility has been _____. Under Section 3007 of the Resource Conservation and Recovery Act (RCRA), 42 USC 6927, you are required to provide us access to your facility and provide us with certain waste generation and management information.

EPA is working with an industry workgroup comprised of representatives from the _____. The workgroup has reviewed and commented on the Agency's information collection and quality assurance plans.

EPA has contracted _____ (EPA Contract No. _____) to assist in the characterization and evaluation of _____. _____ will contact your facility in the near future to collect facility-specific information and schedule the site visit. If you have any questions or need additional information please call _____

14. Arts, Crafts, and Theater Safety, 181 Thompson St., Suite 23, New York City, NY 10012, 212/777-0062, actsnyc@cs.com.

15. US EPA (1990) Common Questions on the Asbestos NESHAP. EPA Publication No. 340/1-90-021. Available online at: <http://www.epa.gov/ncepihom/nepishom/>

40 CFR § 61. The Code of Federal Regulations are available from most larger libraries, all law libraries, and also online at: <http://www.access.gpo.gov/nara/cfr/index.html>, or for EPA-only CFR citations (faster) at <http://www.epa.gov/epahome/cfr40.htm>

16. US EPA (1992) Guidelines for Catastrophic Emergency Situations involving Asbestos, EPA Publication No. EPA 340/I-92-010. Available at: <http://www.epa.gov/nepis/>

17. Callahan's 11/26/01 testimony was included in documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project. The FOIA requested documentation of advice to citizens on using professional abatement, assumption that dust contained asbestos, and how EPA defined "minimal dust layers" or "significant dust layers."

18. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project. The FOIA requested documentation of advice to citizens on using professional abatement, assumption that dust contained asbestos, and how EPA defined "minimal dust layers" or "significant dust layers."

19. Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, http://epa.gov/wtc/confirmation_clean_study.htm

20. The EPA 110 Liberty St. study states "The regulatory clearance criterion for TEM AHERA was 70 S/cm², converted to 0.022 S/cc, based on a volume of 1200 cc. The regulatory criterion for PCM AHERA was 0.01 f/cc based on a volume of 1200 cc." Under AHERA, the PCM light microscope test may be performed instead of the AHERA TEM test. However, if the PCM test fails, then the

tester is required to follow up with the AHERA TEM test to confirm, or start the abatement process over.

21. Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, http://epa.gov/wtc/confirmation_clean_study.htm

22. Chatfield, E. J., and Kominsky, J. R. (October 12, 2001) Summary Report: Characterization of particulate found in apartments after destruction of the World Trade Center. Requested by: “ground Zero” Elected Officials Task Force. Chatfield Technical Consulting, Mississauga, Ontario, Canada and Environmental Quality Management, Inc., Cincinnati, OH. Posted at www.nycosh.org/linktopics/WTC-catastrophe.html

23. Mugdan, Walter (December 19, 2001) Regional Asbestos Coordinators and National Asbestos Coordinators Meeting for December, Conference call.

24. Chatfield, E. J., and Kominsky, J. R., op. cit.

25. Chatfield, E. J., and Kominsky, J. R. (October 12, 2001) Summary Report: Characterization of particulate found in apartments after destruction of the World Trade Center. Requested by: “ground Zero” Elected Officials Task Force. Chatfield Technical Consulting, Mississauga, Ontario, Canada and Environmental Quality Management, Inc., Cincinnati, OH. Posted at <http://www.nycosh.org/linktopics/WTC-catastrophe.html>.

26. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project responsive to the questions of what EPA told citizens.

27. See stories at:

City Limits MONTHLY, Date: November 2000, GROWING IN
<https://secure12.cfxhosting.com/citylimitsorg/content/articles/articleView.cfm?articlenumber=368>

Revitalizing Urban Brownfields, Good Buys for Troubled Neighborhoods, by Jane Salodof MacNeil, http://www.imakenews.com/clfventures/e_article000131068.cfm

28. WTC Report, Chapter 6, Bankers Trust Building [*Deutsche Bank Building*], nerdcities.com/guardian/WTC/WTC_ch6.htm . Web page also currently cached at the following URL. Highlight and copy the following line for the link:

http://216.239.39.100/search?q=cache:JMZozsXYtdsJ:nerdcities.com/guardian/WTC/WTC_ch6.htm+%22deutsche+bank+building%22+%2B+asbestos&hl=en&ie=UTF-8

29. France, D. (10/5/01) Is Ground Zero safe? *Newsday*, MSNBC.

30. NY officials underestimate danger, by Andrew Schneider, Published in the A-section of the *St. Louis Post-Dispatch* on Sunday, January 13, 2002. *Updated by the St. Louis Dispatch on its*

anniversary date, 1/13/03, under a new title, "World trade center attack asbestos health threat" and can be found at www.stltoday.com .

31. Susan Q. Stranahan (January/February 2003) Air of Uncertainty C overage of potential health problems near Ground Zero was slow to develop, as many news organizations simply accepted the reassurances of the EPA. The episode underscores the difficulty of covering questions with no clear answers. *American Journalism Review*.

http://216.167.28.193/article_printable.asp?id=2746 .

AJR is published by the Philip Merrill College of Journalism, University of Maryland at: <http://www.journalism.umd.edu> .

32. Arts, Crafts, and Theater Safety, 181 Thompson St., Suite 23, New York, NY 10012, 212/777-0062, ACTSNYC@cs.com, www.caseweb.com/ACTS .

33. <http://www.911digitalarchive.org/objects/110.pdf>

34. Granger, R. H., McKee, T. R., Millette, J. R., Chmielinski, P., and Pineda, G. (October 2, 2001) Preliminary Health Hazard Assessment: World Trade Center, HP Environmental, Inc., 104 Elden St., Herndon, VA 20170. Submitted for publication.

35. For a copy of Callahan's 11/26/01 testimony, see page 26 of the PDF file, the documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project responsive to the questions of what EPA told citizens.

36. Personal communication, also see: EPA Is Doubtful on Testing at Attack Site by Queen Kim, 9/23/01, Wall Street Journal; and Fallout. The Environmental Consequences of the World Trade Center Collapse. by Juan Gonzalez. Published by The New York Press, NY, 2002, page 109.

37. See press release file of Representative Nadler on 9/15/01 and 9/21/01 at www.house.gov/nadler .

38. Keith Mulvihill (3/17/03, 05:29 PM ET) An internal agency report is criticizing the U.S. Environmental Protection Agency (EPA) for calling the air at Ground Zero "safe to breathe" during the days immediately following the attack on the World Trade Center. Reuters Health, New York City.

Chris Bowman and Edie Lau (3/16/03) 9/11 air assurances disputed. A draft report says EPA erred in saying breathing at Ground Zero was safe. Sacramento Bee

Anonymous (4/15/03) EPA DEFENDS WTC SITE 'SAFE' CLAIM FROM INSPECTOR GENERAL CRITICISM. Risk Policy Report, one of group of publications at www.insideepa.com.

39. The following are press stories of interest:

12/19/02

Halliburton Co., the industrial giant once led by Vice President Dick Cheney, agreed yesterday to pay about \$4 billion in cash and stock to settle hundreds of thousands of asbestos claims.

...

"This settlement is the kind of model that other companies and asbestos attorneys should be looking at to resolve company liability in the future," said Perry Weitz, the lead negotiator for the plaintiffs. "The settlement shows that companies can quantify their asbestos exposure and conduct business without a cloud of asbestos liability to provide compensation sooner than later."

...

[Halliburton to pay \$4 billion to settle asbestos claims, By CHARLES SHEEHAN, Seattle Post-Intelligencer, 12/19/02, http://seattlepi.nwsource.com/business/100562_halliburton.shtml]

12/11/01

Halliburton's insistence that the asbestos claims would not have a significant financial impact on the company failed to mollify analysts.

"I feel sympathy for [the] management and I wish them luck," said Banc of America's Jim Wicklund. "The problem is, in spite of everything they said... there is still a great deal of uncertainty about the ultimate magnitude of their liability."

Deutsche Bank Alex Brown analyst Arvind Sanger agreed. "Even if they win five different lawsuits, nobody will pay much attention," he said. "But if they lose one, everybody will sit up and take notice." The credit rating agency Standard & Poor's slashed Halliburton's debt rating on Tuesday due to its asbestos risk.

...

[Investors fear rising asbestos claims, 12/11/01, BBC News, <http://news.bbc.co.uk/1/hi/business/1703518.stm>]

12/19/02

Pittsburgh -- Halliburton Co. agreed Wednesday to pay about \$4 billion in cash and stock to settle hundreds of thousands of asbestos claims. The deal would cover about 300,000 current and future asbestos cases, mostly involving people across the country who were exposed to asbestos while working at plants that produced the material or in places where asbestos was used, such as steel mills. Most of the claims against Halliburton were inherited four years ago when the Houston based company -- a huge oil field services, engineering and construction business -- acquired Dresser Industries Inc. for \$7.7 billion. At that time, the company was headed by Vice President Dick Cheney.

...

In the second quarter of this year, Halliburton said it lost \$498 million -- its first loss in four years -- as it took charges against earnings, in part for asbestos-related claims. Halliburton stock

closed down 80 cents a share to \$19.55 Wednesday. Asbestos suits have forced more than 60 companies, including W.R. Grace & Co. and Owens Corning, into bankruptcy since 1982, as former workers seek compensation for health problems linked to the potentially cancer-causing building material. Experts say the Halliburton settlement may provide a blueprint for other companies striving to wipe out their asbestos liability.

...

[Halliburton to fork out \$4 billion for asbestos, ASSOCIATED PRESS, The Atlanta Journal-Constitution: 12/19/02]

5/22/02

During Vice President Dick Cheney's tenure as its chief executive, the Halliburton Corporation altered its accounting policies so it could report as revenue more than \$100 million in disputed costs on big construction projects, public filings by the company show. Halliburton did not disclose the change to investors for over a year.

At the time of the change which was approved by Arthur Andersen, the company's auditor at the time Halliburton was suffering big losses on some of its long-term contracts, according to the filings. Its stock had slumped because of a recession in the oil industry. Two former executives of Dresser Industries, which merged with Halliburton in 1998, said that they concluded after the merger that Halliburton had instituted aggressive accounting practices to obscure its losses. Much of Halliburton's business comes from big construction projects, like natural gas processing plants, which sometimes run over budget. With the policy change, Halliburton began to book revenue on the assumption that its customers would pay at least part of the cost overruns, although they remained in dispute. Before 1998, the company had been more conservative, reporting revenue from overruns only after settling with its customers.

...

[Under Cheney, Halliburton Altered Policy on Accounting By ALEX BERENSON and LOWELL BERGMAN, 5/22/02, NY Times]

6/27/03

The Senate Judiciary Committee on Thursday moved another major roadblock to a legislative settlement of all pending and future asbestos injury claims, voting to require industry to pay as much as \$135 billion over 27 years.

...

Utah Sen. Orrin Hatch, the committee's Republican chairman, implored his colleagues to reach consensus on a "no-fault" system, pointing to 67 companies already in bankruptcy protection because of a flood of asbestos injury claims.

...

Sen. Richard Durbin, D-Ill., said the legislation amounted to "a windfall" for corporate defendants such as the Halliburton Corp., citing an analysis that concluded its asbestos liabilities would shrink from more than \$4 billion to \$420 million. He said a number of defendant companies' share prices have moved sharply higher as the committee has progressed toward a deal.

...

[Asbestos victims get relief in Senate Judiciary vote, Greg Gordon, 06/27/03, Minneapolis Star Tribune, <http://www.startribune.com/stories/587/3959164.html>]

40. Headquarters Press Release, Washington, DC, For Release 05/20/2003, EPA KICKS OFF PUBLIC AWARENESS CAMPAIGN FOR VERMICULITE ATTIC INSULATION WHICH MAY CONTAIN ASBESTOS,
<http://yosemite.epa.gov/opa/admpress.nsf/b1ab9f485b098972852562e7004dc686/9a2bad338cf01a0a85256d2d005af6b5?OpenDocument>
41. Headquarters Press Release, Washington, DC, For Release 05/21/2003, Whitman Proud of Accomplishments as She Prepares to Return Home to New Jersey Resigns as Administrator of EPA, Effective, June 27, 2003,
<http://yosemite.epa.gov/opa/admpress.nsf/b1ab9f485b098972852562e7004dc686/d4ff1eb843da7ea085256d2d005ef686?OpenDocument>
42. There is a typo in the 1/27/03 IG report. The units for the AHERA test should have been structures per square millimeter (s/mm^2), not structures per cubic centimeter or structures per milliliter. The AHERA test uses an entirely different unit, the number of structures collected on a given area of a filter. Other tests and standards use concentration in a given volume of air, which has the units s/cc or s/mL .
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44. For a copy of Callahan's 11/26/01 testimony, see page 26 of the PDF file, the documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project responsive to the questions of what EPA told citizens.
45. Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, p. 4, footnote, http://epa.gov/wtc/confirmation_clean_study.htm

The regulatory clearance criterion for TEM AHERA was 70 S/cm^2 , converted to 0.022 S/cc , based on a volume of 1200 cc.
46. See my 3/11/02 memorandum for a good compendium of the language of these statutes and regulations pointing to background levels as the cleanup goal.
47. ATSDR (2000) Section 5.4 Levels Monitored or Estimated in the Environment. Toxicological Profile for Asbestos, Agency for Toxic Substances and Disease Registry, Centers for Disease Control, ATSDR. Available by calling 1-888-42-ATSDR. Currently, only the final draft version is posted at www.atsdr.cdc.gov/toxprofiles/tp61.html]

48. The AHERA TEM level of 70 structures per square millimeter is the same as 0.02 structures per milliliter. This translates to about 0.01 PCM-equivalent fibers per milliliter. For a lifetime exposure, this would result in an excess cancer risk of over 2 per 1000. See EPA's Integrated Risk Information System for asbestos at <http://www.epa.gov/iris/subst/0371.htm>.

Even the NYC Department of Environmental Protection testified that this would be safe for only short periods of time. The following is a quote from Frieden, NYC Commissioner:

Health professionals have stated that short-term exposure to airborne asbestos, at levels equal to or lower than 0.01 [*fibers per milliliter, PCM equivalent*], carries an extremely low risk of causing asbestos-related illness.

[Frieden, T. R., and Miele, J. A. (February 11, 2002) Testimony before the U. S. Senate Committee on Environment and Public Works Subcommittee on Clean Air, Wetlands, and Climate Change. Alexander Hamilton U. S. Customs House, New York City. Thomas R. Frieden, Commissioner, New York City Department of Health, Joel A. Miele Sr., Commissioner, New York City Department of Environmental Protection]

See discussions and chart of different air asbestos levels with associated risks in the following memorandum:

Jenkins, C. (March 11, 2002) Status of air and dust asbestos testing after WTC collapse: 1. Misrepresented "safe levels" and standards for asbestos; 2. Failure to test at low levels related to safety; 3. Region 2 relied on more sensitive TEM tests for settled dusts in own building, required by EPA policy, did not provide same sensitive testing for rest of NYC, and refused Region 8 offer of free sensitive testing for rest of NYC. Cate Jenkins, Hazardous Waste Identification Division, OSW, EPA, memorandum addressed to affected parties and responsible officials. Posted at www.NYenviroLAW.org

49. The EPA Region 2 background study also apparently intentionally ignored a key study on typical background concentrations of settled dusts in the interiors of buildings. It only cited a study by Ewing. EPA claimed they did an exhaustive literature search and only found this one study by Ewing. Any simple computer literature search would have uncovered the Millette and Hays study: Millette, J. R., and Hays, S. M. (1994) Chapter 6. Data: Levels of asbestos in dust, pages 49-50. In: *Settled Dust Sampling and Analysis*, Lewis Publishers, CRC Press.

In addition, EPA would have know about the Millette and Hays study of settled dusts, because I included this study in my 6/9/02 memorandum, which was sent to EPA Region 2 key personnel working on the WTC cleanup, including the person who approved the EPA background study. My 6/9/02 memorandum contained the following table summarizing typical indoor dust levels of asbestos from this study.

<p>TYPICAL ASBESTOS DUST LEVELS INSIDE BUILDINGS</p>

<p>Levels of asbestos found from testing of a large number of interiors with or without asbestos building materials and/or asbestos contamination problems</p>
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	structures per square centimeter (s/cm ²)
<p>“BACKGROUND” If “background” is defined as the level in a building where there are no asbestos containing building materials, then background should be considered to be at or below 200 s/cm². Testing of three government buildings in Maryland with no asbestos containing materials showed levels below 200 s/cm².</p> <p>A western state building with no asbestos containing materials had even lower levels, an average mean concentration of 160 s/cm².</p>	<p>less than 200</p> <p>less than 160</p>
“RECENTLY CLEANED HARD SURFACES” Buildings with asbestos containing materials where hard surfaces had been recently cleaned.	86 to 320
“LOW” Average of a wide range of measurement (6.5 to over 4.3 million s/cm ²) for buildings with asbestos containing materials. This level was described as “low,” but not “background.” See the earlier entry in this table for levels inside buildings where no asbestos containing materials are used. If “background” is defined as the levels found in buildings not containing asbestos materials, then the “low” level of 1000 s/cm ² is high in comparison.	1000
“ABOVE BACKGROUND” Levels that are considered to be definitively above background	10,000
“HIGH” Levels considered high and “in the range of a significant accidental release from an abatement site”	100,000

50. US EPA (2003) FINAL DRAFT PILOT STUDY TO ESTIMATE ASBESTOS EXPOSURE from VERMICULITE ATTIC INSULATION, Research Conducted in 2001 and 2002, Prepared for: Fibers and Organics Branch National Program Chemicals Division Office of Pollution Prevention and Toxics, U.S. Environmental Protection, Agency Ariel Rios Building 1200 Pennsylvania Avenue, N.W. Washington, D.C. 20460, Prepared by: Versar, Inc. 6850 Versar Center Springfield, VA 22151, May 21, 2003.

For web page to access all figures and tables in the report:
<http://www.epa.gov/opptintr/asbestos/insulationreport.pdf>

51. See Table 6 of the EPA vermiculite attic study.

52. Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, p. 4, footnote, http://epa.gov/wtc/confirmation_clean_study.htm

The regulatory clearance criterion for TEM AHERA was 70 S/cm², converted to 0.022 S/cc, based on a volume of 1200 cc.

53. See Table 7.

54. Kominsky, J. R., and Freyberg, R. W. (1993) Asbestos Fiber Reentrainment During Dry Vacuuming and Wet Cleaning of Asbestos-Contaminated Carpet, EPA Risk Reduction Engineering Laboratory, EPA Publication No. EPA/600/S2-91-004, posted at <http://www.epa.gov/nepis/>

A study was conducted to evaluate the potential for asbestos fiber reentrainment during cleaning of carpet contaminated with asbestos. Two types of carpet cleaning equipment were evaluated at two carpet contamination levels. Airborne asbestos concentrations were determined before and during carpet cleaning to evaluate the effect of the cleaning method and contamination loading on fiber reentrainment during carpet cleaning. Overall, airborne asbestos concentrations during carpet cleaning were two to four times greater than concentrations prior to cleaning. The level of asbestos contamination and the type of cleaning method used had no statistically significant effect on the relative increase of airborne asbestos concentrations during carpet cleaning.

...

1) to evaluate the effectiveness of a high-efficiency particulate air (HEPA) filtered vacuum cleaner and a HEPA-filtered hot-water extraction cleaner ...

Kominsky, J. R., et al. (1991) Evaluation of Two Cleaning Methods for Removal of Asbestos Fibers from Carpet, US EPA Risk Reduction Engineering Laboratory, Cincinnati, OH 45268, EPA Publication No. EPA/600/S2-90/053, posted at <http://www.epa.gov/nepis/>

This study was for artificially asbestos contaminated carpet

The effectiveness of dry-vacuuming and wet-cleaning for the removal of asbestos fibers from carpet was examined, and the potential for fiber reentrainment during carpet cleaning activities was evaluated. Routine carpet cleaning operations were simulated by using high-efficiency particulate air (HEPA) filtered dry vacuum cleaners and HEPA-filtered hot-water extraction cleaners on carpet artificially contaminated with asbestos fibers. Overall, wet-cleaning with a hot water extraction cleaner reduced the level of asbestos contamination in the carpet by approximately 70%. There was no significant change in carpet asbestos concentration after dry-vacuuming. The level of asbestos contamination had no significant effect on the difference between the asbestos concentrations before and after cleaning. Airborne asbestos concentrations were two to four times greater during than before the carpet cleaning activities. Neither the level of asbestos contamination in the carpet nor the type of cleaning method used greatly affected the difference between the airborne asbestos concentration before and during cleaning. *[emphasis added]*

Kominsky, J. R., et al. (1993) Evaluation of Three Cleaning Methods for Removing Asbestos from Carpet: Determination of Airborne Asbestos Concentrations Associated with Each Method, US EPA Risk Reduction Engineering Laboratory, Cincinnati, OH 45268, EPA Publication No. EPA/600/SR-93/155, Posted at <http://www.epa.gov/nepis/>

This study was for real-world asbestos contaminated carpet:

A study was conducted to compare the effectiveness of three cleaning methods for removal

of asbestos from contaminated carpet and to determine the airborne asbestos concentrations associated with each. Baseline measurements before cleaning showed an average concentration of 1.6 billion asbestos structures per square foot (s/ft²) of carpet. The effectiveness of dry vacuuming using cleaners with and without a high-efficiency particulate air filter was compared with that of wet cleaning with a hot-water extraction cleaner. The wet cleaning method reduced the level of asbestos contamination in the carpet by approximately 60%, whereas neither dry cleaning method had any notable effect on the asbestos level. The type of cleaner used had little effect on the difference between the airborne asbestos concentration before and during cleaning.

For comparison, see the air levels found for vacuuming with a regular, non-HEPA vacuum in the following study: Millette, J. R., and Hays, S. M. (1994), Chapter 8, Resuspension of Settled Dust, in: *Settled Dust Sampling and Analysis*, page 63, Table 2, Lewis Publishers, ISBN 0-87371-948-4.

55. EPA current policy is that only asbestos fibers at least 5 µg long present a cancer risk. Although the scientific community does not necessarily agree with this position, if PLM light microscope methods are used on WTC dust, a great majority of the thinner asbestos fibers, but still longer than 5 µg, cannot be detected.

56. Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, Muszynski http://epa.gov/wtc/confirmation_clean_study.htm

57. Joel Kupferman (April, 2002) New York Environmental Law and Justice Project, 315 Broadway, Suite 200, New York, NY 10007, www.NYenviroLAW.org . Personal communication.

58. Joel Kupferman (April, 2002) New York Environmental Law and Justice Project, 315 Broadway, Suite 200, New York, NY 10007, www.NYenviroLAW.org . Personal communication.

59. B. Cliff (April 18, 2002) tenant at 200 Rector St. Personal communication.

Dr. Kate Bernstein (April 23, 2002) tenant in Apt. 33F, 200 Rector Place. Personal communication.

60. Stratus Corporation (October 5, 2001) Asbestos Emergency Monitoring Report at: 290 Broadway after the World Trade Center Disaster. Stratus Corporation, 17 North St., Tarrytown, NY 10591, under contract to the General Services Administration.

61. See EPA Region 8 website for Libby, MT at <http://www.epa.gov/region8/superfund/libby/index.html>

62. Chatfield, E. J., and Kominsky, J. R. (October 12, 2001) Summary Report: Characterization of particulate found in apartments after destruction of the World Trade Center. Requested by:

“ground Zero” Elected Officials Task Force. Chatfield Technical Consulting, Mississauga, Ontario, Canada and Environmental Quality Management, Inc., Cincinnati, OH. Posted at <http://www.nycosh.org/linktopics/WTC-catastrophe.html>.

63. Millette, J.R.; Clark, P.J.; Brackett, K.A.; Wheelles, R.K. (1993) Methods for the analysis of carpet samples for asbestos. Environmental Protection Agency, Cincinnati, OH (United States). Risk Reduction Engineering Lab. (6 pages) NTIS Report Number: PB-93-194355/XAB, EPA Publication Number EPA--600/J-93/167. Available from the National Technical Information Service (NTIS) online for no charge at www.NTIS.gov

Millette, J. R., *et al.* (1994) Appendix 4, Methods for the Analysis of Carpet Samples for Asbestos. In: *Settled Asbestos Dust. Sampling and Analysis*, Lewis Publishers, CRC Press.

64. Millette, J.R.; Clark, P.J.; Brackett, K.A.; Wheelles, R.K. (1993), *op. cit.*

Millette, J. R., *et al.* (1994), *op. cit.*

65. Millette, J. R. (June 4, 2002) Personal communication. MVA Inc., Norcross, GA. <http://www.mvainc.com>

Granger, R. H., McKee, T. R., Millette, J. R., Chmielinski, P., and Pineda, G. (October 2, 2001) Preliminary Health Hazard Assessment: World Trade Center, HP Environmental, Inc., 104 Elden St., Herndon, VA 20170. Paper submitted to the American Industrial Hygiene Association. See Figures 7 and 8 for the fiber widths of asbestos from the WTC. Posted at www.NYenviroLAW.org.

Dr. Millette was EPA’s principal investigator in developing EPA’s carpet ultrasonication method. In an email he stated the following:

This is an old claim [that the ultrasonication breaks down bundles of asbestos fibers into individual fibers, thus resulting in a higher count] developed by experts in litigation to try and discredit the dust method. There are ultrasonic instruments that range in power from those that are used to break up kidney stones to those that allow a mother to see her baby in the womb. The ultrasonic bath used in the carpet procedure is a mild mixing type that you can put your hand in. Because of the nature of the material (carpet) you cannot analyze it directly. You must put the particles into suspension and mix them to get a good subsample for filtration and analysis. The ultrasonic mixing was adapted from the EPA water methods that were developed the 1970s. It represents the best technically feasible way to analyze the sample of dust/dirt presented. ... The EPA carpet sonication method is the best technique available to assess carpet contamination.

The study by Granger, *et al.*, HP Environmental, found that asbestos fibers in WTC fallout were already finely divided to such an extent by the explosion that no further separation of the fibers occurred with the use of ultrasonication.

In addition, ultrasonication is also used in other established asbestos methods, such as EPA's indirect preparation method of air samples, as well as the ASTM microvacuum method 5755. Thus, nothing unusual in the carpet sonication procedure.

66. Millette, J. R., *et al.* (1994), *op. cit.*

67. Kupferman, Joel (June 4, 2002) Personal communication. New York Environmental Law and Justice Project, 315 Broadway Suite #200, New York, New York 10007-1121, www.NYenviroLAW.org

68. Kominsky, J. R., *et al.* (1993) Evaluation of Three Cleaning Methods for Removing Asbestos from Carpet: Determination of Airborne Asbestos Concentrations Associated with Each Method, US EPA Risk Reduction Engineering Laboratory, Cincinnati, OH 45268, EPA Publication No. EPA/600/SR-93/155, Posted at www.epa.gov/ncepihom/nepishom/

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Kominsky, J. R., *et al.* (1991) Evaluation of Two Cleaning Methods for Removal of Asbestos Fibers from Carpet, US EPA Risk Reduction Engineering Laboratory, Cincinnati, OH 45268, EPA Publication No. EPA/600/S2-90/053, posted at www.epa.gov/ncepihom/nepishom/

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69. U.S. Army Corps of Engineers (1992) Asbestos Abatement Guideline Detail Sheets, Engineer Pamphlet 1110-1-11. Posted on the internet at <http://www.usace.army.mil/inet/usace-docs/eng-pamphlets/ep1110-1-11/entire.pdf>

See page 11 of the Corps of Engineer's publication for a table which states that removal is the only option for carpet, and pages 48 and 49 for the procedures for removal. These guidelines are for carpet that is only contaminated with low levels of asbestos, as well as carpet defined as "asbestos containing" having over 1% asbestos. The carpet must be HEPA vacuumed before disposal. This is not to make it free of asbestos, or decontaminated, but instead just to reduce the levels. The carpet must still be removed and replace.

70. US Geological Survey, Environmental Studies of the World Trade Center area after the September 11, 2001 attack, Open File Report OFR-01-0429 Version 1.1, <http://pubs.usgs.gov/of/2001/ofr-01-0429/>
71. Liroy, P. J., et al. (2002) Characterization of the Dust/Smoke Aerosol that Settled East of the World Trade Center (WTC) in Lower Manhattan after the Collapse of the WTC 11 September 2001, *Env. Health Persp.*, 110(7): 703.
72. Liroy, P. J., et al. (2002) Characterization of the Dust/Smoke Aerosol that Settled East of the World Trade Center (WTC) in Lower Manhattan after the Collapse of the WTC 11 September 2001, *Env. Health Persp.*, 110(7): 703.
73. Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, http://epa.gov/wtc/confirmation_clean_study.htm
74. CDC (September 6, 2002) Self-Reported Increase in Asthma Severity After the September 11 Attacks on the World Trade Center --- Manhattan, New York, 2001, *MMWR*, 51(35);781-784, <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5135a1.htm>
75. World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks, Prepared by the Contaminants of Potential Concern (COPC) Committee of the World Trade Center Indoor Air Taskforce Working Group, Peer Review Draft (September, 2002), <http://www.tera.org/peer/wtc/Documents.htm>
76. Apartment 5C in EPA's Interim Final WTC Residential Confirmation Cleaning Study, 110 Liberty St, New York, NY, 5/03, EPA Region 2, http://epa.gov/wtc/confirmation_clean_study.htm
77. World Trade Center (WTC) October 21-22, 2002 Peer Review Meeting Notes, 2/7/03, Prepared by: Toxicology Excellence for Risk Assessment, <http://www.tera.org/peer/wtc/>

78. World Trade Center (WTC) October 21-22, 2002 Peer Review Meeting Notes, 2/7/03, Prepared by: Toxicology Excellence for Risk Assessment, <http://www.tera.org/peer/wtc/>
79. Granger, R. H., McKee, T. R., Millette, J. R., Chmielinski, P., and Pineda, G. (October 2, 2001) Preliminary Health Hazard Assessment: World Trade Center, HP Environmental, Inc., 104 Elden St., Herndon, VA 20170.
80. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project responsive to the questions of what EPA told citizens.
81. EPA (1997 - most recent update) Asbestos; CASRN 1332-21-4, <http://www.epa.gov/iris/subst/0371.htm>
82. Overload can occur when a constant infusion of dust such as short fibers results in a compromised state of clearance *via* the normal routes back up the airways (Castranova, *et al.*, 2000). The lymphatic system offers one route by which this excessive burden of inhaled material can be eliminated from the lung (Lauweryns and Baert, 1977) and serves as a conduit to other parts of the body including the serous membranes which line the body cavities, where mesotheliomas develop (Courtice and Simmons, 1954).

References:

- Castranova V, Driscoll K, Harkema J, Jarabek A, Morgan D, Nauss K, Olin S, Vallyathan VVV, Warheit D, Costa D. 2000. The Relevance of the rat lung response to particle overload for human risk assessment: a workshop consensus report. *Inhal Toxicol* 12:1-17.
- Courtice FC, Simmons WJ. 1954. Physiological Significance of Lymph Drainage of the Serous Cavities and Lungs. *Physiol Rev* 34:419-48.
- Lauweryns JM, Baert JH. 1977. Alveolar clearance and the role of the pulmonary lymphatics. *Am Rev Respir Dis* 115:625-83.
83. Documents supplied by EPA in response to a 1/3/02 Freedom of Information Act (FOIA) request from the New York Law and Environmental Justice Project. The FOIA requested documentation of advice to citizens on using professional abatement, assumption that dust contained asbestos, and how EPA defined “minimal dust layers” or “significant dust layers.

APPENDIX 1 -- Chart/Plot of asbestos concentrations in bulk dust by distance and direction from Ground Zero

Data in chart is presented relative to distance and direction from Ground Zero (GZ). GC is represented by a solid bar in the middle of the chart. Lines above the GZ line are north of GZ. Lines below GZ are points south of GZ. Distance and direction from GZ are approximate, and estimated from the perimeter, rather than the center of GZ. Analyses of bulk dust streets was by light microscopes (PLM) rather than electron microscopes (TEM), and thus underestimates amount of asbestos present. Data is from street dust samples taken 9/11/01 to 9/26/01.

Date (9/11 to 9/26/01)	Location (all outdoor samples)	Blocks from GZ	Direction from GZ (approx.)			Bulk asbestos concentration (by PLM light microscope)	Data Sources*
9/11	West St. and Watt St., debris on floor near command post (Watt St. also called Watts St. This is 2 blocks south of Canal's high point on west side, but much further north than most of Canal)	16	NW			0.50%	Con Edison
9/11	West St. and Watt, debris on vehicle	16	NW			0.50%	Con Edison
9/11	West St. and Watt, debris on vehicle	16	NW			0.50%	Con Edison
9/11	West St. and Watt, debris on vehicle	16	NW			1.30%	Con Edison
9/16-9/17	Market St.	16			NE	3%	Liroy, et al.
9/16-9/17	Cherry St.	11			NE	0.80%	Liroy, et al.
9/11	Pier 25 barge	9			N	none detected	OSHA
9/15	Church & Duane	7			NE	less than 1%	USEPA
9/11	Reade & Hudson	6			N	less than 1%	USEPA
9/19	400 Chamber Courtyard	5	NW			1.4%	USEPA
9/15	Chambers & North End	5	NW			1.3%	USEPA
9/21	4 Blocks north of WTC Bldg. 7	5			N	ND	HP Environ.
9/19	Stuyvesant High School	5			N	2.1%	USEPA
9/19	Stuyvesant HS East	5			N	1.4%	USEPA
9/19	Stuyvesant HS East Stair	5			N	1.5%	USEPA
9/15	Chambers & West Broadway	5			N	below detection limit	USEPA
9/19	455 North End Ave.	4	NW			1.8%	USEPA
9/17	Warren & North End	4	NW			less than 1%	USEPA
9/17	Warren & North End	4	NW			less than 1%	USEPA
9/15	Warren & North End	4	NW			less than 1%	USEPA
9/15	Warren & North End	4	NW			less than 1%	USEPA
9/19	22 River Terrace	4	NW			1.6%	USEPA
9/21	4 Blocks NW of WTC Bldg. 7	4			N	0.75%	HP Environ.
9/18	Church St., South of Duane, roof of automobile	4			N	0.688% (0.018 amphibole, 0.67 chrysotile)	Ground Zero Task Force
9/18	45 Warren St., roof	4			N	1.071% (0.021 amphibole, 1.05 chrysotile)	Ground Zero Task Force
9/15	Warren & Greenwich	4			N	1.2%	USEPA
9/11	Warren & Greenwich	4			N	less than 1%	USEPA
9/11	Warren & West Broadway	4			N	below detection limit	USEPA
9/21	4 Blocks NE of WTC Bldg. 7	4			NE	<0.25%	HP Environ.

9/15	Church & Warren	4			NE	less than 1%	USEPA
9/12	Church & Warren	4			NE	less than 1%	USEPA
9/12	Church & Warren	4			NE	less than 1%	USEPA
9/21	2 Blocks NE of WTC Bldg. 7	3		N		0.75%	HP Environ.
9/21	2 Blocks north of WTC Bldg. 7	3		N		ND	HP Environ.
9/21	2 Blocks NW of WTC Bldg. 7	3		N		0.75%	HP Environ.
9/17	Murray & Greenwich	3		N		less than 1%	USEPA
9/15	42 Murray St.	3		N		1.4%	USEPA
9/15	Murray & Broadway	3			NE	1.2%	USEPA
9/14	Maiden & Broadway	3			NE	less than 1%	USEPA
9/12	Church & Murray	3			NE	less than 1%	USEPA
9/12	Church & Murray	3			NE	less than 1%	USEPA
9/11	Greenwich, btw Murray & Park Pl.	2		N		0.25%	Con Edison
9/18	Murray & West	2	NW			1.7%	USEPA
9/16	Murray & West	2	NW			2%	USEPA
9/15	Murray & West	2	NW			1.3%	USEPA
9/12	Murray & West	2	NW			below detection limit	USEPA
9/12	Murray & West	2	NW			less than 1%	USEPA
9/11	Murray & West	2	NW			4.49%	USEPA
9/11	Murray & West	2	NW			less than 1%	USEPA
9/11	S/E/C West and Murry	2	NW			0.75%	Con Edison
9/17	100 Church St.	2			NE	less than 1%	USEPA
9/17	100 Church St.	2			NE	less than 1%	USEPA
9/15	27 Park Pl.	2			NE	less than 1%	USEPA
9/21	4 Blocks west of WTC Bldg. 7	1	NW			0.50%	HP Environ.
9/11	West St. S/O Vesey	1	NW			1.50%	Con Edison
9/21	2 Blocks east of WTC Bldg. 7	1		N		ND	HP Environ.
9/21	WTC Bldg. 7 Center	1		N		ND	HP Environ.
9/21	2 Blocks west of WTC Bldg. 7	1		N		ND	HP Environ.
9/19	Barclay & Church	1		N		below detection limit	USEPA
9/18	Park Place & West Broadway	1		N		1.9%	USEPA
9/17	Barclay & West Broadway	1		N		less than 1%	USEPA
9/16	Park Place & West Broadway	1		N		2%	USEPA
9/15	Barclay & West Broadway	1		N		1.4%	USEPA
9/15	Park Place & West Broadway	1		N		less than 1%	USEPA
9/12	Park Place & West Broadway	1		N		less than 1%	USEPA
9/12	Park Place & West Broadway	1		N		less than 1%	USEPA
9/26	on plaza, from Church St.	1		N		5%	NYS DOL
9/11	Church & Barclay	1		N		below detection limit	Con Edison
9/11	West Bdwy & Barclay	1		N		trace	Con Edison
9/11	Barclay & Washington St.	1		N		below detection limit	Con Edison
9/21	4 Blocks east of WTC Bldg. 7	1			NE	<0.25%	HP Environ.
9/15	Barclay & Broadway	1			NE	less than 1%	USEPA
9/11	Bdwy & Vesey	1			NE	0.25%	Con Edison
9/14	Ann & Park Row	1			NE	less than 1%	USEPA
9/18	Vesey & West	0	NW			1.5%	USEPA
9/15	Vesey & West	0	NW			less than 1%	USEPA
9/12	Vesey & West	0	NW			below detection limit	USEPA
9/12	Vesey & West	0	NW			less than 1%	USEPA
9/18	North Bridge & West	0	NW			not detected <1%	USEPA
9/18	Church & Fulton	0			NE	1.7%	USEPA
9/18	Church & Vesey	0			NE	less than 1%	USEPA
9/17	Church & Vesey	0			NE	less than 1%	USEPA
9/15	Church & Vesey	0			NE	less than 1%	USEPA

GROUND ZERO. Points above this line are north of GZ, points below are south							
9/18	Liberty & West	0	SW			below detection limit	USEPA
9/18	Liberty & Greenwich	0		S		less than 1%	USEPA
9/19	Dey & Trinity	0			SE	less than 1%	USEPA
9/18	Liberty & Trinity	0			SE	less than 1%	USEPA
9/17	Church & Dey	0			SE	less than 1%	USEPA
9/15	Church & Dey	0			SE	less than 1%	USEPA
9/12	Dey & Trinity	0			SE	%	USEPA
9/12	Dey & Trinity	0			SE	less than 1%	USEPA
9/11	Liberty btwn Greenwich & Trinity	0			SE	0.75%	Con Edison
9/18	Cortlandt & Trinity	0			SE	1.2%	USEPA
9/16-9/17	Courtlandt Street	1			SE	0.80%	Liroy, et al.
9/11	Bdwy & Liberty	1			SE	0.50%	Con Edison
9/11	Bdwy & Dey	1			SE	0.50%	Con Edison
9/18	250 South End Ave, exterior window ledge	2	SW			2.266% (0.016 amphibole, 2.25 chrysotile)	Ground Zero Task Force
9/18	250 South End Ave, ground level courtyard	2	SW			2.069% (0.019 amphibole, 2.05 chrysotile)	Ground Zero Task Force
9/16	Albany & West	2	SW			3%	USEPA
9/19	400 Gateway Plaza	2	SW			1.7%	USEPA
9/17	Liberty & South End	2	SW			less than 1%	USEPA
9/15	Liberty & South End	2	SW			1.4%	USEPA
9/18	Albany & Washington	2		S		1.5%	USEPA
9/17	Thames & Greenwich	2		S		less than 1%	USEPA
9/17	Thames & Greenwich	2		S		less than 1%	USEPA
9/15	Albany & Washington	2		S		less than 1%	USEPA
9/14	Fulton & Nassau	2			SE	less than 1%	USEPA
9/19	300 Albany St.	3	SW			less than 1%	USEPA
9/19	Gateway Plaza (West)	3	SW			1.7%	USEPA
9/19	Carlisle & Washington	3		S		less than 1%	USEPA
9/17	Carlisle & Washington	3		S		less than 1%	USEPA
9/15	Wall & Broadway	3		S		less than 1%	USEPA
9/14	59 Nassau St.	3			SE	less than 1%	USEPA
9/19	225 Rector Pl.	4	SW			1.3%	USEPA
9/19	Hudson Tower (North)	4	SW			1.2%	USEPA
9/14	65 West St. (Christines Nails)	4	SW			less than 1%	USEPA
9/26	110 Greenwich Ave.	4		S		below detection limit	USEPA
9/15	Chase Manhattan Plaza	4			SE	less than 1%	USEPA
9/14	15 Nassau St.	4			SE	less than 1%	USEPA
9/14	Fulton & William	4			SE	less than 1%	USEPA
9/19	200 Rector Pl.	5	SW			1.2%	USEPA
9/15	West Thames & South End	5	SW			1.6%	USEPA
9/17	Thames & Trinity	5		S		less than 1%	USEPA
9/15	Rector & Trinity	5		S		less than 1%	USEPA
9/15	Thames & Trinity	5		S		1.3%	USEPA
9/14	Exchange & New	5		S		less than 1%	USEPA
9/14	Liberty & William	5			SE	less than 1%	USEPA
9/14	Trump Bldg (Pine St.)	5			SE	less than 1%	USEPA
9/19	Battery Place	6	SW			1.8%	USEPA
9/13	Wall St.	6			SE	ND	Con Edison
9/13	Wall St.	6			SE	ND	Con Edison
9/13	Wall St.	6			SE	trace	Con Edison
9/13	Wall St.	6			SE	trace	Con Edison
9/13	Wall St.	6			SE	ND	Con Edison

9/13	Wall St.	6			SE	0.1% chrysotile - 0.1% amosite	Con Edison
9/13	Wall St.	6			SE	0.10%	Con Edison
9/13	Wall St.	6			SE	0.75%	Con Edison
9/13	Wall St.	6			SE	0.10%	Con Edison
9/13	Wall St.	6			SE	0.50%	Con Edison
9/14	Wall & Pearl	7			SE	less than 1%	USEPA
9/14	Wall & Pearl	7			SE	less than 1%	USEPA
9/12	Peckslip Ave, outside dock, street, Seaport S/S	7			SE	0.50%	Con Edison
9/16	Battery Park & 2nd	8	SW			4%	USEPA
9/15	Battery Park & 2nd	8	SW			1.4%	USEPA
9/12	Truck, dirt on radiator, Seaport S/S (South St. Seaport, Fulton & Front)	8			SE	0.50%	Con Edison
9/15	Battery Park & West	10		S		1.1%	USEPA
9/17	Brklyn Battery Tunnel Entrance (North)	12		S		less than 1%	USEPA
9/16	Battery Park At Monument	12		S		2.1%	USEPA

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APPENDIX 2 – ASBESTOS STUDIES OMITTED FROM ATSDR AND EPA RE-EVALUATIONS RELEVANT TO:

- **Mesothelial Tissue and Lung Tissue Asbestos Burden Studies in Human Mesothelioma Cases**
- **Carcinogenicity of Chrysotile Asbestos**

[LISTED IN INVERSE CHRONOLOGICAL ORDER]

Accepted for publication in the American Journal of Industrial Medicine, 4/28/03

Asbestos Fiber Length as Related to Potential Pathogenicity: A Critical Review

Ronald F. Dodson, Ph.D., FCCP, FAHA; Mark A.L. Atkinson, M.A., D.Phil.; and Jeffrey L. Levin, M.D., M.S.P.H.

The University of Texas Health Center at Tyler, Tyler, TX

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Asbestos fibers contributing to the induction of human malignant mesothelioma

Yasunosuke Suzuki and Steven R. Yuen

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APPENDIX 3 – MEMORANDA BY CATE JENKINS ON WTC FALLOUT

The following is a list of earlier memoranda prepared by myself addressing toxic exposures to WTC fallout. These memoranda were distributed to several large email lists of citizens, environmental activists, scientists, and governmental officials, including those in EPA and in the NYC DEP and DOH. Many of these memoranda are posted on the NY Environmental Law and Justice and George Mason University 911 Digital Archive websites at:

www.nyenvirolaw.org/nyeljp-jenkins.htm
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DATE	ADDRESSEES	TITLE OF DOCUMENT
11/15/01	Monona Rossol, Arts, Crafts, and Theater Safety, NYC	EPA National Standards vs. New York City Guidelines, Cleanup of Dusts from World Trade Center
11/20/01	Walter Mugdan, Regional Counsel, EPA Region 2	TRADE CENTER ASBESTOS DUSTS – Rebuttal to claim that national asbestos standards do not apply to the cleanup of residences, business locations, or homes in lower Manhattan
12/3/01	Lillian Bagus, Chief, Waste Identification Branch; Robert Dellinger, Director, Hazardous Waste Identification Division, EPA	WORD TRADE CENTER ASBESTOS
12/7/01	Responsible Parties for Evaluating Asbestos Cleanup Procedures in Buildings in Lower Manhattan after the World Trade Center Collapse	Adequacy of asbestos removal from carpets using dry-type HEPA vacuum cleaners
12/19/01	Affected Parties and Responsible Officials	1) Wipe sampling for asbestos in Lower Manhattan, 2) Projection of airborne levels from settled WTC dusts, 3) Estimation of increased cancer risks based on various WTC dust exposure scenarios
1/11/02	Affected Parties and Responsible Officials	PRELIMINARY ASSESSMENT: 1. Asbestos in Manhattan compared to Libby Superfund site. 2. Why cleanup of WTC contamination is ineffective to date. 3. Advantages of cleanup under Superfund statute. 4. Summary risk assessment for WTC fallout
2/7/02	email note, no explicit addressees, sent to all mailing lists	Use of the National Contingency Plan for cleanup of WTC fallout
2/10/02	Affected Parties and Responsible Officials	NYC DEPARTMENT OF HEALTH MISREPRESENTATIONS February 8, 2002 press release: “NYC Department of Health Presents Findings from Indoor Air Sampling in Lower Manhattan”

1/14/02	—	LIBBY vs. MANHATTAN – DIFFERENT ASBESTOS TESTING METHODS, Table
2/11/02	—	Comparison of the test method sensitivities used by EPA and the levels related to health risks for key toxic substances related to the collapse of the World Trade Center — DRAFT
3/11/02	Affected Parties and Responsible Officials	Status of air and dust asbestos testing after WTC collapse: 1) Misrepresented “safe levels” and standards for asbestos, 2) Failure to test at low levels related to safety, 3) Region 2 relied on more sensitive TEM tests for settled dusts in own building, required by EPA policy, did not provide same sensitive testing for rest of NYC, and refused, 4) Region 8 offer of free sensitive testing for rest of NYC
3/29/02	Ed Light, CIH, Building Dynamics, LLC	Dioxin contamination of offices after WTC collapse and transformer fire: Suggested criteria for cleanup levels
4/30/02	Affected Parties and Responsible Officials	TEM vs. PLM METHODS FOR ASBESTOS DUSTS: – TEM found over 1% asbestos, but PLM tests showed NONE – EPA PLM tests of WTC fallout dust may have underestimated area of asbestos contamination – EPA Region 2 knew TEM was required and needed, had it after the WTC collapse for their own building, used it in past, but refused to use it for the rest of NYC
6/9/02	Affected Parties and Responsible Officials	TESTING CARPET, THE ASBESTOS RESERVOIR: – Best test for carpets; EPA ultrasonication method – No consultants needed; only cost is the lab fee – EPA shows HEPA vacuuming does not remove asbestos – EPA and other asbestos dust benchmarks/safety levels
7/3/02	Affected Parties and Responsible Officials	1. UPDATED LIST -- LABS FOR EPA's ULTRASONICATION TEST FOR CARPETS 2. EPA WILL TRY TO REVERSE EARLY STUDIES SHOWING HEPA VACUUMS INEFFECTIVE
8/29/02	Joel Kupferman, NYELJP; Other Concerned Parties and Responsible Officials	Stuyvesant High School Testing – EPA validates use of sonication testing – Brookfield CT school system using sonication
10/22/02	TERA COPC Committee, Responsible Officials and Affected Parties	COMMENTS – TERA SEPTEMBER 2002 PEER REVIEW DRAFT. World Trade Center Indoor Air Assessment
2/21/03	Richard Troast, EPA, Office of Solid Waste and Emergency Response	MISSING/OMITTED STUDIES FROM EPA DRAFT ASBESTOS RISK REASSESSMENT RELEVANT TO: 1. Mesothelial and lung tissue burden in mesothelioma cases. 2. Carcinogenicity of chrysotile asbestos

NYCity Council Hearing on Post-9/11 Remediation of WTC Contamination

Problems with EPA's Scopes of Work; EPA's Outreach

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December 19, 2002 revision

I am Marjorie J. Clarke, Ph.D., Scientist-in-Residence and adjunct assistant professor in the City University of New York system. I was co-author of a National Academy of Sciences report on the Health Effects of Waste Incineration and teach a course on urban environmental health management. I have written extensively on incineration emissions and their control:

<http://everest.hunter.cuny.edu/~mclarke/resume.htm>

Background

In addition to being a tragedy of global proportions, as an environmental disaster, the collapse of the three World Trade Center buildings and subsequent fires from all eight buildings produced uncontrolled emissions equivalent to dozens of asbestos factories, incinerators and crematoria as well as a volcano.

The collapse itself and the burning of the buildings' contents created an unprecedented quantity and combination of dozens of toxic and carcinogenic substances, including organic compounds (e.g. dioxin and furans, PCBs, benzene, PAHs), heavy metals (e.g., lead, mercury, cadmium and others), fiberglass, and asbestos. Individually, these substances have been shown to cause permanent and serious illnesses, such as mesothelioma as well as other cancers, asbestosis, brain damage, learning disabilities, asthma and other respiratory difficulties. *Some of these toxic compounds were released in gaseous form, but much was released as particulate matter, some of it so fine that it eludes one's coughing mechanism and can accumulate in the lungs, exposing many to toxics and carcinogenic substances for decades. Studies have indicated that combinations of pollutants acting synergistically can result in toxic effects many times higher.*

These toxic and carcinogenic substances were dispersed over a large area for several months. US Geological Survey aerial maps from September, 2001 show asbestos contamination in Manhattan miles from the WTC and NASA satellite maps show the plume of particulates frequently over Brooklyn and Councilmember Yassky has indicated in press reports that there was immediate fallout of fine particulate in Brooklyn. At different times people could smell the plume in upper Manhattan, Brooklyn and parts of New Jersey; and materials recognizable from the WTC landed in Brooklyn.

These substances did not just contaminate the outdoor air, and fallout on the streets and exteriors of buildings, as USEPA had alleged for eight months, but these tiny particles also infiltrated buildings, even when windows were closed. There are no natural cleaning mechanisms inside buildings as there are for outside air (i.e. wind and rain), so particulate matter builds up, particularly in carpets, upholstery, clothing, and draperies. These reservoirs of dust can continue to be sources of contaminants for many years, released to the air when children jump on the sofa and roll around on the carpets. Mold is also a problem in places due to inattention to sealing the buildings after they were contaminated (both to prevent spread of toxics and infiltration of water). The potential for recontamination of neighborhoods exists if buildings contaminated by mold are demolished, but this danger has been ignored by the environmental agencies, just as indoor toxic dust has been.

EPA's Too Little Too Late "Cleanup"

After eight months of having wrongfully delegated the abatement of hazardous wastes from indoor spaces to the City DEP, who delegated it to landlords and tenants, EPA's plan for remediation, was done under protest, and is a half-hearted attempt to appease and public and dupe the media. EPA also made up standards for indoor air quality on the fly. Neither the cleanup plan nor the standards for protection of public health are scientifically valid from a number of standpoints, and they were not and still have not been peer reviewed by the scientific community. Despite repeatedly hearing specific recommendations for creating a cleanup standard that would use the precautionary principle to be protective of health, from independent scientists, such as myself, and the educated citizenry, EPA went forward with a flawed plan. Not really believing in this flawed "cleanup", EPA has refused repeated requests from scientists and the community to conduct an outreach program designed to reach all affected New Yorkers with truthful information about the contamination that was spread to building interiors or about the public health threats this can cause. Below are some of the most substantial problems with the remediation.

The Boundaries for Cleaning are Arbitrary, not based on Science

The boundary for EPA's remediation program is still Canal, Allen and Pike. When asked for the scientific basis for stopping any remediation measures beyond these boundaries, EPA told us that this was an arbitrary limitation based on FEMA's unscientific suggestion. EPA has also taken FEMA's recommendation to limit its remediation program just to apartment buildings, assuming that all commercial buildings have insurance that will pay for proper remediation and that the building owners will actually have proper abatements done. No schools or government buildings are included in this program, though the infiltration of contamination did not discriminate. There is no scientific basis for this. Not cleaning all indoor spaces puts some people at risk and allows for dusts in those spaces to recontaminate "cleaned" spaces. **EPA should extend the boundaries to include all indoor spaces and as far away from Ground Zero as tests indicate that contamination exists.**

Clearance Standards; A Cancer Risk of One-in-Ten-Thousand is Not Acceptable

There is No Safe Level for exposure to carcinogens. No one will argue with this. But EPA has used an "acceptable risk" factor to allow people to be exposed to small amounts of cancer-causing substances. As a general rule, EPA uses one in a million cancers (10^{-6}) as an "acceptable risk" when certifying that an area has been adequately remediated of hazardous substances. Even in similar situations to the World Trade Center contamination, EPA has used this standard. But for the Lower Manhattan "cleanup", EPA has used a one in ten thousand lifetime risk factor to create standards for every contaminant that it has deemed important enough to test. EPA has said it has problems measuring asbestos (only) to this level using one measuring instrument due to "filter clogging", but this would indicate that the cleanup had not been successful, and a recleaning was necessary. And in any event, it is possible to run a few instruments side-by-side for a shorter period to get the needed result. EPA should not use filter clogging as an excuse to expose New Yorkers to 100 times the asbestos levels as everybody else, OR that such filter clogging applies to measurement of any other carcinogen or toxic substance besides asbestos.

The National Contingency Plan (NCP) makes it clear that a one-in-a-million (10^{-6}) risk level "shall be used as the point of departure for determining remediation goals" when applicable standards are not available,

which is the case for indoor contamination by most of the WTC contaminants.¹ Furthermore, the New York State Superfund program requires that cleanup levels correspond to an excess lifetime cancer risk of 10^{-6} for Class A and Class B carcinogens.² Asbestos is a Class A carcinogen. There were many carcinogens in the toxic soup emitted during the WTC collapse and fires. **EPA should design standards using the precautionary principle, to protect public health from carcinogens at the one in one million risk level.**

Bait and Switch: Remediation vs. Testing only

EPA has decided to give tenants the choice to have their apartments tested, but not remediated. But EPA will only test for presence of asbestos. Studies by Rutgers' Paul Lioy and others have shown that the distribution of toxicity and carcinogens was not uniform. An indoor space can have high levels of other toxics and carcinogens while having low levels of asbestos. If found to have what EPA considers to be low levels of asbestos, EPA will refuse to "clean" an apartment, even if it may have high levels of other contaminants. **This "testing only" option should not be offered.**

Flawed Risk Communication and Outreach

This flawed plan also presumes that tenants understand the nature of the contamination and the long-term health risks, neither of which EPA has been providing in their educational outreach. EPA's outreach explains more about the inconveniences of cleaning, and past EPA statements, that the air is safe, both lead citizens towards the testing option. Also, the program is still voluntary, depending on tenants to have knowledge of the program (and its pitfalls) and expertise to know if their apartment needs remediation. EPA's outreach has been limited to a website and a few individuals making personal appearances at apartment buildings. Worse, EPA's outreach materials withhold information about the types of WTC contamination that studies have found in apartments and they do not provide any information that would motivate people to register for the cleanup (e.g., health risks, diseases resulting from decades of exposure to the contaminants residing in dust reservoirs like carpets). The deadline has been extended to December 28, 2002. But many residents are still not aware of the program or need for abatement. **EPA must improve its public outreach to that people are adequately informed of the risks of the contaminants that may still be in their apartments. If this does not take place, many people may forego having their apartments cleaned in the false belief that they will be safe. The ultimate consequences to public health could be considerable. EPA should also extend the deadline for residents to sign up for the "cleanup" for as long as it takes them to conduct and VERIFY RECEIPT of a thorough and proper risk communication of the health reasons for residents to take advantage of the program to every single person living downtown and in their preferred language.**

Type of Remediation

1. Common areas are still given just visual inspection to assess need for cleanup. The problem is that significantly elevated levels of asbestos have been found in areas that have been cleaned before and where there doesn't appear to be contamination on visual inspection. **All Common Areas should be cleaned prior to any cleaning of apartments.**
2. Intake/discharge registers of HVAC systems (if present) will be removed/cleaned. Only the first foot of duct work will also be vacuumed, then the register will be reinstalled and covered with plastic. **This will**

¹ 40 CFR 300.430 (e)(2)(i)(A)(2). The NCP is the federal regulation that governs Superfund.

² New York State Department of Environmental Conservation, Division of Environmental Remediation, Technical and Administrative Guidance Memorandum No. 4046, January 24, 1994, pp.1-2.

ensure that contamination can remain in HVAC ducts, and that recontamination can occur. EPA should clean all HVAC systems thoroughly.

3. Only the first foot of all exhaust duct work (including stove, dryer and bathroom vents) will be vacuumed. Again, this is not a scientifically-derived or protective protocol, but one developed for convenience. The contamination that is left in these duct systems also constitutes a long-term reservoir for recontamination.

4. If a HVAC system requires cleaning, then the Monitoring Contractor shall prepare a scope of work for the cleaning the HVAC system or portion thereof. The scope of work shall be provided to DEP and EPA within 2 business days of the completion of the HVAC system evaluation." (This will guarantee a hodge-podge, case-by-case methodology for cleaning HVAC.

5. Curtains, fabric window treatments, upholstery and other materials that cannot be cleaned by wet wiping will be HEPA vacuumed two times. Fabric covered furniture will be vacuumed using a stiff brush attachment. But HEPA vacuuming can vaporize any mercury on the particulate. This method is not effective in removing asbestos, as shown in tests at Brookdale, CT schools, where ultrasonication detected large amounts of asbestos, where microvac showed none.

6. HEPA vacuuming may well volatilize any mercury bound up in particulate matter in dust. No mention is made of this possibility or how to ameliorate the impact.

7. Window air conditioners will be vacuumed then removed from their position and vacuumed internally. Filters will be HEPA vacuumed and reinstalled. Wet wiping then wet wipe sampling for clearance testing would be an additional precaution.

8. Baseboard heaters will be cleaned. Protective covers on finned radiant heaters and baseboard heaters will be removed to expose heat elements. Fins are to be brushed and vacuumed to remove dust. Again, wet cleaning, then wet wipe sampling for clearance testing would be an additional precaution.

9. No specific mention has been made of cleaning electronics, computers etc. that have internal fans that take in outside air, and are known reservoirs for dust.

10. Cleaning clothing and accessories (handbags, shoes, etc.) is the responsibility of the resident. The Cleaning Contractor will not open and/or clean inside drawers, cabinets, breakfronts, etageres and similar enclosed storage and display spaces.' **These will remain contaminated and serve as another source of recontamination.**

11. As part of the Cleaning Program, the Scheduling Contractor will contact the New York City Department of Health (NYCDoH) if mold is observed in a residence or residential building. The NYCDoH will then contact the resident to provide recommendations on how to address the affected areas." This leaves cleanup of mold to the resident!!! **EPA should clean up all mold contamination.**

Not Cleaning Common Areas and Ductwork will Recontaminate Cleaned areas

Owners and managers of residential buildings and co-op boards can request to have their buildings' common areas and HVAC inspected and cleaned. If a tenant association makes this request, EPA will seek agreement by building owner or manager. But an owner does not have to agree. This will result in fewer buildings having HVAC inspections and abatement. HVAC systems that remain uncleaned pose the threat of

recontaminating apartments that have been cleaned. Only if the building owner requests, the Project Monitor will inspect other common areas including laundry rooms, utility rooms, compactor rooms and elevator shafts. These areas will be cleaned "as needed". This term is vague. **EPA should clean all common areas and the entire length of ductwork in buildings being remediated.**

Type of Clearance Testing

For clearance testing, "Residents have a choice between two forms of airborne asbestos testing, modified-aggressive and aggressive" (as if they know the difference in results). EPA's fact sheet says: 'Modified-aggressive testing simulates the normal air movement you would expect in a room where a fan or air conditioner was running. In aggressive testing, a one-horsepower leaf blower is used to direct a jet of air into all corners of the residence before testing is begun. The way this is written, a lay person would choose modified testing every time, regardless of the fact that aggressive testing is the method specified for proper asbestos abatements and would be more precautionary in showing the presence of contamination remaining after cleaning has been done.

Wipe samples will be collected at 10 percent of the residences where sampling only has been requested, up to a maximum of 13 residences, as instructed by EPA. This sampling will consist of the collection of 3 wipe samples each for dioxin and mercury. Considering that thousands of buildings were contaminated, this tiny number of samples for dioxin and mercury is not scientifically valid. The locations of the wipe sampling are also not specified. Would any be inside of ductwork on horizontal surfaces? Would any be in other reservoirs for dust? Wipe samples are not suitable technique for sampling soft surfaces such as upholstery and carpets.

Common spaces will be sampled without the use of forced air devices (fans, leaf blowers etc). This ensures that common areas will have a less effective remediation than inside apartments. There is no scientific basis for this.

Transparency of Process

EPA has gone about the remediation reluctantly. It delegated collection of indoor data to NYCDEP, who delegated it to landlords, most of whom have not complied. It waited until February to even begin the process of determining which contaminants are a threat to public health. Thus far, it has crafted new standards without the usual peer review and public comment processes. Although a closed conference, under the auspices of TERA, occurred the end of October, 2002, the lack of input from interested informed scientists is also problematic. The TERA peer review does not include these cleanup or testing protocols, which ostensibly were written subsequent to the "Contaminants of Potential Concern" document.

EPA has specified that all data shall be provided to EPA Indoor Air web database. **Researchers need the data; methods can be devised so that the data can be shared without compromising residents' identities.**

We urge that EPA's scopes undergo careful, public review by independent scientists and that said scientists be invited to make a presentation on an alternative course of action, taking into account the Precautionary Principle, that in the face of partially quantified dangers, government must err on the side of caution in protecting the public health.

Statement of Marjorie J. Clarke, Ph.D.

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NYS Assembly's second hearing on Air Quality issues surrounding the World Trade Center collapses and fires April 12, 2002

My name is Marjorie J. Clarke, Ph.D. I'm a Scientist-in-Residence at Lehman College, and an adjunct professor at Lehman and Hunter College, City University of New York. I was the Department of Sanitation's specialist on emissions from incinerators in the 1980s, the author of a book and numerous publications on the subject of minimizing emissions, and I served on a National Academy of Sciences committee on Health Effects of Waste Incineration, co-authoring the NRC publication by that name. I also served on the New Jersey Standard-Setting Task Force on Mercury emissions from incinerators in the early 1990s. My graduate degrees are in geology, environmental sciences, and energy technology. More details about my credentials can be gleaned from the above website.

I am glad that the Council environment, health and downtown committees are having this hearing on the health impacts on lower Manhattan due to the World Trade Center collapses and fires. . I hope that, once you have fully investigated the statements and actions by EPA and other governmental agencies at all levels, investigated the precedents set by earlier EPA actions that have applied to similar situations elsewhere but not in lower Manhattan, that you will work hard to recommend legislation and other improvements in procedures, codes, standards, communications, and research, and to seek to have implemented the many good recommendations that were made at this and prior hearings and subsequent testimony. It's vital to understand that not only are there immediate problems to remediate (clean-up, treatment of illness), but there are many more problems to solve so that the next time there is an environmental disaster of any kind, procedures are in place for every aspect of the myriad of issues that result. We are simply not prepared. It's clear that the agencies have not learned anything; in fact, they still say that everything they did was correct, even as the data continue to trickle out to the contrary. As important as remediating current problems and preventing new ones, I hope you will publicize everything that you find so that the public understands, and is therefore more likely to support all recommendations.

There are several issues of importance to and lessons to be learned by New York State in the way the environmental agencies have handled air quality issues in lower Manhattan since Sept. 11. I describe the problems below, and list some recommended solutions.

Lack of Coordination

I concur with the Ground Zero Task Force, that there still needs to be a Cleanup Oversight Agency - I'd go further and say that there needed/needs to be one agency responsible for monitoring health and providing health assistance, and another for environmental sampling, analysis and public dissemination of the results. There was a long delay before all the environmental and health agencies even began to talk with one another about sampling of air quality and accumulated dust. I heard from a high level policy official at City DEP that it took 2 weeks for discussions to start between the head of NYCDEP (Miele) and the local USEPA office. When did DEC begin to

coordinate with these other agencies? Why did it take five months for the USGS data about the caustic nature of the particulate matter to become public? This could have explained the nosebleeds and some of the coughing.

The fires burned and smoldered for at least 100 days; a decision was made on some level not to attempt to suffocate them (i.e., blocking off all the sources of air from above and below). Because the decision was made not to contain the site, every time we have a heavy wind, the dust that is still all over lower Manhattan is kicked up and spread around more. The City's meager attempts to wet down the streets certainly resulted in some of the asbestos/fiberglass/toxic and carcinogenic dust to be washed out via the storm sewers into the harbor, where significant levels of contaminants have been measured in the sediments (doing unknown damage to ecosystems there). But much of the dust has remained in place, just to become airborne again once the water evaporates. The City should have been applying a "wet-vac" technology to collect the dust so that it could be brought to a hazardous waste disposal site. It's not too late to start.

When the City made its decisions to evacuate and return residents and businesses to lower Manhattan, would the decision have been different if these data were public? Is it possible that the City made a decision NOT BASED ON SCIENCE? There seemed to be a rush to reopen the stock exchange at all costs, rather than explore ways to move it uptown. Can we learn specific lessons from each breakdown in communications and preparedness and devise specific procedures for all to follow in the future? Or are we destined to repeat history?

Unprecedented air pollution source (type and size)

The WTC collapses and fires actually constituted a brand new, combination type of air pollution source, with aspects of a (1) crematorium (most of the bodies will never be found because they were cremated, and their ashes scattered all over downtown and surrounding areas intermingled with the asbestos, fiberglass and concrete dusts), (2) a solid waste incinerator of unprecedented proportion (described below), (3) asbestos factory (but on a scale thousands of times the size and intensity of what would be found even in a badly operated factory) and (4) volcano (the initial cloud was similar to nuee ardente - hot gas and dust cloud - in some respects, depositing ash in a large area).

Since this is a new type of air pollution source, no emissions standards exist and therefore, none of the existing standards for other sources directly applied. Many of us remember the bitter battles between Brooklyn residents and the City over the Brooklyn Navy Yard plant. The emissions from this plant would have been controlled well over 90% for most pollutants, and yet we had the equivalent of many badly designed downtown which burned totally uncontrolled. New York State wrote a law banning the construction of the Brooklyn Navy Yard incinerator due to public pressure. Backyard burn barrels have also been banned due to the uncontrolled dioxin emissions. Yet the extent of environmental contamination by the Navy Yard incinerator would have paled in comparison to what people have been living with for months. The emissions from the World Trade Center fires were equivalent to a large number of badly designed, totally uncontrolled incinerators operating with stacks at ground level. The emissions were orders of magnitude more than any incinerator. No attempt had been made to put out the fires (i.e. by cutting off the sources of oxygen from above and the tunnels below.) Many months have passed, and no attempts were made to contain the emissions from the site either before the fires went out. No procedures have been established to require or do this should any similar situation arise in the future. I had recommended in November at the City Council hearing that a temporary structure (dome) over the site be erected, with installation of incinerator emissions controls to clean the air inside the dome so that the

workers could do their work in safer conditions and the cleanup around the downtown be finished, once and for all. Now every time there is a wind, the debris is picked up and dispersed, recontaminating those areas that have been cleaned.

Synergistic effects

There has been a toxic and carcinogenic "soup" of air pollutants in the downtown air, constantly being generated by fires, and worse, smoldering embers that incompletely combust thousands of tons of toxic precursors present in the form of fine particles and gases -- the perfect recipe formation of dioxins, furans, and similar products of incomplete combustion.

It's hard to imagine a more perfect machine for generating toxic and carcinogenic air pollution in a form that is most easily inhaled to the deepest part of the lung.. First, there were thousands of tons of asbestos, fiberglass, silica, and very alkaline concrete which was pulverized into various size fractions, but much of which was extremely fine in size (less than 0.25 micron diameter). Then there was a tremendous source of heavy metals, PCBs, and acids just from the building's contents (latex paints typically contain mercury - think of the number of gallons that had been applied to the walls). Lead came from volatilization of lead from car batteries, leaded glass in computer screens, lead solder, and lead pigments among other sources. Mercury would have come from batteries, fluorescent lighting, paints, thermostats and thermometers, mercury light switches, and other sources (see attachment 1 for a list). The same is true of cadmium, chromium, arsenic, and other heavy metals. Most of this was initially pulverized; much of that was then in a form easy to volatilize given a high enough temperature, and then easily able to condense onto fine particulate right there at the smoldering ruins, and subsequently carried from the site and deposited or inhaled.

In addition there were combustible products and packaging all over the buildings -- everything from products and packaging made of paper, cardboard, wood and plastic, including furniture, floor coverings, textile partitions just to name a very few. Fire is easier to start when the combustible matter is a very fine size because the temperature and oxygen can get to all surfaces quickly (try to start a log burning vs. small scraps of paper). The source of heat in the WTC came not only from burning of the jet fuel, but also from the cars underground, as well as from the combustible materials in the building (paper and plastic are highly combustible).

The paper and plastics are not only important because they fed the fires, which volatilized metals and other toxic gases, but also because under conditions of a few hundred degrees to 1800 degrees Fahrenheit, dioxins, furans, and similar compounds form, de novo, when paper and plastic smolder where insufficient oxygen and temperature is present to burn them thoroughly. I understand that the temperature of the pile had been within the temperature range for generating but not destroying dioxins for much of the time since 9/11, so the emissions from these fires could easily have been similar to a number of uncontrolled incinerators operating at ground level for that length of time.

In the 1970s, before it was known that municipal solid waste incinerators needed to be designed and operated very carefully to combust the waste thoroughly, some incinerators created tens of thousands of nanograms/cubic meter of dioxin emissions. The stack size of one of these incinerators was a tiny fraction of the equivalent stack size of the World Trade Center air pollution source. In the pile, there was certainly little oxygen, there was a great deal of dioxin precursors (paper and plastics), and the temperatures were perfect for incomplete combustion, so the smoldering would have permitted the generation of an enormous quantity of toxic and carcinogenic organics.

Dioxin is a family of 210 discrete man-made chemicals that are some of the most carcinogenic and toxic chemicals known. Dioxin is the contaminant of Agent Orange that was responsible for birth defects across Vietnam after that war ended. Dioxin adheres very tightly to particulate matter in incinerators, and is stored in fatty tissues in human beings for long periods of time. Dioxins are created in large quantities in poorly designed, uncontrolled incinerators, when products such as paper, cardboard, wood are incompletely burned with such substances as PVC plastic, benzene, and other chlorinated ring structures. The Trade Center was full of fuel for such incomplete combustion. The optimal temperatures for formation of dioxin are roughly between 400 to 1800 degrees Fahrenheit. European dioxin emission standards from an incinerator with a small stack (as compared with the area of Ground Zero) are 0.1 nanograms (billionths of a gram) Toxic Equivalents per cubic meter of emission.

Potential for Serious Long-Term Health Effects

It is important to understand that once toxic and carcinogenic substances are in a gaseous state in an incinerator (which would roughly correlate with the pile here), they would naturally condense onto the surfaces of any fine particulate nearby as they moved out of the hot zone (towards ambient air temperatures). We now know that much of the concrete, asbestos and fiberglass of the trade center structure and much of its contents were pulverized into very fine particulate. The finer the particulate matter, the greater the surface area per unit volume. Therefore, it is likely that much of the particulate matter has heavy metals, dioxins and other chlorinated organic compounds, and other pollutants adsorbed onto the surfaces. The finer sizes of particulate matter, laden with toxic and carcinogenic substances, can evade the body's coughing mechanism - the cilia - all the way down to the alveoli (air sacs) where they can reside for the long-term. The longer the fires burned, the greater was the source of volatilized metals, organics, and acids. Research has shown that diesel emissions, asbestos, cigarette smoke, and even air pollution can cause lung cancer. Is it such a stretch to think that this combination of asbestos, fiberglass, dioxins, and heavy metals will do the same?

Inadequate Air Quality Standards

Most air quality standards were created in the 1970s to protect the public health from air pollution. But the science of air pollution has been evolving slowly since then, and we do not know all there is to know about the health consequences of air pollution.

There are a few types of air quality standards --

1. ambient air quality - mostly irritants (SO₂, NO_x, CO, O₃, particulates) from cars,
2. occupational exposures (a wide range of pollutants, 8-hour/day exposure), and
3. emissions from point and non-point sources (as measured in the stack or tailpipe).
4. There are just a few standards for hazardous air pollutants, which cause health effects with far lower doses (ppm, ppb) than the criteria air pollutants for which there are ambient air quality standards. Most toxic and carcinogenic air pollutants are not regulated under "NESHAPS", and there has been decades of delays in standard-writing for other pollutants. This needs to be rectified soon, before we face something like this again.

The shortcoming of ALL these types of standards is that they were calculated by considering the effect on human health and the environment (i.e., the health of ecosystems) of only one pollutant at a time. If the air contains two, or five, or five hundred discrete organics, heavy metals, acids, each of which has its own toxic and carcinogenic properties, but every pollutant is below the individual standard levels, then the government points to that and says that the air is safe. But is it? The

government hasn't written standards for combinations of pollutants, so it considers the air to be safe if all standards, as currently written, are met.

It's common sense that elevated levels of five pollutants is worse than one. It's also common sense that when there are widespread complaints of symptoms ranging from headaches and coughing to new onset asthma in marathon runners, and when everyone who entered into areas a half mile away and more from Ground Zero could smell the pollution, the air has not been "safe" for everyone. The additive effects of multiple pollutants need to be considered in assessing evacuation zones, public and health measures. Furthermore, two or more pollutants can interact with one another and produce impacts that are significantly more than the additive effects. Research has shown that inhalation of both asbestos and cigarette smoke produces several times the effect of either one alone. When $1 + 1 + 1$ does not equal three, but equals 30, this is called synergy. The Mt. Sinai Environmental Sciences Laboratory, which pioneered research into the health effects of asbestos, has found that those exposed to asbestos and who smoke, have not twice but 80 to 90 times the probability of suffering from asbestos-related diseases such as lung cancer, mesothelioma and asbestosis.

Despite the fact that the air was still so full of contaminants that everyone could smell "it" many blocks from Ground Zero until the end of November, all three environmental agencies stated that nothing was wrong with the air at the City Club's forum on October 26. Their basis has been that each individual pollutant is below action or standard levels "most" of the time. But it is clear that a large number of pollutants are significantly elevated above background levels. I received an email from Dr. David Cleverly, dioxin expert at USEPA, that dioxin had been 50 times normal background levels, but not as high as actionable levels most of the time. Since there were many toxic, carcinogenic and irritating pollutants, and this is not the only scenario where tall buildings could collapse and burn (consider earthquakes, further terror attacks), standards need to be rewritten to assess the impacts of synergy - to protect the public health.

But EPA's website says that "most of the air samples taken in areas surrounding the work zone and analyzed for dioxin have been below EPA's screening level, which is set to protect against significantly increased risks of cancer and other adverse health effects. The screening level is based on an assumption of continuous exposure for a year to an average concentration of 0.16 nanograms per cubic meter (ng/m³)", which is 60% higher than incinerator emission standards at the stack exit in several European countries. My understanding, from what I have heard, is that the screening level was hastily put together so that EPA could say something (explaining why it is **higher** than a European STACK LEVEL emission standard). Twelve days after the attack, ambient concentrations of dioxin were 0.139 ng/m³ at Church and Dey just east of the site, 0.16 and 0.18 ng/m³ at Barclay and W. Broadway just north of the site, and at Broadway and Liberty, levels were at the 0.1ng/m³ level. No measurements were taken northeast of the site, which would be downwind most often. The temperatures of the debris have also continued to be sufficient to vaporize many toxic heavy metals, such as lead, cadmium, chromium, arsenic, mercury, to mention just a few of the many that have surely been emitted in large quantities from this uncontrolled incinerator. I, myself, could smell the metals in the air while I was at the Municipal Building for a meeting in early October. My colleague, and medical waste incinerator expert who wrote the City's Medical waste management plan in 1991, Wally Jordan of Waste Tech, remarked that he smelled chlorinated organics when he went to the site around that time.

Cate Jenkins, a scientist at USEPA, has written a number of informational memos since 9/11 indicating instances where EPA has ignored its own precedents, and where the NYC DOH has developed standards in conflict with EPA policy, among other important topics. These can be viewed at <http://www.nyenvirolaw.org/#CateJenkins>. We have learned, for example, that EPA has cleaned up building interiors and has considered entire towns as superfund sites. Libby, Montana was contaminated with an asbestos material that is reported to be the same or similar to what lower Manhattan is covered with. Its governor asked that it become a superfund site, and it was a couple of months ago.

What can we learn from this? Background levels refer to what is loosely considered to be "normal" levels of any given pollutant in the atmosphere. But what does it mean if dioxin plus hundreds of discrete substances including asbestos and several other toxic and/or carcinogenic organic compounds, heavy metals, silica, acids and other gases and particulate matter are elevated, or even many times background levels, and are borderline actionable? Doesn't it seem likely that breathing air in which many toxic or carcinogenic pollutants are borderline actionable is worse for public health than breathing air in which only one pollutant is borderline? Yet standards assume the impact on human health is from only one pollutant. Is it protective of public health to look at each pollutant one at a time, ignoring the additive effects of inhaling each of several pollutants? Can we assume that the impacts on human health is only the additive effect of the concentrations of each pollutant, or might there be synergistic interactions between some of these compounds that increase the impacts further? Since ambient air standards are for individual pollutants, it is imperative that research be done to assess the impacts on public health of combinations of pollutants. Standards need to be rewritten as well to assess the impacts of synergy. The environmental agencies at all levels need to become more expert in evaluating the health and environmental effects of various mixtures of pollutants. Based on this information EPA should rewrite its air quality standards to assess the impacts of various combinations of pollutants so that we will be ready next time to know how to protect the public health.

Standards Needed for Different types of exposure

Various governmental agencies have applied occupational safety exposure levels for specific pollutants to those exposed to WTC air. But there are several distinct groups of those exposed, and each group has had distinctly different exposures:

- Those working on the pile (Variables: the level of emissions have decreased over time as the fires decreased in extent, degree of protective respirator/masks used, amount of time spent)
- Those who were caught in the initial horrendous dust cloud, covered in dust, running away, breathing intense quantities of dust deeply into the lungs and ingesting dust particles.
- Those living in the area (Variables: level of emissions varies depending on specific location, on weather, and length of time since 9/11; degree of protective respirator/masks used)
- Those who cleaned apartments (level of exposure varying with amount of dust in apartment, method of cleaning, degree of protective respirator/masks used, amount of time spent in cleaning)
- Those working in the area - 8 hours a day five days a week; (Variables: degree of protective respirator/masks used)
- Those at risk: Children, Elderly, Compromised Immune systems, those with pulmonary problems are more likely to suffer more adverse affects than others for all the above categories.
- Handlers of disposed debris: shipments to India, S. Korea - no protection for workers offloading (no knowledge of contents).

Most of these groups of exposed cannot be compared with occupational exposure. Studies of occupational exposure assume 5 days a week, 8 hours a day exposure to adults (healthy males?) What about those who live there, those at risk, those caught in the initial cloud? This requires considerable investigation, and many new standards need to be created to address these different categories of exposure.

Trucks and Barges

Entrainment of pollutant-laden fine dust is also occurring, as we heard, by loading debris into trucks and barges. There are standards for reducing entrainment of incinerator ash. These involve spraying water and containment in leak-proof, covered trucks. Why aren't we enforcing those standards? Is it because this is not an incinerator? Shouldn't common sense dictate that the closest standards that exist be the ones to be followed in such a case? We heard that "guys with guns" enforce covering of trucks – Now. But I had heard from people who lived in the area, that the military had been enforcing the opposite in the first weeks, when pollutant levels were highest, so that they could check the trucks' contents. That the trucks might be covered by leaky tarps now does not negate the exposure to residents and workers of pollutants that were emitted earlier.

Government Secretiveness (or worse?)

Air quality data has been selectively shared with the public, leaving the public mistrustful. Further, the agencies waited far too long to begin adding monitors to the area. We can only imagine the levels of dioxin, asbestos, heavy metals, acids, other organics, silica, etc. that was in the air while people were running from the area. We shouldn't ignore this impact on their health. On EPA's website, it initially listed only asbestos in air, asbestos in dust and a gross measure of particulate matter in air. After several weeks passed, EPA added PCB and lead. After another few weeks, a few days' individual samples of dioxin were presented. All told, this is maybe 20 pages of information. But in a televised public forum (City Club forum held October 26 and subsequently televised on CUNY TV), EPA said that all of its data was online. EPA repeated this at City Council hearings on November 1 and at State Assembly hearings later in November. Early on, I learned that EPA had 900 pages of data, including a list of heavy metals, dioxins and furans, acid gases, as well as those items listed. But EPA has demanded that the Manhattan Borough President and City Council must file Freedom of Information requests for it or else come to the repository and look at it. I asked for an electronic copy. I was told I was the first one to ask for it, and was told that it would not be possible to email me the data. How could this be, since the data surely exist on someone's computer? The Borough President's office never filed the FOI request (since their policy is not to do so). It is just this kind of secretive behavior that invites journalists or others without scientific training, who **do** go down to view the full datasets, to quote data selectively. If the data were freely available in a spreadsheet, then academic, environmental, and community institutions could have already started studies. Those who want to conduct analyses are still unable to do so. Considering what is available online, the datasets appear to be thin, with many pollutants missing from the database and with only a few dates sampled for some pollutants. The first date that dioxin data are available are 12 days after the event. Most data are not available daily. EPA's dioxin data were not put up for months. I recently had a phone call from the Daily News journalist who broke the "toxic air" front page story last fall, and it's clear that he has managed to get much more dioxin data from EPA than they have put on their website. In fact, there is a long list of probable air pollutants (organics, heavy metals) from this event that have not been listed on any of the government websites.

Where was EPA while thousands of New York City residents were exposed to air pollutants from the WTC collapses? The EPA website shows only summaries of data, when they could have made data from 9/11 onwards available for lower Manhattan. If more or earlier data is available online, it's not easy for the public to find. EPA should make its entire air quality archives easily available on its website as well as those from all other sources.

Not only was EPA's secretiveness reprehensible this time, but procedures should be put in place NOW to ensure that should anything like this ever happen again, the environmental agencies would immediately be meeting to coordinate comprehensive sampling and analysis, AND prompt disclosure to the public via the internet of ALL data along with all current and applicable standards as well as background levels for each pollutant.

We also need to conduct research to understand toxic and carcinogenic impacts of multiple, unknown pollutants. One method of doing this is by conducting assays using surrogate organisms, to observe the impacts on their health of different pollutant combinations. Tetramitus flagellate is one such single-celled organism that has been shown to indicate toxicity of unknown mixtures. Dr. Robert Jaffe, of the Environmental Toxicology Laboratory, <http://www.envirolab.com/> has been pioneering work in this area. This technology has the potential for and needs to be used as a screening measure to watch for new attacks of unknown substances or mixtures of substances so that we can react in time to protect public health.

Building codes and operations

Very little has been spoken about building codes, and how the composition, structure, and operation of buildings contributed to the death toll, and how revision of these regulations is needed to prevent future deaths. When I worked on the 83rd floor of WTC 1 for a couple of years around 1980, we didn't have fire drills very often (I can only remember one, maybe two). When we did have drills, we were told to walk down the stairs to the 78th floor at which point we were told to stay put. That was the total extent of the fire drill. Is that protective of public health? The truth is, the WTC buildings were so tall that they were not readily evacuable. The stairways were not designed to evacuate everyone in a reasonable amount of time. To complicate this further, the Port Authority made announcements to go back to their offices. They did not immediately send announcements to everyone in both buildings to evacuate to the ground floor and leave. Some people who had gone to the first floor returned to their offices and lost their lives. A last point: Firefighters were coming up the same stairwells that the thousands of office workers were using to evacuate. This effectively halved the capacity of the stairwells for evacuation purposes. How many people might have gotten out if they didn't have to wait to enter a stairwell that was reduced to half its original capacity (remembering that some of the stairwells became impassable due to the fires themselves)? How many other tall buildings in NYC have insufficient number of narrow stairwells? How many are not totally evacuated during fire drills? What about those in wheelchairs on high floors? All these questions point to the need to limit the number of floors of new buildings to a size that can easily and routinely be evacuated quickly, assuming that firefighters will need space in the stairwells.

Insofar as construction of future buildings is concerned, attention must be paid to the safety factor chosen for retarding the effect of fire on the building's structural members. The WTC was designed to withstand the impact of a 707 aircraft. But why wasn't it also assumed that the 707 would be carrying thousands of gallons of jet fuel, and that this jet fuel would cause a fire of sufficient temperature and duration to melt the steel members? This is not a difficult mental exercise, and structural engineers figured this out within a day or so of having watched the floors compact. There

is no room for error. If just one floor gives way, because the steel has partially melted, the weight of floors above comes crashing down, and the entire building will collapse, immediately, as we saw. Note that WTC building #7 was not even hit by an aircraft, but it also collapsed due to the duration of fire. The structural engineers interviewed said that it would have been possible to put a thicker layer of protective coating on the structural members of the WTC, but it would have cost a little more. How many people would have been saved if the buildings held together for another half hour? We should learn from this disaster. Building codes should be revisited to address all these issues and correct all deficiencies.

Are we ostriches or will we face the future?

I'll close by drawing an analogy with the way the environmental agencies are dealing with the public health hazard downtown. In south Florida, where I grew up, in the 1940s, as tourism was quickly growing, the government kept information about hurricanes secret for fear that too much information would hurt business, particularly the tourist trade. Predictably, south Florida got walloped a couple of times, and then the government, wisely, decided to make an about-face and become the world's experts on hurricane tracking, prediction, alerts, mitigation and standards for evacuation of the population to protect the public health. They established a world-class center in Coral Gables to serve as the source of information and research. Later, by the time I was six, I was tracking every hurricane's progress on a chart I got for free at the 7-11 store by listening to the radio for coordinates.

We have exactly the same situation here. There is a lot we don't know. The government wants to protect business and the tourist trade. The government has kept a great deal of information off limits to anyone for the first several weeks, and lately it has made it difficult to obtain in any usable form. Even worse than this is that we don't know the long-lasting impacts of the initial huge, dense cloud of finely pulverized asbestos and silica-laden dust on those running and inhaling deeply in its midst. We don't know the additive and synergistic effects of combinations of many toxic and carcinogenic pollutants that continue to be emitted from the fires or entrained from the dust as it blows off the rooftops and ledges. Will this exposure to air pollution compromise immune systems, making people more vulnerable to future illnesses or terrorist attacks? On what basis did the government choose a perimeter for evacuation? On what basis did they rush to reopen the area? Have we learned anything from this experience? Now is a time for the environmental agencies to pull their heads from the sand, make an about-face, coordinate and release all data and interpretive guidelines on the Web. We need to err on the side of caution rather than seeking to go "back to normal" at the cost of the public health.

The federal government should assist the City by committing its funds and encouraging the Governor to seek additional federal 9/11 grants on an accelerated basis to conduct ongoing, comprehensive surveillance of symptoms in affected populations, buy room filters for residents, pay for proper indoor and building cleanup, research the acute and long-term impacts on health of highly concentrated combinations of pollutants acting for a short time, as well as elevated levels of combinations acting for longer periods of time.

The federal government should write new standards to reflect short-term exposure to high concentrations, as in the initial cloud, as well as synergistic effects of many toxic, carcinogenic pollutants.

We also need to have contingency planning for different types of environmental disasters as this new war against terrorism progresses. We need to actively examine worst case scenarios and plan for them. We need to understand how far to evacuate and for how long. This is the only way to regain public trust. Recalling the hurricane example, and realizing that we may not be finished with terrorism, becoming the world's experts in environmental health disasters and being truly open with the public is the best course of action in the long term.

Recommendations:

1. to investigate, quantify, substantiate, and publicize any lies, misstatements, unpreparedness, lack of coordination, ineptitude, lack of attention to redirecting staff, or worse that did occur in the days and months since the World Trade Center attack on 9/11/2001. The Council should investigate all apparent or actual conflicts of interest that might have motivated agency and elected officials to make statements or make decisions.
2. To investigate and come to conclusions on
 - (a) the Bases for EPA's, DEP, DOH and other elected and appointed officials' statements as to the safety of the downtown area for reoccupancy, (i.e., what did they know, when did they know it, who did they ask, what agencies did they coordinate with, and on what topics -- example: when did EPA and DEP first learn about the caustic nature of the dusts from USGS)?
 - (b) the instructions and protective equipment tenants and landlords were given for cleaning indoors, by which agencies, and the agency procedures on which this was based,
 - (c) the lack of attention or decisions regarding to indoor air quality and recommended cleanup measures, made by EPA and the agencies for months after the attacks despite precedents of EPA having made other, more health-protective decisions in other similar instances (e.g. Libby, Montana's superfund site). Knowing this information should help in designing
 - (1) improved procedures for intra- and inter-agency communications in the event of environmental disasters,
 - (2) criteria for evaluating whether an incident, be it a natural or man-made disaster is an Environmental disaster, and procedures for their use,
 - (3) procedures for immediate, multi-pronged, and continual communications of all information with the affected public
 - (4) the standards that should be used to protect public health. Per Cate Jenkins memo, the NYC DOH chose a standard many orders of magnitude less protective than the one in one million standard that EPA typically chooses.
3. To issue recommendations on EPA emergency actions in the case of suspected environmental accidents, disasters, releases. Which federal agency takes the lead in protecting public health in such a circumstance? How do they coordinate, on what topics, and in what time frame? How fast should they communicate and coordinate with the state and local agencies? How is the responsibility and work to be divided?

4. To issue, publicize and widely disseminate a report combining measures and procedures used to measure all specific pollutants from ALL air quality and dust measurements that have been taken by EPA, other agencies, and private companies since 9/11. It would be helpful if this, and other reports you issue, were available for download, and that data be available in database or excel format that can be used in research (PDF format cannot).
5. To characterize and quantify the extent to which the public's health has been adversely affected (those working on the pile, those living/working in the area, children, elderly, immune-depressed, short- and long-term) by the air pollution from the WTC attacks, or at least make detailed recommendations of who should research this.
6. To seek to make the overall results of extensive medical tests (baseline and continuing) being done on the entire group of NYC fire-fighters to become public.
7. To determine and make recommendations on how much money is necessary to examine and conduct long-term follow-up on all those exposed to air pollution and dusts from the 9/11 attacks, and from where the source of funding might come, and seek increased federal funding to cover these costs.
8. To recommend that the National Academy of Sciences conduct a risk assessment of the public health impacts due to the air pollution caused by the 9/11 attacks.
9. To ensure that guidance is disseminated to all physicians and hospitals in the area to look for and properly treat those exposed to WTC air. According to Mt Sinai 2/4/02 memo to help physicians determine whether pulmonary symptoms are related to WTC, some symptoms from exposure can begin as late as 3 weeks after exposure or cessation of exposure. If physicians had to be given guidance on these issues, many of those exposed are likely not to realize their symptoms are WTC-related. Why didn't the City, State or Federal government issue this memo in September? Efforts are not being made to locate all those who were exposed and to characterize their exposures and register their symptoms over time.
10. To recommend and publicize specific measures that need to be taken immediately to clean up the downtown area of dangerous dusts and to prevent the continuous reentrainment and spread of these dusts from the ground zero area into surrounding areas.
11. To investigate existing EPA, DEP, DOH standards and procedures to see whether standards required to prevent, control, or remediate environmental contamination in environmental disasters, accidents, or releases were not used to prevent, control or remediate pollution in this case (and why). Example: to prevent the spread of incinerator ash when it is transported from its source to a landfill, federal regulations require that the generating (and intermediate handling) facility be enclosed and operated with negative air pressure, that the ash is totally wetted, that trucks transporting ash be entirely containerized and sealed to prevent entrainment or leaking onto the ground, and that receiving facilities operate under similar constraints. Despite the fact that the debris from the WTC has the consistency and many properties of incinerator ash, leaky, imperfectly covered trucks are continuously scattering the debris between Ground Zero and the barge at Pier 25. Why aren't existing protective procedures being used? Steps need to be taken (i.e., legislation) to ensure that in all future environmental disasters, the

entire array of existing procedures be canvassed and that the most protective procedures appropriate to the situation be utilized.

12. To develop and recommend what measurements need to be taken in the event of an environmental release, accident or disaster, and how the measuring stations should be deployed and operated. It is unconscionable that data taken early on is still dribbling out from the federal government -- e.g., Two samples that were taken inside a high-rise apartment and in a gymnasium across from the wreckage of the World Trade Center had a pH of 11.8 to 12.1 - equivalent to what would be found in liquid drain cleaner. It is clear that stations were not deployed in concentric rings around ground zero were not done, and few of the measuring stations were in the predominant downwind areas. It is clear that many measurements were "grab" samples, only for five or six minutes. Since the wind direction and speed varies, it is necessary to have continuous, long-term samples looking both for long-term averages and for short-term spikes.
13. To recommend measures that need to be taken immediately to remediate the public health impacts resulting from inhalation and ingestion of polluted air. First we need to identify Everyone who was in the area at the time of the attacks, including the pile and enforcement workers, those who have lived or worked in the area, those who have been hired to clean up apartments and businesses. Then we need to get medical histories to construct a baseline (a Registry). The exposure should be quantified, first by location during each day of the pollution period, and then by the type of activities performed -- those breathing heavily due to working on the pile, running for one's life, etc. involves an increased exposure due to more forceful inhalation (more air and particles brought deeper into the lungs, allowing the possibility for more to be retained long-term in the lung. This study and ongoing medical examinations and treatments, for all diseases that should arise, should be performed, at federal expense, for a period of 20 or 30 years.
14. To investigate the procedures underway at Fresh Kills landfill -- are they protective of workers, what is the airborne dispersion of dangerous materials. Videos on C-SPAN3 online show that not only were many workers not wearing protective respirators on the pile, but they are not at Fresh Kills, with operations proceeding out in the open air. Procedures at the barge should also be investigated; are workers wearing protective gear? Are materials being well-contained?
15. To investigate the disposal and marketing of WTC debris and recyclable steel -- has testing been done to quantify whether this is a hazardous waste, and should be transported and handled under those rules? If it is hazardous waste, is the facility that has been selected for the debris, consistent with federal or state rules? To the extent that scrap steel or other materials are exported to other countries (e.g. steel that has already gone to India and S. Korea), has EPA or any other federal or other agency advised those on the receiving end about the composition of the materials, or protective handling procedures? This isn't the first time a company or municipality in the US has exported toxic waste to another country without proper advice or precautions, and it won't be the last. There should be a law.
16. To encourage research into and adoption of more protective building codes (less toxic materials, evacuable buildings, better fire drill and practice evacuations, better, more well-thought out announcement systems during emergencies. It is arguable that many people died in stairwells too small to evacuate everyone, especially since their capacity was reduced by half

due to firefighters climbing them at the same time. It is arguable that some died when they heard Port Authority announcements to go back to their offices. Could the buildings be built with fewer toxics?

17. If the US Attorney General's statements can be taken at face value, we can expect worse terrorist attacks in the future. It is not unlikely that any future attacks will involve some degree of environmental contamination. Many scenarios for future attacks would involve some of the same issues as are being dealt with here (indoor contamination, removal, not just wetting of outdoor contamination). In addition to terrorist attacks, environmental disasters can and have occurred in other ways: industrial accidents, natural disasters (e.g., major earthquakes in urban areas, tornadoes, fires, hurricanes). Utilizing my knowledge of geology, it is a 100% certainty that major west coast cities will suffer even greater destruction (collapses, fires) than they have already due to larger earthquakes in the future. We just can't reliably predict when. Therefore, many of these recommendations will be useful in protecting public health after future disasters.
18. There are no uniform, justifiable procedures for determining the evacuation of nearby populations after an environmental disaster, therefore, we are woefully unprepared for any environmental disasters in the future. This time, the "frozen zone" was not based on specific scientific principles, and neither was the timing of allowing people to return. We should learn from the experience with establishing hurricane evacuation routes, and the procedures taken to order evacuations for approaching hurricanes. As important, it is necessary to develop justifiable procedures for repopulation after an environmental disaster (i.e., the testing that needs to be done, the verification that safe conditions exist).
19. For these reasons, and similar to the decision to establish a National Hurricane Research Center in Coral Gables (when it was realized that we didn't know how to track, predict, evacuate or minimize impacts of hurricanes), we need to establish a permanent Environmental Disaster Research center dedicated to conducting all the research that was needed prior to now to determine and address the synergistic and other impacts on human health of various types of environmental disasters. Examples of research would include investigating the impacts of combinations of pollutants that we have observed in this case. Other areas for research, development, and demonstration would be the measurement technologies for screening for unknown combinations of pollutants, as Dr. Robert Jaffe has developed. This research should then be used to develop new air quality standards to address impacts from combinations of pollutants. Results of the research conducted at this facility would be invaluable to the Congress and those writing air quality, emissions, occupational safety, and NESHAP standards at EPA.

Attachment 1

Mercury in Discarded Consumer Products in the New Jersey MSW Stream¹

Product	Tons	Percent
Consumer Batteries (subtotal)	14.25	83.6
Alkaline	8.23	48.3
Mercury Oxide	5.86	34.4
Others	.16	.9
Electric Lighting (subtotal)	1.08	6.3
Fluorescent Lamps	1.05	6.1
High Intensity Lamps	.03	.2
Paint Residues	.37	2.2
Fever Thermometers	.59	3.5
Thermostats	.35	2.0
Pigment	.23	1.4
Dental Uses	.13	0.7
Special Paper Coating	.02	0.1
Mercury Light Switches	.04	0.3
TOTAL	17.05	100.0

Note: Recognize that this is the discarded waste stream. A building could easily have more or less of each of these (consider that paint could exist in large quantity on the walls, where in a waste stream there would be only the nearly empty can)

¹. Report of the Task Force on Mercury Emissions Standard Setting; Volume III, Technical and Regulatory Issues, NJ DEPE. Trenton, NJ January, 1993. Table 2.6

Attachment 2

<http://www.corpwatch.org/issues/PID.jsp?articleid=1608>

Trading in Disaster

World Trade Center Scrap Lands in India

By Nityanand Jayaraman and Kenny Bruno
Special to CorpWatch
February 6, 2002

RELATED CHART

Indian Citizens Group Protests WTC Scrap

Potential Contaminants in World Trade Center Debris

CHENNAI and NEW YORK -- It might seem like a tangent to the tragedy of the Sept 11th attacks: the fate of the thousands of tons of steel that formed the twin towers. As with so many other unwanted materials from the US, more than 30,000 tons of steel scrap -- possibly contaminated with asbestos, PCBs, cadmium, mercury and dioxins -- has been exported to India and other parts of Asia. Though the risks from the scrap are probably not on the order of the health threats at Ground Zero, the U.S. nevertheless has the obligation to ensure that toxic contamination from the World Trade Center is not exported to other nations.

Mysterious Shipments

At least one shipload, onboard a vessel named Brozna, landed in the South Indian port city of Chennai in early January. The scrap was unloaded, as any routine consignment would be, by port workers with absolutely no protection. Two other ships, Shen Quan Hai and Pindos, also reported to be carrying World Trade Center scrap berthed and offloaded their cargo in Chennai. But preliminary investigations failed to reveal documentation linking the cargo to the Trade Center. Reports are vague about another shipment making its way into Northern India through the Western port city of Kandla.

Similar shipments have reportedly reached China, where Baosteel Group purchased 50,000 tons of the potentially toxic scrap. Malaysia and South Korea are also reported to have received shipments. Eventually, most of the 1.5 millions tons of scrap from the cleanup may end up dirtying Asian ports and threatening Asian workers.

Few details are known about who purchased the scrap, but an unidentified Indian trader reportedly bought an undisclosed amount of the World Trade Center debris, and the 33,000 ton shipment onboard the Brozna was collected by Chennai-based Sabari Exim Pvt. Ltd. and removed to the company's facilities outside the city.

Nor are the names of US-based traders who may have exported the shipments to India known. However, two New Jersey companies were among the bidders that won the contract for removing

more than 60,000 tons of Trade Center scrap. New Jersey-based Metal Management Northeast, bought 40, 000 tons and Hugo Neu Schnitzer, based outside Jersey City, bought 25,000 tons. Schnitzer was reportedly eyeing the Southeast Asian markets, possibly Malaysia, where prices are higher.

Public Health Concerns From Tribeca to Chennai

In this case, it is hard to accuse the US of double standards because US safety regulations were trampled in the chaos over Ground Zero. In lower Manhattan, thousands of rescue workers and residents have been exposed daily to unknown but significant dangers from air contamination. Hundreds of New York firefighters are filing to go on permanent disability, while serious respiratory infections and other chronic health problems afflict area residents, especially children. A few days after the attacks, even President Bush stood on the rubble without protective gear, joining the rest of a city too shocked and too busy to take proper precautions against the toxic cloud over Manhattan.

The steel scrap imported by India and China may not represent the same level of health threat as Ground Zero. But given the amount of material involved, and the short time frame for any decontamination process, it is indeed possible that the steel is contaminated with toxic materials.

In the months after the bombing reports surfaced about the presence of toxic contamination at Ground Zero, including poisons such as dioxins, polychlorinated biphenyls (PCB), cadmium, mercury, asbestos and lead in the debris. What remains in question is whether toxic chemicals have attached themselves to the steel scrap.

There are no safe levels of exposure to cancer-causing substances like asbestos, PCBs and dioxins, and toxic metals like cadmium, mercury and lead. Asbestos, PCBs and dioxins may cause harm even in miniscule doses. Also, like cadmium and mercury, once ingested or inhaled, they resist degradation or excretion and tend to build up to dangerous levels in the body over the long run.

Insurance companies like American International Group and Liberty Mutual have refused coverage to the demolition contractors charged with the clean-up. The contractors fear that without insurance they will be driven into bankruptcy by an anticipated flood of lawsuits over asbestos, mercury and other toxins released into the air by the collapse of the twin towers and clean up efforts, according to the New York Times.

Not Enough Information

Contamination of steel scrap is a common concern in the scrap industry. As far as CorpWatch has been able to determine, US authorities have not studied the levels of contaminants in the Trade Center scrap that was exported. If they have, the information has not reached Indian authorities or port workers.

Trade union groups swiftly moved into action when the exports were reported last month, but were hamstrung by the lack of information. "The Port Authorities tell us that steel scrap is legal. And unless we find evidence of contamination, we can't stop the shipment," said S.R. Kulkarni, secretary of the Mumbai-based All India Port & Dock Workers Union.

Nor has the information been forthcoming in the United States. The New York Environmental Law and Justice Project recently filed a Freedom of Information Act request with the USEPA after US public health activists suspected regulatory officials were downplaying the toxic contamination in and around Ground Zero.

However, Chennai-based lawyer T. Mohan says there's enough doubt raised about the safety of the debris to warrant precautionary steps. "There were talks to declare Ground Zero a Superfund site. That's proof enough for us to be concerned that this consignment may be contaminated," he noted.

Who's Responsible?

Under the Basel Convention on the Transboundary Movement of Hazardous Waste, it falls to the Indian Government to prevent the import of wastes if they are found hazardous. That's because the US refuses to sign the Basel Convention and is therefore not bound by the treaty. This includes an amendment known as the Basel Ban prohibiting developed countries from exporting hazardous material to industrializing nations like India. But Mohan believes that morally, "the burden of proving [the waste] is not hazardous rests with the US exporters and US government."

Despite a Indian Supreme Court order prohibiting the imports of hazardous waste into India, US shipments top the list of hazardous waste exports to India. Everything from zinc ash, toxic ships-for-scrap and lead-bearing wastes are routinely sent to unscrupulous importers in India. The Indian regulatory agencies, notably the port and customs authorities and the Indian Ministry of Environment and Forests, have maintained their habitual silence on matters such as this that pertain to human health and environment.

"They seem more intent on passing the buck to each other rather than dealing with the problem and hauling in the US Government for negligence," says attorney Mohan.

Steel reprocessing is a dirty business, especially when the steel contains plastic, chemical and heavy metal contaminants. In fact, secondary steel almost always contains some toxic materials. Lower wages and laxer environmental regulations in Asian countries mean that Asian traders and reprocessors can offer better prices for the steel scrap than their European or North American counterparts. That is one of the reasons why scrap metal is exported to Asia in the first place.

The export of contaminated scrap and hazardous wastes to industrializing countries fits a long-standing pattern of environmental discrimination by the United States. An infamous example is the shipload of toxic incinerator ash from Philadelphia that traveled the oceans for two years before ending up on a beach in Haiti in 1988.

In a February 4th letter to the US embassy in New Delhi, three major Indian trade unions, Greenpeace and People's Union for Civil Liberties blasted the US Government for its "continued inaction" in stemming the export of wastes and scrap to industrializing countries. They called it "a consistent pattern in keeping with USA's tacit, if not active, support for toxic trade."

"We're totally opposed to the US and other rich countries using India as a dumping ground for all kinds of wastes and rejects. Such dumping of steel scrap is adversely affecting the major steel plants in our country, apart from causing environment and health problems," says P.K. Ganguly, the New Delhi-based Secretary of Centre of Indian Trade Unions.

The way out of the current bind over the World Trade Center scrap is simple, say environmentalists. United States authorities should provide evidence that the scrap lying in India is free of poisonous contaminants. If it is found to be contaminated, then immediate steps should be taken to return the consignment to the US.

If, on the other hand, the shipment is found clean, there may be no immediate threat of exposure to toxic chemicals. Even if the scrap turns out not to be dangerous, the question remains: who profits -- and who suffers -- from shipping valuable steel scrap to be recycled half-way across the globe in India before it returns to the US in its new incarnation as soup cans or luxury cars?

Nityanand Jayaraman is an independent, investigative reporter based in India.

Kenny Bruno coordinates CorpWatch's Corporate-Free UN Campaign.

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Tel: 415-561-6568 Fax: 415-561-6493
URL: <http://www.corpwatch.org>
Email: corpwatch@corpwatch.org

From: <Jennakilt@aol.com>
To: Traci Brody, Nica Mostaghim, David Bottimore
Date: Thursday - July 24, 2003 3:32 PM
Subject: additional comments re epa document

Additional comments concerning the document: Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster.

From both the TERA and VERSAR conferences it has become obvious that in order to assess any EPA document about the consequences of a disaster, the panel must be told the whole truth; not just that part of the picture which EPA wants them to concentrate on. They must be given the context of what they're looking at.

The document currently being considered does not do what it says it does. It does not address the issue of the exposure of people to airborne pollution from the World Trade Center disaster; nor does it evaluate the consequences to their health.

In order to do justice to its mission, the document would have to consider those contaminants which are in people's homes and likely to remain there unless EPA reverses its stand on indoor cleanup. It would have to inform the peer reviewers that many areas where the plume went on September 11 itself, when most of the airborne debris fell, were never cleaned. These areas include offices, Chinatown, the Lower East Side and Brooklyn.

Nor did the cleanup include the vast majority of HVAC systems where independent testing found high levels of contamination by lead, cadmium and benzene, among others things. Nor did EPA test for anything but asbestos. This means that those people who opted for testing first got no cleanup if the air tests performed found no asbestos.

Nor did EPA conduct tests for dust such as ultrasonication which EPA itself developed or ASTM microvac.

The mere fact that people were presumed to be informed enough to make decisions about what test to have indicates the amateurish approach EPA took to the cleanup. People were discouraged from having aggressive testing done yet that is the kind of test that would be most likely to unearth problems.

In addition the document should mention all the contaminants it does not study in depth. The fact that they are not in the book does not mean that they are not in people's lungs and systems. Finally, the document should have been written after referring to the 250,000 pages of EPA's own data in Edison, New Jersey. The current document was written on the basis of a paucity of data on PAH's, for example, so that for several months the levels were assumed according to a formula whereby they could be half or all or none of the previous levels. The 250,000 pages might be useful here. The fact that the writers of the document didn't know they existed is surely cause for investigation.

Re: the danger of asbestos that's under five microns in length: See Andrew Schneider's article in the St. Louis Post-Dispatch, January 2002. He quotes Hugh Granger: "In most of the autopsies on asbestos victims, the predominance of fibers we see are small, are under five microns."

The plan to refer the assessment of exposure and human health to an independent panel makes

eminent sense. EPA has a conflict of interest in doing the assessment itself.

Re: Stuyvesant High School, this is to ensure that my verbal comments get incorporated into the record. Any panel needs to be informed of Stuyvesant's particular circumstances during the cleanup. The community there were not like office workers who received only the exposure that emanated from the site. Stuyvesant also had virtually all the WTC debris on its north doorstep as well since that is where the barge was placed to transport the debris to Staten Island. With the barge came a diesel crane and fleet of diesel trucks making hundreds of trips per day. The filtration system was only 10% effective til the end of January.

Jenna Orkin
9/11 Environmental Action
Concerned Stuyvesant Community

Received: from imo-m08.mx.aol.com
by mail.versar.com; Fri, 18 Jul 2003 13:07:21 -0400
Received: from Wdecker4cb@aol.com
by imo-m08.mx.aol.com (mail_out_v36_r1.1.) id x.51.3246d0b2 (15875)
for <bluditra@versar.com>; Fri, 18 Jul 2003 13:10:24 -0400 (EDT)
Received: from aol.com (mow-m04.webmail.aol.com [64.12.184.132]) by air-id07.mx.aol.com
(v95.1) with ESMTP id MAILINID72-3e033f182a002d0; Fri, 18 Jul 2003 13:10:24 -0400
Date: Fri, 18 Jul 2003 13:10:24 -0400
From: Wdecker4cb@aol.com
To: bluditra@versar.com
Subject: RE: EPA Public Comment /WTC Health Consequences
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X-Mailer: Atlas Mailer 2.0
Content-Type: text/plain; charset=iso-8859-1
Content-Transfer-Encoding: 8bit

Dear Ms. Budis:

Neighborhood Environmental Watch has consistently advocated for widespread testing by the EPA to determine the extent of environmental contamination versus the amazingly inaccurate and subjective "method" of determining whether dust emanated from the WTC on the basis of visual inspection. Once accurate testing, using advanced techniques, has been completed, every contaminated building should be remediated using asbestos protocols. NEW represents individuals and families who are now permanently displaced as a result of the EPA's deliberately inept "clean-up" and the health consequences resulting from exposure to smoke, ash, and dust contaminated with furans and dioxin, PCB's, mercury, and numerous other toxic materials. Obviously, because of our displacement, we and numerous others were unable to attend the hearing.

We would like to submit letters and statements we have sent to the EPA and other agencies and testimony given at the EPA Ombudsman's hearing, as individuals whose health is such that we have been advised by treating physicians that we can not reinhabit our home or even live again in NYC, and as board members of NEW, regarding the health consequences emanating from exposure to WTC smoke, ash, and dust. Please advise. Thank you for your attention to this correspondence.

Carla Breeze & Wayne Decker, Neighborhood Environmental Watch
2011 Matthew NW #4
Albuquerque, NM 87104
505/243-6501

Received: from smtp101.mail.sc5.yahoo.com
by mail.versar.com; Wed, 16 Jul 2003 09:57:33 -0400
Received: from pool-162-83-212-254.ny5030.east.verizon.net (HELO D6DTD411)
(didreyfus@162.83.212.254 with login)
by smtp.mail.vip.sc5.yahoo.com with SMTP; 16 Jul 2003 14:00:49 -0000
Reply-To: <diane_dreyfus@UTECHO.com>
From: "unitech operations" <didreyfus@yahoo.com>
To: <diane_dreyfus@UTECHO.com>,
"Traci Bludis" <BLUDITRA@versar.com>
Cc: "mary mears" <mears.mary@epamail.epa.gov>,
"wanda calderon" <calderon.wanda@epamail.epa.gov>
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Importance: Normal
In-Reply-To:
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Dear Traci,

I spoke with Dr. Dourson regarding the 7-4-03 document (sent 10JUL03 to your attention) document Monday 14JUL03 and was shocked to see that it had not been incorporated in the public comment section. Could you please append your file to include both of these documents.

They are not only necessary to substantiate my comment that Dr. Chatfield with his W.R.Grace connection appears less than neutral but it is also provide a great resource for scientists and historians of the disastrous failure of EPA.

If you are for some reason unable to fold this in, please advise soonest as to the reasons.

Thank you.
Diane Dreyfus,
M.S. Arch.

Urban & Regional Planning

PS

I will forever wonder why Dr. Chatfield did not mention his W.R.Grace/EPA/Libby, MT connections in either his bio or in the comment period set aside to discuss such conflicts. W.R.Grace provide the asbestos for the first forty floors of the WTC and that toxic material was mined in Libby MT... I believe that is sufficient evidence of conflicted loyalty in this case.

-----Original Message-----

From: unitech operations [mailto:didreyfus@yahoo.com]

Sent: Thursday, July 10, 2003 6:22 PM

To: 'Traci Bludis'

Subject: The Document "Comments on the EPA Office of InspectorGeneral's 1/27/03 interim report . . . A DOCUMENT

Dear Traci,

Thanks for facilitating us in incorporating this important document in support of Little Italy Neighbor's Association and Mothra-NYC.org's 206 members.

I understand that other organizations will be writing to echo this position and I wil send you the full document under separate cover if you trouble with either of the links.

On be half of the above,
Diane E. Dreyfus
Steering

Received: from smtp100.mail.sc5.yahoo.com
by mail.versar.com; Thu, 31 Jul 2003 20:34:13 -0400
Received: from pool-162-84-134-247.ny5030.east.verizon.net (HELO D6DTD411)
(didreyfus@162.84.134.247 with login)
by smtp.mail.vip.sc5.yahoo.com with SMTP; 1 Aug 2003 00:38:18 -0000
Reply-To: <diane_dreyfus@UTECHO.com>
From: "unitech operations" <didreyfus@yahoo.com>
To: "Traci Bludis" <BLUDITRA@versar.com>
Cc: "mary mears" <mears.mary@epamail.epa.gov>,
"wanda calderon" <calderon.wanda@epamail.epa.gov>,
"Ben Barry" <barry.benjamin@epa.gov>,
"babs finanazi" <finazzo.barbara@epamail.epa.gov>,
"Anne Hoerning" <hoerna01@gcrc.med.nyu.edu>,
"jane kenny" <kenny.jane@epamail.epa.gov>,
"matt lorber" <lorber.matthew@epamail.epa.gov>,
"NYU forum" <lyris@forums.nyu.edu>,
"Pete Gleason" <PJGleason@aol.com>
Subject: PLEASE INCORPORATE THIS DOCUMENT in the WTC Peer Reviewers
Date: Thu, 31 Jul 2003 20:38:56 -0400
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X-MSMail-Priority: Normal
X-Mailer: Microsoft Outlook, Build 10.0.4510
Importance: Normal
In-Reply-To:
X-MimeOLE: Produced By Microsoft MimeOLE V6.00.2800.1165

Respiratory Problems for Downtown Residents

Preliminary results of the study organized the New York State Department of Health and NYU/Bellevue, and local community organizations show the residents of lower Manhattan who have lived within 1 mi. radius of Ground Zero since 9/11 of significantly more persistent new on-set respiratory symptoms than a control group of similar socioeconomic level individuals living more than 5 mi. away. Symptoms include coughing, wheezing and shortness of breath that was not present before the attacks. The study also showed the people living downtown now use asthma medication more persistently than do people from the control group.

Interestingly, the lung damage was not apparent from the test doctors usually use first to diagnose asthma and other lung damage a test called spirometry which measures how quickly and efficiently the lungs can inhale and exhale. The lung damage did, however, show up during Methacholine Challenge test which can be used to test for asthma or to determine a person's likelihood of developing asthma. Affected residents were discovered to have "twitchy lungs" meaning that their lungs reacted more quickly than normal to potential asthma triggers.

Study organizers plan to present their findings at the National Asthma Conference this summer and plan to publish the study as soon as possible.

From the Downtown Dispatch -- Summer 2003

Thanks Diane Dreyfus

**INDEPENDENCE PLAZA TENANTS'
ASSOCIATION**

310 Greenwich St., #23 E, New York, NY 10013

July 22, 2003

David P. Bottimore
Senior Project Manager Versar, Inc.
6850 Versar Center
Springfield, VA 22151

Dear Mr. Bottimore:

We are submitting this letter and the enclosed documents for review by the NCEA peer review panel. We sincerely hope that the concerns expressed herein will be included in the panel's report regarding the federal Environmental Protection Agency's handling of the environmental impacts of the World Trade Center destruction and consequent threats to the health of residents, workers and visitors to Lower Manhattan. And we hope that the panel will recommend that the EPA ask the National Academy of Science to convene a panel to conduct a thorough study of the post-9/11 indoor environment. That study should include what people were exposed to before the EPA cleanup, the cleanup itself, and what contamination remains. We have a right to know this information, and the government needs to acknowledge the truth and find ways to deal with it, in order to truly help our citizens now and better protect them in the future.

We would appreciate your reviewing the enclosed copy of a June 6, 2003 letter to then EPA Administrator Christine Todd Whitman, from the Environmental Committee of the Independence Plaza North (IPN) Tenants' Association, regarding the gross inadequacies of the EPA WTC Residential Cleanup Program.

Please keep in mind, in reading the following and the attached documents, that all air testing done in "common areas" at IPN was passive air testing.

IPN, a large housing complex located six blocks north of the World Trade Center site, is comprised of three 39-story towers and 70 town houses, totaling 1,332 apartments. The complex also includes 15 ground floor commercial spaces, plus underground parking garages in two of the towers. In addition to being exposed to the lethal contaminants released from the collapse of the WTC, our buildings were also subjected to the hazardous WTC debris transfer operation located just outside our windows for more than eight months. Consequently, our apartments were exposed to an enormous amount of contaminants, which the EPA has failed to abate in a comprehensive and effective manner.

Despite many months of efforts by citizens and elected officials to compel the EPA to do thorough testing and cleaning, the agency finally chose instead to do a "voluntary," haphazard, piecemeal "dust cleanup." Now, we find that, due to the incompetence of the cleaning and monitoring contractors and the apparent disregard for public health and safety on the part of EPA oversight personnel, this cynical, poorly planned program may be more dangerous than if nothing at all had been done.

The EPA's false reassurances of our safety in the immediate aftermath of the environmental catastrophe of 9/11, and its poorly conceived cleanup plan, instituted a year and a half later, have caused increasing concern about the health of our tenants and our neighborhood.

The initial designation of this program as 'voluntary' doomed it to certain failure. It ensured that an undetermined level of re-contamination would exist throughout buildings that were undergoing 'whole building cleanup'. The movement of air and people was certain to carry contaminants from "un-cleaned" apartments into common areas and "cleaned" apartments, via HVAC systems and foot traffic.

The setting of an arbitrary boundary (Manhattan, below Canal Street) for the cleanup program, and the exclusion of commercial establishments, government office buildings, schools, libraries and other public spaces likewise ensured cross-contamination. At IPN, for example, the EPA refused to clean common areas of the complex, such as management and security offices, and maintenance areas, which are regularly frequented by tenants but which the EPA deemed to be part of the "commercial" operation of the complex.

These fatal flaws in the EPA's cleanup program were exacerbated at IPN by the EPA's rush to clean individual apartments before all common areas had been certified as being "cleared" of contaminants. This was in direct violation of agreements reached in several meetings between EPA and the tenants' environmental committee. It also violated EPA's own protocols, as published on its Internet site. It was also an error that could easily have been avoided by more careful scheduling and by honest, competent oversight by the EPA personnel responsible for the cleanup.

One issue of concern to many tenants was not included in the June 6 letter to Ms. Whitman — that of worker safety. Most of the workers who did the cleaning did not wear any protective gear whatsoever. Even during the tearing up and removal of hallway carpeting that had been tested and found to contain large amounts of asbestos, none of the workers we observed wore even masks or gloves. Tenants reported that a few workers wore gloves and a few wore paper dust masks while cleaning some apartments. We were told by several workers that they had been told by their supervisors not to wear any protective clothing, because "the residents would be frightened" by that. One of our committee members had her apartment independently tested for contaminants before the EPA cleanup, so she knew that she had astronomically high asbestos levels on her terrace and a high reading in her dining room. She had to argue with EPA and DEP representatives, forcefully and at length, in order for the workers in her home to be protected by haz-mat suits and full-face respirators.

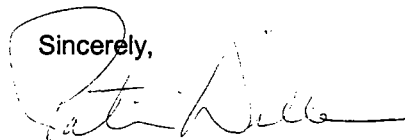
Since the enclosed letter was sent to Ms. Whitman in June, there have been the following developments:

- The EPA sent copies of the cleaning/testing reports for the common areas in IPN's three tower buildings to both the IPN complex manager Ms. Deborah Dolan and Ms. Diane Lapson, chairwoman of the tenants' environmental committee. The report is virtually incomprehensible. We are enclosing herewith Ms. Dolan's June 24th letter to Arlene Anderson, EPA's Quadrant Coordinator, asking for a revised format of the report — one that might be able to be understood. We would be happy to send you the original 75-page report, if you wish to see it for yourselves — it's really quite absurd.
- On July 15, Ms. Dolan got a call from Ms. Anderson's supervisor, Patrick Evangelista, who told her he would send her a re-formatted report of the common area test results within two weeks.
- On July 16, Ms. Dolan again got a call from EPA, informing her that the two "community rooms" at IPN are going to be cleaned and tested sometime between July 19 and August 2 — some seven months after most of the other common areas in the complex were cleaned and tested, and after virtually all individual apartments have been cleaned and tested. (See section (4) of the enclosed letter to Ms. Whitman.)
- In the July 16 phone call, Ms. Dolan was also told that EPA is "hoping" to send us (the Environmental Committee) a response to our June letter to Ms. Whitman within the next several days. If we actually receive such a letter, it will be the first time since before the "dust cleanup" began at IPN last December that EPA has sent a written response to any of our emails and letters.

In closing, it is our belief that the real risks to residents' and workers' health, in the aftermath of 9/11, have been greatly minimized by the EPA since Day 1. We hope that the peer review panel will strongly urge the federal government to immediately commission an independent study, as we suggest in the first paragraph of this letter, that would reveal the truth of the current environmental situation. Hopefully, such a study would lead to a new, much improved cleanup of WTC-impacted areas of New York City. It might also cause the EPA to reform its procedures and take a more honest, less public relations-focused approach to this kind of environmental catastrophe, in order to safeguard citizens' health in the future.

Thank you for your attention to this matter.

Sincerely,



Patricia Dillon, for the
IPNTA Environmental Committee

encls. (2)

cc: Hon. Jerrold Nadler

IPNTA Environmental Committee
40 Harrison Street, 31H
New York, New York 10013

June 6, 2003

Ms. Christine Todd Whitman
Administrator
U.S. Environmental Protection Agency

Dear Ms. Whitman:

We are writing on behalf of the thousands of residents of Independence Plaza North (IPN) regarding the manner in which the EPA's dust cleanup program has been conducted at IPN. We are extremely concerned because despite the agreements reached between representatives of your agency, IPN's Managing Agent and their legal counsel, and our committee, long before the "dust cleanup" program at IPN began, there have been egregious violations of those agreements and of EPA's own protocols for the cleanup.

Some of the most worrisome violations are as follows:

- 1) EPA has not sent copies of any inspection or testing reports to the Tenant Association, although we specifically requested them and your representatives agreed to send them.
- 2) The few reports that have been sent to the IPN Management Office have only referred to the results of testing in vacant apartments, and have not arrived in a timely manner. IPN never received written test results for apartment 7A at 310 Greenwich Street, which was not occupied at the time of testing. In fact, the EPA never notified Management that the air test had "failed". Management was made aware of the problem when a clerk employed by the cleaning company called to schedule a re-cleaning appointment. Due to the absence of timely information from your Agency, that apartment has now been rented and is occupied.
- 3) No test results have been submitted for the 'random' wipe tests for heavy metals and other contaminants. According to the EPA, these tests were conducted only in vacant apartments, purportedly because it was "easier" to take wipe samples in an unoccupied apartment. The wipe test results have not been reported to IPN Management nor has Management been advised of the total number of apartments that were tested or of the actual apartments where the tests were conducted.
- 4) The single most important thing that IPN tenants, IPN Management and the EPA representatives agreed upon during the pre-cleanup meetings was the absolute necessity of ensuring that the common areas of the complex were cleared of contaminants before the cleaning of individual apartments began. Otherwise, all parties agreed, there would be a great likelihood of cross- and re-contamination of apartments and other areas that had already been cleaned. Recently, three to four months after the cleaning and testing of the common areas and after most apartments have been cleaned and tested, we were informed that the following common areas were either found to contain high levels of asbestos, or had "undetermined" test results due to filter clogging.
 - a) 310 Greenwich Street: The laundry room was cleaned on February 6, 2003 and tested on February 7, 2003. On April 15th, the EPA notified Management that air tests showed there were unacceptably high levels of asbestos in the laundry room and the second and third

floor stairwells and hallways. The laundry room, heavily used by the building's tenants for all this time, and the 2nd and 3rd floors, were finally re-cleaned and re-tested on April 24th and 25th.

- b) The 4th and 22nd floors of 310 Greenwich Street were cleaned and tested in January 2003. The common areas of these floors were re-tested, but not re-cleaned, on April 23rd. In this case, the EPA said that re-testing was necessary due to "air filter overloads with particulate matter, or because of damage to the air sample filter." The EPA's own website states that if post-clearance tests are invalidated because of filter overloads, the area must be re-cleaned as well as re-tested. Here, as in many instances, your agency is not even adhering to its own extremely inadequate protocols.
- c) The cleaning contractor informed Management on 4/8/03 that they were required to re-clean the 'B' stairwell in the 80 North Moore Street building because asbestos levels exceeded the risk level. Specific test results were not available. EPA/DEP never informed Management of this matter. It is astonishing - and very worrisome - that cleaning and testing of all common areas in 80 North Moore Street, except the lobby, had been completed on December 19, 2002, but not until April 2003 was Management informed of the high asbestos levels and the need to re-clean the B stairwells.

Furthermore, although the EPA consistently denied responsibility for cleaning common areas in the complex that it deemed part of the "commercial" operation (IPN Management office, security room and maintenance areas), it did agree to include the community meeting rooms, which are in daily use by the senior citizens' lunch program and other tenant functions and meetings. However, since neither the IPN Manager nor the undersigned have received any comprehensive reports on the cleaning and testing of the common areas, and since EPA did not specifically schedule the cleaning of the community rooms with Management, we have no way of knowing for certain that those rooms were, indeed, cleaned and tested. If they were not, they would, of course, be a major source of re-contamination of the entire complex.

5) A couple on the 35th floor, 310 Greenwich Street, was informed on March 17th that their apartment had unacceptably high asbestos levels after cleaning. More than 5 weeks later, the EPA had not scheduled re-cleaning and testing. The couple has occupied the apartment throughout this time.

It is fairly obvious from the information detailed above that none of the testing results have been provided in a timely fashion. In fact, as of this date, Management has not received any written test results for the complex's common areas. The delays in re-cleaning and re-testing the common areas mean that there is a strong probability that apartments that participated in the cleanup, as well as common areas in the entire complex, have already been re-contaminated.

Will the EPA re-clean apartments on the floors that have been shown to contain asbestos? The agency has given no indication that they will do that. Instead, your staff seems to be very anxious to close up shop, wash their hands of this problem, and leave us to our fate. During the past month, tenants who registered for the cleanup have been told they could no longer make an appointment for cleaning - they had missed "the deadline," a "deadline" these tenants did not know existed.

Additionally, it is not acceptable that the EPA refuses to provide any information, even to IPN's owners and Manager, about occupied apartments that have required additional cleaning and testing.

The EPA made a unilateral decision not to send the test results for the buildings' common areas until all the test results show an (EPA) acceptable clearance level. To date, Management has not received these EPA test results.

We request that these results be forwarded to us now. The IPNTA has been forced to assume

the role of steward of the residents of this very large housing complex after the EPA declined this duty and relegated themselves to a secondary role. We, as the 'watchdogs' of this cleanup process, are serving to safeguard the health of the residents. In order to monitor this process effectively, we must be provided with the particulars of the cleanup.

The IPNTA Environmental Committee is formally requesting that apartments and common areas where post-clearance testing results were "undetermined" due to filter problems, be re-cleaned as well as re-tested.

We are also formally requesting that the U. S. Department of Environmental Protection Agency provide a written report, forthwith, to IPN Management and to the IPN Tenant Association, which contains, but is not limited to the following information:

- ❖ All common area testing results;
- ❖ The total number of apartments at IPN that have been cleaned, or are scheduled to be cleaned and tested;
- ❖ A breakdown of how many such apartments received "aggressive" post-clearance testing versus how many received "modified aggressive" testing;
- ❖ The number of IPN apartments that have been tested but not cleaned.

We also insist that the specific information on which IPN apartments (occupied and unoccupied) have been, or are scheduled to be, cleaned and tested, be immediately forwarded to the Owners and to the Managing Agent of Independence Plaza North.

We ask that you send the requested information as soon as possible, but no later than June 20th, 2003 to:

Ms. Deborah Dolan, Manager
Duane Street Associates
40 Harrison St.
New York, N.Y. 10013

Ms. Diane Lapson, Chairperson
The Independence Plaza Tenant Association
40 Harrison Street, 31 H
New York, N.Y. 10013

Sincerely,

The Environment Committee of the Independence Plaza Tenant Association –
Diane Lapson, Kathryn Freed, Maureen Silverman, Pat Dillon, Harriet Grimm, Mariette Bailey



HUDSON RIVER MANAGEMENT LLC

40 HARRISON STREET, NEW YORK, N. Y. 10013 • (212) 962-3530 • Fax (212) 571-5663

June 24, 2003

United States Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866

Attn: Arlene R. Anderson
Quadrant Coordinator

Re: Independence Plaza North
Common Area Cleaning/Testing Report

Dear Ms. Anderson:

This will serve to confirm receipt of the cleaning/testing reports for the common areas in our 80 N. Moore, 40 Harrison and 310 Greenwich Street buildings.

After reviewing the EPA's submission, we have determined that the report is virtually indecipherable for the following reasons.

- The report, in excess of seventy-five pages, is not numbered, and with the exception of three pages, there are no headings on the pages that identify the specific location for the data reported therein.
- There are no cross-references of the sample numbers.
- The third page of the report (beginning with sample #05511-345-1459) includes fifteen areas that were tested but "not analyzed"; there is no indication if these areas were subsequently re-cleaned, retested or analyzed. Additionally, because there is no heading at the top of the page, Management does not know the location of the areas that were not analyzed (other than "Eastside", "Westside", and "SW corridor"). On many other pages of the report, there are samples that were also "not analyzed" and again, no further information is provided.

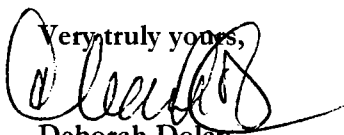
Kindly advise the undersigned if the EPA will revise its' report to a more comprehensible format.

Our comments notwithstanding, we do have several specific questions regarding some of the data.

- ✓ Generally speaking, the number of "non-asbestos fibers" per sample ranges from one to ten. However, there are numerous instances where non-asbestos fibers are present in amounts as high as ninety-eight. What is the significance of these higher concentrations of non-asbestos fibers?
- ✓ Why are there variances in the amount of air collected for the samples?
- ✓ It appears that some samples were analyzed by the PCM method in addition to TEM analysis. Please explain why two methodologies were used for analysis of some samples, and by what process these samples were selected.
- ✓ Management was advised by the EPA that tests for contaminants other than asbestos (i.e., lead, mercury et al) were conducted in some of our vacant apartments. When can we expect the results of those tests?

Please direct your response to my attention at your earliest convenience.

Thank you.

Very truly yours,

Deborah Dolan
Manager

Cc: Harold N. Cohn
Harvey Cohn

Received: from nycsmtp3out.rdc-nyc.rr.com
by mail.versar.com; Tue, 22 Jul 2003 22:56:13 -0400
Received: from rachel.nyc.rr.com (66-108-188-162.nyc.rr.com [66.108.188.162])
by nycsmtp3out.rdc-nyc.rr.com (8.12.1/Road Runner SMTP Server 1.0) with ESMTP id h6N2xYnm008855
for <BLUDITRA@versar.com>; Tue, 22 Jul 2003 22:59:36 -0400 (EDT)
Message-Id: <5.0.2.1.2.20030721214349.025ac008@pop-server.nyc.rr.com>
X-Sender: rlidov@pop-server.nyc.rr.com
X-Mailer: QUALCOMM Windows Eudora Version 5.0.2
Date: Mon, 21 Jul 2003 21:52:45 -0400
To: "Traci Bludis" <BLUDITRA@versar.com>
From: Rachel Lidov <rlidov@nyc.rr.com>
Subject: Re: Meeting Follow up - WTC Public Comments to EPA
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"; format=flowed

Dear Ms. Bludis:

Thanks so much for sending this on to me. In the end, minor health issues made it impossible for me to attend.

As a member of Concerned Stuyvesant Community, with a daughter just graduated, I have concerns about how well the WTC Health Registry will serve her and her fellow students, and as a New Yorker, I have concerns for friends and family and fellow residents given both the general failures to identify and measure COCs post 9/11/01 and the awareness that these young adults may not see much point in voluntarily registering. It seems therefore important to try to make some attempt to exercise my citizen's rights to stay on top of the situation as best I can.

I gather that some concerns over the EPA's compliance with transparency and public process were brought out during the 2 day meetings. I would be very interested in any further documents that come out, and in finally getting access to the CVs of the panelists.

Can you give me any more information on what we can expect to come our way? and when?

Thanks so much,
Rachel Lidov

-- At 08:09 AM 7/15/2003 -0400, you wrote:

Please find attached a compilation of the public comments submitted to EPA during the December 2002 to April 2003 comment period for the Exposure and

Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster document. Several observers at the meeting asked to see these comments, so we wanted to distribute it to all observers.

Thanks again for participating in the meeting and contributing so many thoughts and suggestions.

Traci Bludis
Environmental Scientist
Versar, Inc.
703-750-3000 x449
bluditra@versar.com

Asbestos Fiber Length as Related to Potential Pathogenicity: A Critical Review

Ronald F. Dodson, Ph.D., FCCP, FAHA; Mark A.L. Atkinson, M.A., D.Phil.; and

Jeffrey L. Levin, M.D., M.S.P.H.

The University of Texas Health Center at Tyler

Tyler, TX

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Abstract:

Background: Asbestos inhalation is recognized as increasing the risk for the development of disease. It is unique among dusts in that it is both a carcinogen and capable of inducing extrapulmonary responses ranging from pleural thickening and fibrosis as well as malignancy. One feature of asbestos suggested as crucial in its pathological activity is its fibrous morphology. Long fibers that have been inhaled are cleared less readily and are thus more persistent in the body. Furthermore certain experimental models link fiber length to levels of risks for development of certain diseases. The present review will survey the data on this subject.

Methods: The review considers experimental models that have been used to assess the response to various lengths of fibers in animal models in addition to data obtained from studies of human materials. The review also emphasizes the importance in defining the method by which a sample is categorized.

Results: Data are offered which support the potential for longer fibers as well as shorter fibers to contribute to pathological responses.

Conclusions: The data presented argue that asbestos fibers of all lengths induce pathological responses and that caution should be exerted when an attempt is made to exclude any population of inhaled fibers, based on their length, from being contributors to the potential for development of asbestos-related diseases.

Key Words: Asbestos; public health; fiber length

Asbestos has been used in many applications since ancient times [Craighead et al., 1982; Hammar and Dodson, 1994; Alleman and Mossman, 1997]. Until recently, the variety of these applications has only expanded with the increased industrialization of more modern societies. The range of modern usage reflects the versatility of its properties including high tensile strength, excellent insulating ability, and the resistance of certain forms to strong chemicals. Furthermore, asbestos offered many positive attributes that stimulated its commercial exploitation. The minerals were easy to process into the desired products, readily available and inexpensive. For all of these reasons, three (chrysotile, amosite, and crocidolite) of the six fibrous forms (asbestos) of the minerals were widely used in products distributed in the United States [Bowles, 1946; Hammar and Dodson, 1994; Alleman and Mossman, 1997].

The result of this widespread use of asbestos-containing products was the exposure of numerous workers in diverse occupations to asbestos, and the consequent development of asbestos-related diseases after a certain period of latency [Craighead et al., 1982]. These diseases include parenchymal fibrosis (asbestosis) induced by the accumulation of asbestos fibers in the lung as well as pleural changes (pleural fibrosis and plaques).

Asbestos also carries a more insidious risk than most other dusts in that it is also recognized as a carcinogen, which, as will be discussed in this manuscript, is in part attributable to its fibrous habit. The types of cancer most frequently associated with asbestos exposure are lung cancers and mesothelioma [Craighead et al., 1982], but other types of cancers have been reported in some exposed cohorts. [Selikoff and Lee, 1978; Levin et al., 1998]. While fibrosis and cancer in the lung may result from causes other

than asbestos exposure, with rare exception, the cause of mesothelioma is considered to be the inhalation of asbestos fibers [Craighead et al., 1982]. Even in the relatively recent past, the incidence, or at least the identification of this tumor was sufficiently rare for the British pathologist Willis [Willis, 1960] to conclude in his book, 'The Pathology of Tumors', that "Thus, to the present day, the accounts of supposedly primary serosal tumors contrived to be descriptively inadequate and insufficiently critical, displaying a lack of awareness of the possible behaviour of small undetected carcinomas". Borow was slightly more accepting of the tumor's existence [Borow et al., 1973] with the statement that "Malignant tumors arising in mesothelial tissue have been so rare that until recently they were considered pathologic curiosities". Perhaps one of the most unique facets of this tumor's etiology is the fact that exposure to the causal agent (asbestos) often occurred 30 or 40 years before diagnosis of the tumor. Also key is the tumor's occurrence in some individuals with lower levels of exposure to asbestos than is usually associated with other asbestos-related pathology and even in those with only secondary or environmental exposures to asbestos.

Given these proven health effects from exposure to asbestos, it is not surprising that as noted by Landrigan: [Landrigan, 1998] "New uses of asbestos have almost completely ended in the United States and in most other developed nations as the result of governmental bans and market pressures". The widespread use of asbestos in commercial applications continues to the present in developing nations. In spite of this response by governments, tons of asbestos-containing products remain in place. Additionally, large amounts of asbestos are present in products as components of

minerals used in their manufacture. It is particularly worrisome that these are generally not considered to be “asbestos-containing.”

As a result of this proven role of asbestos in the induction of disease in man, Federal Agencies have established work practices and exposure levels based on measurements of “regulated fibers”. The terms “regulated fiber” and “pathological active fiber” are often liberally and erroneously interchanged. Regulated asbestos fibers as defined in both the Occupational Safety and Health Administration and Environmental Protection Agency guidelines are critical in assessing the dust exposure level in a given setting and, therefore, the potential for human exposure and the correlated potential for the eventual development of disease. However, these measurements are based on the premise that there should be practical and reproducible standards but are not meant to imply that the count is based on a potentially “more hazardous” population of fibers. Langer and colleagues [Langer et al., 1991] emphasized that the counting guidelines include the physical definition of a fiber to be included in the count, the aspect ratio used for defining an included fiber, and how one includes bundles or other structures. These guidelines are defined with an emphasis on “practicality and theoretical considerations” not in an effort to target a population of fibers as relating to specific health risks. In other words, it makes no sense to establish a count scheme, which would not reasonably be expected to yield the same results from a sample, which was analyzed by several laboratories and several analysts. The working resolution of instruments available for analysis of asbestos is approximately 0.2 μ m for the phase contrast microscope, 50Å for the scanning electron microscope, and 5 Å for the transmission electron microscope [Omenn et al., 1986].

The importance of using instruments with the appropriate resolution when counting asbestos fibers is further emphasized in that a single “fibril” of chrysotile may be as thin as 50nm while those of amphiboles are larger at approximately 500nm [Mueller and Stanley, 1975]. Thus counting fibers with the light microscope from either environmental samples or from tissue, yields data which, at best, provide information on only a small percentage of the overall fiber burden since the diameters of most asbestos fibers are below the limit of resolution of the light microscope [Ashcroft and Heppleston, 1973; Crossman et al., 1996; Pooley and Ranson, 1986; Murphy et al., 1986]. It was the recognition of this limitation of the light microscope for asbestos fiber analysis that resulted in the analytical transmission electron microscope being defined as the “state of the art” instrument for analysis of air samples for asbestos under the Asbestos Hazard Emergency Response Act (Title II of the Toxic Substance Control Act 15, U.S.C. Sections 2641 through 2654). The counting protocol when using TEM provides not only a morphological definition of the structures to be counted, but allows the analyst the capability to use magnification appropriate to “see” those structures that are below the level of detection by the light microscope. Simply because the analytical transmission electron microscope is used in a count does not mean the data reflect a true representation of the fiber burden because the scan must be made at a sufficiently high magnification to permit detection of short as well as long thin fibers [Murai et al., 1994].

This issue is of particular relevance when discussing the subject of fiber length and pathogenicity since results from models in which fiber length was determined solely by the light microscope must be critiqued with these limitations in mind.

The concept of the pathogenicity of fibers based on length has been the subject of several publications. The two scientists most instrumental in conducting studies suggesting that physical features serve as a significant factor in determining the potential pathogenicity of an inhaled fiber are probably Stanton and Pott. Dr. Mearl Stanton's team in the United States observed that various fibrous dusts, when injected as pleural implants, induced sarcomas in Mendal rats [Stanton and Wrench 1972; Stanton et al., 1981]. These observations led to the often-quoted "Stanton Hypothesis" which suggests that "the carcinogenicity of fibers depended on dimension and durability rather than on physicochemical properties" [Stanton et al., 1981]. However, when one reads the findings of the study more carefully, it also indicates that the "probability of pleural sarcoma correlated best with numbers of fibers that measured 0.25 μm or less in diameter and more than 8 μm in length, but relative high correlations were also noted with fibers in other size categories having diameters up to 1.5 μm and lengths greater than 4 μm ."

Professor Pott and his colleagues from Germany [Pott et al., 1974; Pott, 1987; Pott et al., 1987; Pott et al., 1988] tested the potential of various types of dusts, which were injected intraperitoneally into rats, to develop tumors. In contrast to Stanton's concept that longer fibers are more active carcinogens, Pott and colleagues [Pott et al., 1974] found that fibers shorter than 10 μm in length could induce tumors. In one set of experiments they used milled chrysotile, which contained few fibers longer than 10 μm in length and with 99.8% of the fibers shorter than 5 μm in length. Thirty percent of the animals in this group developed tumors. Additional studies by the group found that relatively thick basalt as well as ceramic fibers also induced tumors [Pott et al., 1988].

Davis [Davis et al., 1991] studied the effects of intraperitoneal injection of rats with tremolite from various sources. While tremolite is considered a non-commercial amphibole, it is of importance when discussing human asbestos exposure since tremolite has been reported by some, but not all, investigators to be a component of chrysotile asbestos and other commercially exploited minerals [Srebro and Roggli, 1994; Wright et al., 2002; Hammar and Dodson, 1994]. Furthermore, tremolite exposures can also occur from environmental sources, for example, in areas where tremolitic rocks exist as outcrops or asbestos contaminated soil is used for construction of dwellings. Over time these materials yield respirable dusts through the weathering or aging process [Senyegit et al., 2002; Papiris et al., 1993; Metintas et al., 2002].

One variable in assessing exposure to shorter amphibole fibers, especially tremolite, is the determination that a short structure is actually the asbestiform form of the mineral (a fiber) versus the nonfibrous and, therefore, non-asbestos analog which has broken along a cleavage plane to produce structures that visually appear similar to the asbestiform habit [Langer et al., 1991]. From the perspective of the federal regulations a cleavage fragment would not be considered a regulated structure since it is not a true fiber.

However, these forms are usually short structures and can occur in the same formations along with asbestiform structures. More to the point Davis [Davis et al., 1991] found that all tremolite samples, irrespective of morphological form or length (including those which were morphologically consistent with cleavage fragments), possessed some potential to produce mesothelioma after being injected into the peritoneal cavity. This included some samples with thicker fibers as well as a sample defined as having “relatively few asbestiform fibers” which “nevertheless produced tumors in 70% of rats”.

Thus while not a “regulated fiber” these structures may well pose significant health risks.

The works of Stanton and Pott suggested that longer fibers including non-asbestos fibers have more carcinogenic potential than short fibers. Fraire [Fraire et al., 1994] studied the effects on the pleural surface induced by intrapleural injections of fiberglass. The fiberglass preparation was carefully sized and consisted of fibers with a mean length of 2.2µm and a width of 0.15 µm. The changes he observed ranged from chronic inflammation, fibrosis, and foreign body reaction to mesothelial hyperplasia and dysplasia. The most dramatic pathological event was the occurrence of mesothelioma in three of the twenty-five animals.

Lippmann [Lippmann, 1990] used data from humans to further refine this concept of a correlation between fiber length and the potential for inducing disease. He concluded that asbestosis was most correlated to the number of fibers longer than 2µm and thicker than 0.15 µm; mesothelioma to the number of fibers longer than “about” 5µm and thinner than “about” 0.1 µm; and lung cancer to the number of fibers longer than “about” 10µm and thicker than “about” 0.15 µm.

By contrast Dr. Andrew Churg, who has contributed appreciably to the understanding of the connection between the tissue burden of asbestos and resulting diseases, concluded from a study involving individuals heavily exposed to amosite and chrysotile that “except for pleural plaques, the association of fiber size and disease remains uncertain” [Churg and Vedal, 1994]. Furthermore these authors concluded that in their study “mesotheliomas are not associated with long fibers and in fact are probably associated with lower-aspect-ratio fibers than found in subjects without asbestos-related disease”.

Mc Donald [McDonald et al., 2001] reviewed the asbestos tissue burden of a series of individuals with mesothelioma who were 50 years of age or younger at the time of diagnosis. His findings included the observation that “shorter fibers were more abundant than longer fibers, and high concentrations of all fibre lengths tended to occur together”. “Short, medium and long fibres were all associated with mesothelioma risk: those longer than 10µm had the greatest increment in risk per fiber, followed by medium [6-10 µm] and then by short [<6µm].

A study of lung tissue from 55 mesothelioma cases using analytical transmission electron microscopy in our laboratory revealed some of the pitfalls associated with extrapolating data from fiber burden. First, it is imperative that the study clearly define the counting procedure, the techniques used, the magnification of the count and finally a clear definition of what is included in the count (so that the reader is able to determine what is not included) [Dodson et al, 1997]. For example, in our transmission electron microscopy study, 48% of the amosite fibers fit the Stanton hypothesis. However, if one used a light microscope, only 33 % would meet the criteria due to the different detection limit. This difference is even more dramatic for chrysotile. Thirty-nine percent of the chrysotile fibers met the Stanton definition (>8µm in length and <0.25 µm in diameter), but by light microscopy only 1.4% would have been detected due to the thin diameter of the fibers. Even observations by transmission electron microscopy at low magnification can greatly skew the information with respect to fiber burden since the reduced level of detection would render the results equivalent to that seen in a count done by light microscopy.

There are several other factors, which further compound the difficulty of establishing an exact definition of what constitutes a “more dangerous” length fiber. These include such things as physical features other than length and width. The questions asked by Pott [Pott, 1987] are still valid. These include: how long do fibers have to stay in the bronchial wall or serosa tissue in order to cause an alteration that can lead to development of a tumor without the further presence of fibers? Does a longer persistence time lead to a proportionately greater effect? What role do features other than physical characteristics play in the pathogenic potential of fibers? Wylie et al. [Wylie et al., 1978] concluded in a test of the Stanton Hypothesis that “correlation coefficient are low enough (within their test model) to suggest the possibility that factors other than size and shape play a role in mineral fiber carcinogenicity”.

There are indeed many other contributing issues, which have now been identified as associated with fibrous particulates and their potential for inducing cell damage. Just a few of these include the generation of active oxygen species [Churg, 1996; Mossman and Churg, 1998; Jaurand, 1997; Mossman et al., 1986a; Mossman et al., 1986b] surface properties of the different types of asbestos, [Bonneau et al., 1986a; Bonneau et al., 1986b] and charge characteristics [Hamilton, 1983; Valerio et al., 1987]. Xu [Xu et al., 2002] studied the mutagenicity of short crocidolite (average length of 3.2 μm) asbestos evaluated via response of mammalian cells. They concluded that the mutagenicity of these short fibers was mediated by reactive oxygen species. These are surface specific and the only relationship to variations in fiber dimensions occur in the changes of available areas for reactive surfaces. However, the mass of shorter fibers which result in their greater abundance in any inhalation situation would suggest that in total these

together could pose a greater overall opportunity for surface reactivity in the lung or other tissues than on the smaller numbers of fibers which make up the longer population.

Dement [Dement, 1990] in a workshop on fiber toxicology listed some of the additional information, other than fiber dimension, needed to assess the potential for a fiber to be toxic. These included: a) specific surface area; b) the chemical composition; c) the solubility in water, saline, and simulated lung fluid; d) the trace metal content, especially iron; e) the trace organic content; f) the surface charge at physiological pH (zeta potential); and g) the surface reactivity (ESR and spin trapping). Obviously the references quoted above address what is known about a limited number of these factors for a limited number of fiber types.

Complicating these variables of the inherent potential for a fiber to be potentially hazardous is the realization that in the real world of human exposure there are generally multiple exposures which compound and reinforce the reactions associated with inhaled fibers [Dodson and Ford, 1991; Coin et al., 1996]. Consideration of the relationship between fiber length and the risk for the development of disease frequently includes allowance for the fact that short fibers are cleared more readily from the lungs. However, this is an extrapolation that is of less importance when there are constant infusions of short fibers and a resultant eventual dust overload, which can greatly compromise clearance [Castranova et al., 2000]. While the mucociliary clearance from the airways is a highly efficient system for the elimination of inhaled particles [Wanner et al., 1996], it should be borne in mind that the lymphatic system also acts to clear particles from the

lung [Lauweryns and Baert, 1977] and serves as a conduit to other parts of the body including the serous cavities [Courtice and Simmons, 1954].

It is also important to remember that when the fiber burden of lung tissue is assessed, the burden of uncoated fibers represents what remains following the period from last exposure to sampling. In such cases there is a prejudice for the retention of long fibers, which are less readily cleared than short fibers. Even given this fact there are, with extremely rare exceptions, appreciably higher concentrations of short fibers ($<5\mu\text{m}$) than longer fibers in the lung parenchyma from subjects with both occupational exposures and members of the general population. Of course, as we have already pointed out, identifying these fibers and counting them requires the use of analytical electron microscopy at sufficiently high magnification and is also technique dependent [Dodson et al., 1993]. This raises legitimate questions as to the impact of these short fibers while still in the lung tissue on cell damage and the stimulation of fibrosis which becomes manifest a period of time following their clearance. The issue of length distributions within the population of asbestos fibers in extrapulmonary sites is often even more consistently skewed in that the majority of the fibers are short ($<5\mu\text{m}$).

Sebastien [Sebastien et al., 1980] reviewed samples of lung and parietal pleura from 29 cases sent for confirmation of diagnosis. The majority of these cases had work-related asbestos exposure. Sixteen of the twenty-nine samples of pleura were found to be positive for asbestos based on the detection limit of the technique employed while twenty-seven of the lungs were positive. They noted when the pleural samples were positive for asbestos the type was “almost all” chrysotile. The mean length of fibers in

the lung was 4.9 μ m and of those in the pleura was 2.3 μ m. They also concluded that “lung parenchymal retention is not a good indicator of pleural concentrations”, a point missed in most attempts to extrapolate risk, based on fiber length and toxicity, to extrapulmonary sites.

A study comparing fiber burden in lung, thoracic lymph nodes, and pleural plaques from occupationally exposed individuals was carried out in our lab [Dodson et al., 1990]. The average length of asbestos fibers, both chrysotile and amphibole fibers, found in the lung was longer than lengths for the same fibers obtained from the lymph nodes or plaques. However, the majority of asbestos fibers in all three sites were short fibers (<5 μ m) with only 4% of the chrysotile in the lung >10 μ m and none were detected within the parameters of the analysis which were >10 μ m in the pleural plaques or lymph nodes. The amphibole distribution consisted of 20% of the asbestos >10 μ m in the lung and the number dropping to 8% and 2.5% in the pleural plaques and lymph nodes respectively. We have also evaluated lung tissue and lymph nodes from a non-occupationally exposed group of individuals [Dodson et al. 2000]. Within the limits of detectability of the study, no asbestos fibers were found in eight of the twenty-one cases. When an asbestos fiber was found in the lymph node it was usually short (<5 μ m) and most often a noncommercial amphibole.

In another study from our lab the asbestos fiber burden was also evaluated in extrapulmonary sites, which have the potential for the development of peritoneal mesotheliomas -the omentum and mesentery [Dodson et al., 2000]. The exposure of these individuals based on tissue burden at these locations suggested more contact with

amosite-containing materials than findings in our lung, lymph node, and pleural plaque study would imply. Long fibers ($>8\mu\text{m}$) were found in all sites. The greatest percent of long chrysotile fibers was found in the lung while the size distribution of amosite fibers was similar in all sites. The predominant chrysotile fibers in all sites were less than $8\mu\text{m}$ in length while approximately half of the amosite fibers were less than $8\mu\text{m}$ in the various sites.

Suzuki and Yuen [Suzuki and Yuen, 2001][Suzuki and Yuen, 2002] compared the asbestos burden in lung and mesothelial tissues from individuals with mesothelioma from the aspects of fiber burden, fiber types, and fiber dimensions. They found that the majority of fibers in both the lung and mesothelial tissues were less than $5\mu\text{m}$ in length. They also reported that only 4% of the fibers fit Stanton's hypothetical dimensions of $>8\mu\text{m}$ in length and thinner than $0.25\mu\text{m}$ in diameter. The majority of the fibers they found were shorter and thinner than these parameters.

The data presented typify the nuances and complexities associated with attempting to correlate fiber toxicity to fiber dimensions. As mentioned at the outset this becomes even more complicated when the term "regulated fiber" is presented with some implication of it having meaning with respect to its inherent risks to human health. A regulated fiber is defined by arbitrary definitions and under the federal guidelines represents only a population of the potentially respirable fibers when they become aerosolized. It says nothing about the long-term pathophysiological effects of the fiber relative to a fiber of different dimensions once it has actually reached the alveolar spaces. In the real world the actual exposure that individuals have to asbestos comprises a mixture of fibers that

span a wide array of dimensions. More to the point, most fibers found in the lung and transported to extrapulmonary sites also show variations in size. In fact, the corpus of existing data appears to support the contention that shorter fibers are more readily relocated to the pleural region. We believe that it is difficult to exclude fibers of a particular dimension from a role in causing disease within the lung or extrapulmonary sites when one accepts that both the exposure and tissue burden have fibers of varying lengths and widths. In contrast the experimental models are limited by the simple fact that fibers of very limited length distributions were tested. A telling point remains that when the appropriate analytical techniques are utilized it becomes apparent that in most tissues the overwhelming majority of the asbestos fibers are less than 5 μ m in length.

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From Bob Van Dyke <groundupvandyke@yahoo.com>

To Matthew Lorber:

Please add the following to the public comments regarding the July 2003 Peer Review of the EPA study entitled:

EXPOSURE AND HUMAN HEALTH EVALUATION OF AIRBORNE POLLUTION FROM THE WORLD TRADE CENTER DISASTER

by fax at: 202 565-0078

by email at: lorber.matthew@epa.gov

From the Ground Up is a group of over 600 small business owners from Lower Manhattan, many of whom were formerly located in or immediately adjacent to the World Trade Center.

Our members represent a cross-section of Lower Manhattan's once-vibrant small business community.

Thank you for your invitation for public comment. Our members wish to raise their concerns about the impact of the hazardous fallout to our health and the environment from the September 11th terrorist attacks. These health and environmental issues are an ongoing concern, because the EPA cleanup efforts to date have been limited to residential units in Lower Manhattan. Small businesses have received no such assistance with the cleanup of their properties. This leaves small business owners, their employees and their customers at risk.

In addition, the EPA's statements about the alleged lack of environmental and health risks presented by the WTC "dust" have been misused by insurance companies, who have latched onto these official government statements as justification for underpayment or outright denial of property damage claims based on WTC "dust."

1. EPA Administrator Christine Todd Whitman reported that the EPA was "greatly relieved to have learned that there appear to be no significant levels of asbestos dust in the air in New York City." She further stated " We are working closely with rescue crews to ensure that all appropriate precautions are taken. We will continue to monitor closely." The reported "monitoring" appeared to produce even better news, as Whitman reported on September 21, 2001. "[A] host of potential contaminants are either not detectable or are below the Agency's concern levels."

Any health study of air quality in the aftermath of September 11th must consider the various populations at risk and the amount of exposure they experienced.

Small Business owners have generally fallen into a non-represented class. We are not protected by large company benefits and are facing a struggle unique to this disaster. Public officials urged all of Lower Manhattan's small businesses and their employees to return to work as soon as possible after September 11th. In so doing, Lower Manhattan's small business community relied on the EPA's assurance that the environment was safe. In most cases, small business reopened while the WTC site was still burning and the air was still acrid with toxic smoke and dust. Consequently, the small businesses were unwittingly providing services/food in an environment that was unhealthy for the small business owner and his/her employees and customers.

The first line approach for public officials and the EPA seemed to be denial - denial that there was any problem with contaminants, denial that people were at risk. Eventually, they admitted that a problem existed and addressed the fact that certain steps had to be taken by the individuals living and working in Lower Manhattan to clean up their environments. However, the information on correct cleanup procedures was not readily available and, once obtained, was confusing.

We are a double risk population. Most small business owners and their employees were 1) caught in the dust/debris clouds of September 11th, and 2) have since played unwilling host to this toxic debris in the two years since 9/11, as our ability to clean our establishments has been hampered by government agencies - including the EPA - and our insurance companies, who have repeatedly demonstrated their unwillingness to pay for cleaning up our premises.

This travesty has been exacerbated by the on-going loss of customers, revenue, inadequacy of government relief programs for small businesses and difficulty in obtaining insurance (both for 9/11 recoveries and affordable coverage on a going-forward basis).

Finally, as an example, we are offering the testimony of Jan Fried of the restaurant Steamers Landing as given at New York City Hall earlier this year:

I am Jan Fried. I own Steamers Landing with my partner John Calder. Steamers is a small restaurant on the Hudson River behind Gateway Plaza less than 2 blocks from the World Trade Center Site.

On September 11th, in the first hour of the attack, firefighters had to break through our windows to get into our place, where they set up a staging area to help people onto boats that could take them to safety. When we finally were allowed to return on September 20th, we found we had no windows left on the north side. The restaurant was covered in dust and debris. The horrific smell of rotting food and raw sewage was everywhere, since our sewage tank (in the basement) had split in half.

Over the weeks, every time we worked at our site, we both developed severe headaches. We heard not one word from any government agency about the possible short or long-term impact from being exposed to the dust and debris. In November of 2001, we attended a packed meeting of 150 small business owners with officials from city, state and federal agencies. Though small businesses like ours were facing monumental problems, the major concern owners voiced that night was cleanup: How were you going to get your place cleaned, so that you could re-open? And then how would you get the money to pay for it? How dangerous was the dust? No one from the government seemed to know anything that night. All these agencies and officials heard our concerns, but not one did anything to help. All the elected officials there from the City thought FEMA was taking care of everything, from rebuilding expenses to cleanup, but FEMA had nothing to offer. To the best of my knowledge the EPA and DEP were not even present.

Because we continued to experience headaches and because word was circulating in the press that asbestos and other dangerous substances were present, we arranged for a cleaning by a certified contractor to fully decontaminate our restaurant. The cleaning cost nearly \$18,000. Our insurance paid only \$10,000 because they feel my landlord, Lefrak Organization, is responsible for the rest. Lefrak refuses to pay, saying it is the responsibility of the insurance company. In addition, our contractor advised us that we had to replace all our contaminated equipment, our light fixtures, ceiling panels, fabrics, refrigeration system,

and our entire ventilation system. This cost us an additional \$90,000. The insurance company refused to pay anything but a tiny fraction of the bill. I would like to know if the EPA officials would have wanted to dine in my restaurant after 9/11 if we had not taken the initiative of cleaning and replacing all our equipment.

Knowing that my business was full of contaminants, I wouldn't eat there myself, nor would I subject my staff or clientele to this risk either. It makes no sense that the health department impounded and destroyed all cars parked in the area that day, but had nothing to say about a contaminated kitchen.

When my partner consulted Gregory Serio, Superintendent of Insurance for New York State, whose office had seen a large number of claims related to contaminated refrigeration and HVAC systems, he was told that if the appropriate agency would have made an official recommendation for replacement of contaminated equipment, getting paid for our loss would have been much easier.

Because government agencies did nothing, they have let insurance companies walk all over small businesses. It's frightening to think that so many businesses could not afford to clean properly and were forced to operate with pockets of contaminants everywhere. Our place is safe only because we took on the burden of trying to understand the risk, hiring a contractor with the expertise to do the job right, and shouldering the bulk of the cost ourselves.

Fwd: Question on Use of Ambient Monitoring Network Data
Date: 7/15/2003 7:58:29 AM Eastern Standard Time
From: BLUDITRA@versar.com
To: Bottimoredavid@aol.com
Sent from the Internet (Details)

Here's a question submitted from an observer.

Received: from mail6-ny2-R.bigfish.com
(mail-ny2.bigfish.com [63.161.60.93])
by mail.versar.com; Mon, 14 Jul 2003 22:48:15 -0400
Received: from mail6-ny2.bigfish.com (localhost.localdomain [127.0.0.1])
by mail6-ny2-R.bigfish.com (Postfix) with ESMTP
id C24FDE7A3F; Tue, 15 Jul 2003 02:51:30 +0000 (UCT)
Received: by mail6-ny2 (MessageSwitch) id 1058237490777503_562; Tue, 15 Jul 2003 02:51:30
+0000 (UCT)
Received: from mail.rand.org (unknown [130.154.8.173])
by mail6-ny2.bigfish.com (Postfix) with ESMTP
id 11A6EE7194; Tue, 15 Jul 2003 02:51:30 +0000 (UCT)
Received: from byron.rand.org (byron.rand.org [130.154.240.21]) by mail.rand.org
(8.9.3p2/8.9.3) with ESMTP id TAA04214; Mon, 14 Jul 2003 19:51:17 -0700 (PDT)
Received: from pghmail1.rand.org (pghmail1.rand.org [130.154.233.36]) by byron.rand.org
(8.9.3p2/8.9.3) with ESMTP id WAA10235; Mon, 14 Jul 2003 22:51:15 -0400 (EDT)
Received: by pghmail1.rand.org with Internet Mail Service (5.5.2653.19)
id <37N35VB5>; Mon, 14 Jul 2003 22:51:15 -0400
Message-ID: <082ABC83769A37489A414BFF5A9EEF565E0E00@pghmail1.rand.org>
From: "Willis, Henry" <hwillis@rand.org>
To: "bluditra@versar.com" <bluditra@versar.com>,
"lorber.matthew@epa.gov" <lorber.matthew@epa.gov>,
"mdourson@aol.com" <mdourson@aol.com>,
"dourson@tera.org" <dourson@tera.org>
Subject: Question on Use of Ambient Monitoring Network Data
Date: Mon, 14 Jul 2003 22:51:15 -0400
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2653.19)
Content-Type: text/plain;
charset="iso-8859-1"
X-BigFish: v

Dear Matthew, Dave, and Michael,

It was good to meet each of you at today's review panel meeting for EPA's report on Exposures and Health Assessment from the WTC Disasters. I won't be at the second day of the meeting, but on my way home I thought of a question that I should have asked today.

A large part of the characterization of particulate matter in the ambient air is based on data from the ambient air quality network. It is my understanding that this network was not designed with the idea of monitoring exposures from point source pollution. Is my understanding incorrect. If not, then what are the limitations (if any) of using this data to characterize the WTC pollution as a point source? Specifically, is there modeling or other evidence to support that the ambient PM monitoring stations are spaced in a way that they can accurately reflect the WTC plume? In other words, how could one counter a claim that the plume actually never was over the stationary monitoring stations, but instead was most often concentrated on a path between the monitoring stations?

I don't remember this being addressed on the current version of the report, but I may have missed it. Since this question is relevant to my work as well, I would greatly appreciate any insights you have.

Sincerely,

Henry Willis

Henry H. Willis, Ph.D.
Associate Policy Researcher
RAND
201 North Craig Street, Suite 102
Pittsburgh, PA 15213
412-683-2300 ext. 4650
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Fwd: Re: Question on Use of Ambient Monitoring Network Data
Date: 7/23/2003 3:45:25 AM Eastern Standard Time
From: tbrody@versar.com
To: bottimoreddavid@aol.com
File: pic21479.gif (60005 bytes) DL Time (TCP/IP): < 1 minute
Sent from the Internet (Details)

Here's Matt's response to Mr. Willis (from my previous forwarded e-mail).

Received: from myrtle.rtpnc.epa.gov
by mail.versar.com; Fri, 18 Jul 2003 14:06:40 -0400
Received: from epahub11.rtp.epa.gov (epahub11.rtp.epa.gov [134.67.213.52])
by epamail.epa.gov (PMDf V5.2-32 #42055)
with ESMTP id <0HI8002LYFTVXR@epamail.epa.gov> for bluditra@versar.com; Fri,
18 Jul 2003 14:10:43 -0400 (EDT)
Date: Fri, 18 Jul 2003 14:09:28 -0400
From: Lorber.Matthew@epamail.epa.gov
Subject: Re: Question on Use of Ambient Monitoring Network Data
To: "Willis, Henry" <hwillis@rand.org>
Cc: "bluditra@versar.com" <bluditra@versar.com>,
"dourson@tera.org" <dourson@tera.org>,
"mdourson@aol.com" <mdourson@aol.com>
Message-id:
<OF0076E223.95E82E24-ON85256D67.00629D14-85256D67.0063BDB9@rtp.epa.gov>
MIME-version: 1.0
X-Mailer: Lotus Notes Release 5.0.9a January 7, 2002
Content-type: multipart/mixed;
Boundary="0__=0ABBE7F4DFF11B848f9e8a93df938690918c0ABBE7F4DFF11B84"
Content-disposition: inline
X-MIMETrack: Serialize by Router on EPAHUB11/USEPA/US(Release 5.0.9a |January
7, 2002) at 07/18/2003 02:09:30 PM

(Embedded image moved to file: pic21479.gif)

Henry - the map above comes directly from EPA's web site. It shows the PM 2.5 stations which were specifically established to evaluate PM emissions from Ground Zero. So, in answer to your first question, your assumption is incorrect - this network (however perfect or imperfect)

was set up with the express purpose of evaluating Ground Zero emissions. Modeling work has been occurring, and will go on likely for awhile, on modeling the plume from Ground Zero. This work is being conducted by Paul Lioy and colleagues, with help and support from EPA's National Exposure Research Lab.

I personally like to stay out of the business of countering claims. One objective of the ongoing monitoring is to see how well it would predict what was measured. This considers, of course, the time and location of the sampling, and maybe most importantly, some way of assigning a "source" term to estimate the emission rate of PM from Ground Zero. It is very complicated generally, but knowing a tiny bit about monitoring, the claim that the plume could always have been snaking between monitoring stations is really not valid. The wind direction changes from hour-to-hour, and as any multi-hour wind-rose figure will show you, wind blows in all directions - its just a matter of the percent of time it blows where. The modeling could suggest that on certain days, the wind was predominantly blowing (but not always blowing) in a direction where there may have been no or few monitoring stations to intercept it. However, that simply cannot be a consistent finding and the modeling will be informative about the source strength, and the direction and extent of movement of PM from Ground Zero to the extent of the monitoring domain.

Hope this helps.

Matt Lorber

"Willis, Henry"
<hwillis@rand.org> To: "bluditra@versar.com" <bluditra@versar.com>,
> Matthew Lorber/DC/USEPA/US@EPA, "mdourson@aol.com"
<mdourson@aol.com>, "dourson@tera.org"
<dourson@tera.org>
07/14/2003 10:51 cc:
PM Subject: Question on Use of Ambient Monitoring Network Data

Dear Matthew, Dave, and Michael,

It was good to meet each of you at today's review panel meeting for EPA's report on Exposures and Health Assessment from the WTC Disasters. I won't be at the second day of the meeting, but on my way home I thought of a question that I should have asked today.

A large part of the characterization of particulate matter in the ambient air is based on data from the ambient air quality network. It is my understanding that this network was not designed with the idea of monitoring exposures from point source pollution. Is my understanding incorrect. If not, then what are the limitations (if any) of using this data to characterize the WTC pollution as a point source? Specifically, is there modeling or other evidence to support that the ambient PM monitoring stations are spaced in a way that they can accurately reflect the WTC plume? In otherwords, how could one counter a claim that the plume actually never was over the stationary monitoring stations, but instead was most often concentrated on a path between the monitoring stations?

I don't remember this being addressed on the current version of the report, but I may have missed it. Since this question is relevant to my work as well, I would greatly appreciate any insights you have.

Sincerely,

Henry Willis

Henry H. Willis, Ph.D.
Associate Policy Researcher
RAND
201 North Craig Street, Suite 102
Pittsburgh, PA 15213
412-683-2300 ext. 4650
Fax: 412-683-2800
hwillis@rand.org

Fwd: LATEST EPA "All Clear"& Safe to Live Downtown NOT TRUE

Date: 7/15/2003 11:35:22 AM Eastern Standard Time

From: BLUDITRA@versar.com

To: Bottimoreddavid@aol.com

Sent from the Internet (Details)

Received: from web80604.mail.yahoo.com

by mail.versar.com; Tue, 15 Jul 2003 11:13:07 -0400

Message-ID: <20030715151622.32880.qmail@web80604.mail.yahoo.com>

Received: from [165.247.43.225] by web80604.mail.yahoo.com via HTTP; Tue, 15 Jul 2003 08:16:22 PDT

Date: Tue, 15 Jul 2003 08:16:22 -0700 (PDT)

From: Ari Porter <retorpari@yahoo.com>

Subject: LATEST EPA "All Clear"& Safe to Live Downtown NOT TRUE

To: bluditra@versar.com, envact911@nyc-lmtc.org,

911_healthAlerts@yahooGroups.com

Cc: ikloupte@hotmail.com, jerrold.nadler@mail.house.gov,

katelbernsteinmd@aol.com, ellensm@aol.com

MIME-Version: 1.0

Content-Type: text/plain; charset=us-ascii

We are continuing to suffer salt-in-wound genre of cover-ups by the EPA. Please do all you can to stop this. Please accept the attached information into the minutes of your meeting today. Thank you.

Also many of us are still experiencing medical conditions as a result of the WTC and this continued cover up by all of our so-called environmental protection agencies.

"Hello

This latest "All Safe" missive from EPA to Milford once again avoids informing us of the dangers of living downtown, and specifically, in this building.

We are investigating and will post further as it becomes available. We have recent lab reports clearly showing asbestos and fiberglass in Liberty Court.

These we hope to copy and will be posted throughout the building, at Gristedes, possibly as paid ad in Broadsheet, and so forth soon.

Also Jerrold Nadler has been informed and is working

behind the scenes for us to conduct a Congressional Investigation that will encompass this entire fraud being perpetrated upon us innocent WTC surviving victims. This latest "All Clear" is an outrage. Nadler calls this cover up "malfeasance" for one thing.

Please post here or to [retorpari\(at\)yahoo.com](mailto:retorpari@yahoo.com) if you have recent lab reports. If you don't have any, please consider having one done. Your lives are worth it, even if the USA Gov't and our own local DeP and DoH, Management et. al. don't think so.

There are some entities which will be sued later on via major class-action suits. Residents already have much of the proof required and are collecting more.

Management well knows that this building is still toxic, and partially due to their own error of having gone into apts. with a NON HEPA mini-vac to vacuum out the bathroom and Kitchen ducts in Winter 2001-2. This is a major contamination-cause of the continuing toxicity here.

More as this develops. "

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From: "Paul Bartlett" <paulwoodsbarlett@hotmail.com>
To: David Bottimore
Date: Friday - July 25, 2003 5:43 PM
Subject: NCEA peer review comment; PCBs, PCDD/Fs, PBBs, PBDD/fs; background levels

Attachments" PCBsinairWTC.pdf (192107 bytes)

David P. Bottimore
Senior Project Manager
Versar, Inc.
6850 Versar Center
Springfield VA 22151

via email

RE: Exposure and Human Health Evaluation of Airborne Pollution from the
World Trade Center Disaster
NCEA, Technical Peer Review

Dear David Bottimore:

I have reviewed the report and submissions, and am submitting some
information lacking in the report. Overall, I did not find the conclusions
in the summary supported in the body of the report.

There is a lack of good measurement data documenting the dispersion of PCBs
and PAHs from the WTC fallout. It should be noted that there were likely to
have been fires of PCB contaminated oils in the substations and leaking
conduit under WTC 7. Fires from PCB contaminated oils were likely to be
episodic and not for the full duration of the WTC fires. Consequently, the
geographic deposition of PCBs is likely to be more uneven in concentration
than other contaminants. The infrequent air monitoring for PCBs with
unusually poor detection limits reported in the paper, may not have missed measuring fallout of
these PCB fires.

I have attached the paper for reference of the reviewers:

POLYCHLORINATED BIPHENYL (PCB) CONCENTRATIONS IN
ATMOSPHERICALLY DERIVED ORGANIC FILMS FROM LOWER
MANHATTAN AFTER SEPTEMBER 11, 2001

by Craig M. Butt¹, Jennifer Truong¹, Miriam L. Diamond¹ and Gary A. Stern²
¹Department of Geography, University of Toronto, Toronto, Ontario, Canada
M5S 3G3

²Freshwater Institute, Department of Fisheries and Oceans, Freshwater
Institute, 501 University

Crescent, Winnipeg, Manitoba, Canada R3T 2N6
Published in ORGANOHALOGEN COMPOUNDS Vol. 59 (2002) pp 219-222
<PCBsinairWTC.pdf >

This paper documents elevated levels of PCBs near the WTC site with diminished levels with distance.

I believe this research team has additional measurement data from WTC fallout using the same technique for PAHs.

Their contact information is:

Miriam L. Diamond
University of Toronto
416 978-1586 diamond@geog.utoronto.ca

Gary A. Stern (204) 984 6761
Freshwater Institute,
501 University Cr., Winnipeg, MB, R3T 2N6

The infrequent sampling events and poor detection limits of the EPA PCB and dioxin monitoring stations were inadequate to document the dispersion and human exposure of the WTC toxics. The probability of the sampling event to capture the peaks of human exposure is low. The detection limits, by design, were incapable of measuring these contaminants at background levels.

The use of outdoor settled bulk samples by Lioy, et al, cited in the report, have a bias to the larger particulates; the smaller particulates breathed in the air are not significantly subject to gravitational settling as are the larger particulates. The smaller particulates are more likely to be resuspended outdoors after depositing. The best way to characterize the particulates breathed in the air is by the analysis of the particulates from an air sampler equipped with the appropriate filter. Unfortunately this was not done as far as we know, despite the advocacy of this approach by the NY American Lung Association and others.

The discussion of dioxin measurements and health exposure assessment acknowledges that the PCB measurements were too poor to measure individual congeners to calculate PCB contribution to dioxin TEQ. It must also be noted that brominated equivalents to PCBs and PCDD/Fs (PBBs and PBDD/Fs) were likely to be produced by the WTC fires from burning PBDEs and other precursors, but were not measured for or reported. These brominated compounds are likely to have toxic equivalence to their chlorinated cousins, so allowances should be made when assessing the health risks of measured PCBs and PCDD/Fs.

There is a dubious screening comparison used in the NCEA report with a systematic bias: reference background toxic concentrations are often

characterized in the report as the highest value measured and reported in an urban environment, a situation where the sample site is most likely to be in close proximity to the pollutant source, hence at an elevated level ABOVE background urban levels. This is not a reference concentration that gives assurance of safety from adverse health effects, particularly with substances of unknown safety levels.

Please share this correspondence and attachment with the other peer reviewers.

Sincerely,

Paul Bartlett
Research Associate (on leave)
CBNS, Queens College
Flushing, NY 11367
718 670-4183
paulwoodsbarlett@hotmail.com

FORMATION AND SOURCES: FIELD CASES

POLYCHLORINATED BIPHENYL (PCB) CONCENTRATIONS IN ATMOSPHERICALLY DERIVED ORGANIC FILMS FROM LOWER MANHATTAN AFTER SEPTEMBER 11, 2001

Craig M. Butt¹, Jennifer Truong¹, Miriam L. Diamond¹ and Gary A. Stern²

¹Department of Geography, University of Toronto, Toronto, Ontario, Canada M5S 3G3

²Freshwater Institute, Department of Fisheries and Oceans, Freshwater Institute, 501 University Crescent, Winnipeg, Manitoba, Canada R3T 2N6

Introduction

On September 11, 2001, two airplanes struck the north and south towers of the World Trade Center (WTC). The fires caused by the collisions were estimated to initially exceed 10,000 °C and continued to burn, at lower temperatures for at least three months, causing fumes to extend throughout Manhattan and adjacent boroughs of New York City. The fires consumed office equipment, furnishings, and building materials. The collapse of the twin towers and adjacent buildings, also dispersed debris, such as pulverized cement and asbestos, throughout the area. Further, an electricity substation, located underneath “7 World Trade Center”, containing 492,000 litres of PCB contaminated transformer oil was destroyed¹.

Household and building fires are known to produce high concentrations of toxic gases, including PCB, PAH, chlorophenols and polychlorinated dibenzodioxins and furans^{2,3}. Surface wipes taken after household fires have measured very high contaminant concentrations, such as between 2.6 – 6.4 mg/m² for Σ PCB³.

We now appreciate that surface films develop on the interior and exterior of surfaces^{4,5}. The composition of surface films is representative of the particulate-associated and gas-phase contaminants that comprise the complex mixture of urban air. This paper presents the polychlorinated biphenyl (PCB) concentrations found in organic films from exterior building surfaces, namely windows. Seven sites were sampled in Lower Manhattan, with three sites located within ~0.5 km of the WTC, in addition to a control site in Brooklyn.

Methods and Materials

Organic film samples were collected from the outside of windows by scrubbing the surfaces with pre-cleaned laboratory Kimwipes, soaked in HPLC grade isopropanol to aid in the removal of the organic constituents. Between 1 and 5 m² of window surface area were cleaned at each site, dependant upon the apparent “dirtiness” of the window. Field blanks were prepared at three sites by soaking 10 precleaned Kimwipes with isopropanol and waving in the air until dry.

Sampling was conducted between October 27 and October 29, 2001. Air temperatures during that period ranged between 5 and 14.5 °C. Eight samples were collected from seven sites in lower Manhattan and at one location in Brooklyn. Samples were collected from either ground level or second story windows. Three sites (Church/Warren, WTC East and the paired Museum-North and Museum-South) were located within 0.5-0.75 km of the WTC and were expected to be most immediately impacted by the contaminant plume. The windows at these sites directly faced the WTC, with the

FORMATION AND SOURCES: FIELD CASES

exception of Museum-South that faced directly away. The remaining four Manhattan sites (Worth/Broadway, Canal/Broadway, NYU and Union Square) were located along a north-south transect northward from the WTC. The furthest site, Union Square, was ~4 km from the WTC. The Brooklyn location, which served as a control site, was approximately 3.5 km away from the WTC. The last time of cleaning was before September 11, 2001.

After sample collection, Kimwipes were DCM extracted using a soxhlet apparatus for approximately 18 hours following the methods described by Diamond et al.⁴. Samples were passed through a Florisil column for cleanup and analyzed by high-resolution gas chromatography (GC) with ⁶³Ni electron capture detection (ECD). A total of 103 PCB congeners (including coeluting congeners) were quantified using external standard mixtures. Data were blank corrected for each congener using the method detection limit (MDL – calculated as the mean field blank value plus three times the field blank standard deviation). The field blanks were typically less than 5% of the sample signal.

Results and Discussion

Total PCB concentrations decreased with increasing distance from the WTC site (see Table 1) with the highest concentrations measured at the three sites near the WTC. The highest PCB concentrations were measured in the two samples from the Museum site, a building located just south of the WTC, the direction of prevailing winds for several days after September 11th. These concentrations were nearly three times greater than the Church/Warren site, which was located closer to the WTC than the Museum site, but to the north. Paired samples were collected on the north (Museum – North Side) and south (Museum – South Side) facing windows at the Museum site, corresponding to the sides of the building that directly face and face away from the WTC, respectively. The total PCB concentration on the Museum – North windows were about 10 % greater than south facing windows. This is a minimal difference and indicates that the atmospheric plume was relatively well mixed at close range.

Table 1. ΣPCB Concentrations (ng/m²) in Organic Films from Lower Manhattan and Brooklyn

Location	Σ PCB (ng/m ²)	Distance from WTC (km)
Museum – North Side	1398	0.75
Museum – South Side	1260	0.75
Church/Warren	404	0.5
Park Row/Spruce	105	0.75
Worth/Broadway Street	511	1.0
Canal/Broadway Street	107	1.5
NYU	10	2.75
Union Square	89	3.5
Brooklyn	82	4.0

The control site, Brooklyn, had similar concentrations to that of the site furthest from the WTC, Union Square. Concentrations at these sites were about 82 and 89 ng/m², respectively. The similarity between these two sites suggests that either the background PCB concentration for the New York City area was ~85 ng/m² or that the contaminant plume from the explosion had equally impacted these two sites.

FORMATION AND SOURCES: FIELD CASES

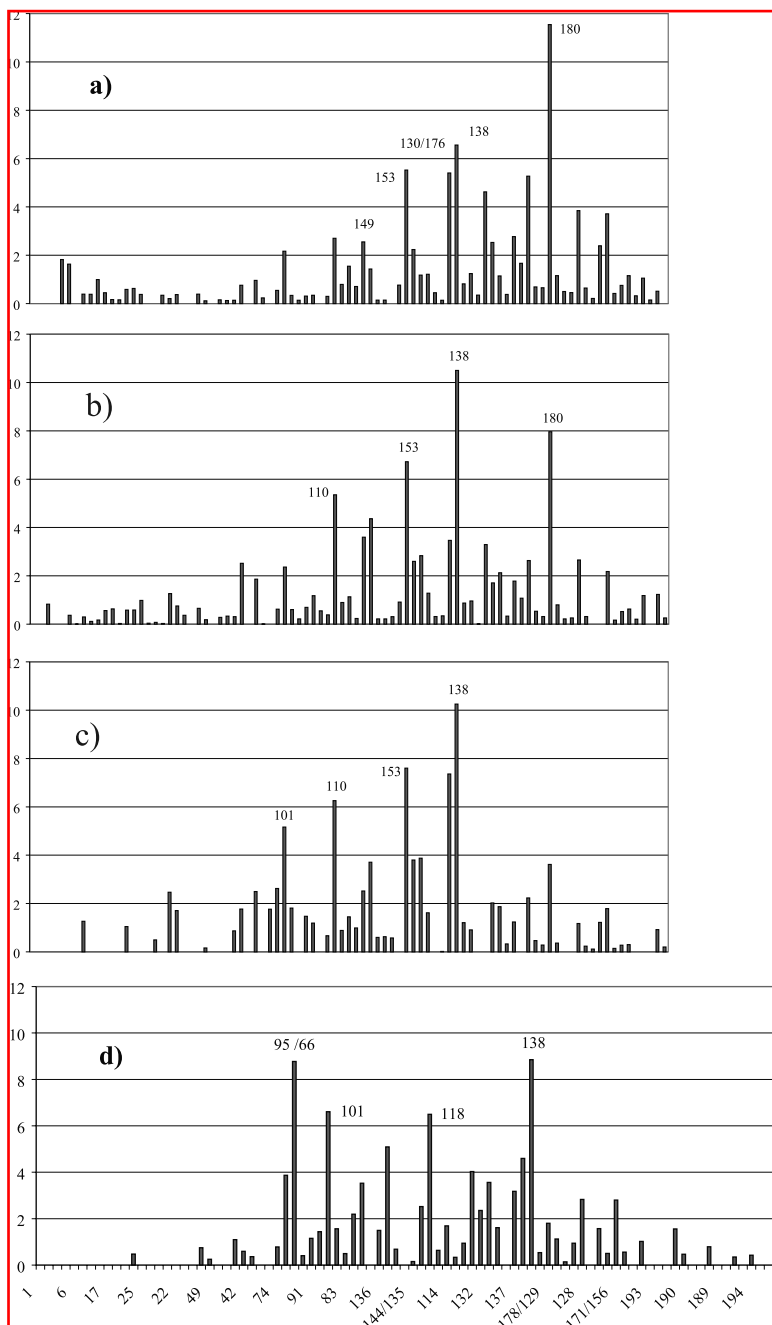


Figure 1. PCB Congener Profiles (percent of Σ PCB) for a) Church/Warren, b) Museum – North, c) NYU, and d) Urban/Lt. Industrial Toronto

FORMATION AND SOURCES: FIELD CASES

The PCB concentrations of window films at sites near the WTC were about one order of magnitude higher than those measured in downtown Baltimore (~100 ng/m²) and Toronto films (~95 ng/m²). The PCB film concentrations from downtown Baltimore and Toronto were similar to the Brooklyn and Union Square sites, suggesting that all three cities have somewhat equal background PCB concentrations. These concentrations were considerably lower than those consistently found at a downtown Toronto site located immediately beside a suspected PCB “hotspot” (~ 5000 ng/m²). PCB concentrations in films sampled nearby WTC were lower than those sampled after a simulated house fire³ (2600-6400 ng/m²) and suggest an exponential drop off in concentrations from the site of combustion.

PCB homologue patterns were similar among all sites with the dominant homologues being P₆CBs (constituting between 30-40% of total PCB, ~34 % geometric mean) followed by the P₅CBs (~22 %) and the P₇CBs (~23 %). PCB congener profiles were, in most cases, dominated by congeners 138, 180, 153 and 110 (Figure 1). Three general patterns were evident. First, the profile of Church/Warren, the site closest to Ground Zero, was unique in that PCB 180 comprised the greatest proportion of total PCB concentration. This site was characterized as having a “heavier” profile. Second, the other sites that were close to the WTC, Museum and Park Row/Spruce, had similar congener profiles to those sites that were a moderate distance away, Worth/Broadway and Canal/Broadway. These profiles had roughly equal proportions of PCB 138 and PCB 180. Third, the sites furthest from the WTC, Brooklyn, NYU and Union Square; had similar congener profiles in which PCB 180 constituted a low proportion of the total PCB concentration.

The PCB congener profiles of Manhattan films had a greater proportion of higher chlorinated congeners than typical downtown Toronto films, as indicated through an enrichment of the higher molecular weight congeners such as PCB 180 (Figure 1). Manhattan films were comprised of lower chlorinated congeners than that sampled nearby a medical waste incinerator in Baltimore⁶. The latter site was dominated by the P₉CBs, in particular PCB 206 (~28 % of total PCB).

Acknowledgements

We thank the building owners and managers of New York City who allowed us to sample and shared their stories with us during the difficult time of healing. We thank Josephine Archbold, Kim Tsoi and Heather Jones of University of Toronto for sampling assistance and Debbie Armstrong of the Freshwater Institute for sample analysis. Funding was provided by the Meteorological Service of Canada and the U.S. EPA is thanked for their support.

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NEW YORK ENVIRONMENTAL LAW & JUSTICE PROJECT

Member of the Clean Water Network, National Coalition Against the Misuse of Pesticides, National Lawyers Guild

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Re: Submission of public comment 2002. EXPOSURE AND HUMAN HEALTH EVALUATION OF AIRBORNE POLLUTION FROM THE WORLD TRADE CENTER DISASTER (EXTERNAL REVIEW DRAFT). . 01 Oct 2002. .
--

There exist numerous problems with the Draft Report: insufficient and inaccurate data, the failure to recognize synergistic effects, and the reliance upon conclusory statements regarding the presence and exposure of toxic substances both in outdoors and indoors highlight the concerns regarding the draft report. More questions than answers arise during examination of the EPA's report on the impacts of 9/11.

Why was there a failure to collect and preserve sufficient samples?

Was the proper methodology used in sample-taking?

Why are government data sets not included in the report? - especially the data collected by the EPA.

How can so many people have gotten ill?

These questions are just few among a growing number that suggests serious flaws in the data collection and analysis of 9/11 substances. Unfortunately, The answers to these questions lie in the failure of the EPA to adhere to its own standards and the law. By disregarding protocols it had used in the past, and failing to take the lead in assessing and mitigating the environmental concerns posed by 9/11, the EPA has left us again with more questions than answers. The NCEA report consists of conclusions based upon insufficient data or lack of data. Without a timely and accurate report on the health affects/potential health affects associated with the toxins already known to be present, the agency gave false assurances to people living and working in lower manhattan. The lack of transparency and truthfulness in producing, providing, and reporting data on 9/11 toxins has led to a growing distrust from the public. EPA's palliative statements resulted in a reduction of sample-taking, monitoring, and a sound analysis.

Our research examines the numerous flaws and contradictions in the draft report. Furthermore, our report highlights the failure to include key data and other factors that suggest inaccurate conclusions by the EPA.

1. **Failure to establish an inventory of hazardous materials present in the World Trade Center ("WTC"). And failure to warn public about potential exposures**

Mercury, Lead, Arsenic, PCB's, Tetrachlorethylene, among others were present and generated from the site. Despite the knowledge of these toxins being produced at the site, the EPA did not provide any warning to the public that large quantities of these toxins were present before the collapse. The report "*Toxics Targeting Computerized Environmental Report*"-WTC Complex, NY, NY 10048 on Sept. 18, 2001 was based on readily available information.

- a. The existence of readily available databases on the materials that were present at the WTC was not revealed by the EPA or other agencies. Such databases as the New York and Federal Hazardous Waste Generators and Transporters, sites reported by the NYS manifest system and the USEPA's Resource Conservation and Recovery Act Information System were not used.
- b. The World Trade Center had housed many facilities specific to the tenant government agencies, including a Secret Service shooting range that kept millions of rounds of lead ammunition on hand. An array of hazardous chemicals was stored in a U.S. Customs lab, including thousands of pounds of arsenic, lead, mercury, and chromium, among other toxic substances. The City of New York maintained an emergency generator at its command center located at 7 WTC, with a large, above-ground fuel storage tank that had been exempted from violation of local building codes. And more still: some 130,000 gallons of PCB-contaminated transformer oil at an electrical substation at 7 WTC likely contributed to its collapse and to the toxic residue later found in the area. see attachment **A** (especially pages 55-56)

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
D001	Solid waste that exhibits the characteristic of ignitability	102	GALLONS	GENERATED	98
D002	Solid waste that exhibits the characteristic of corrosivity	12600	POUNDS	GENERATED	98
D009	Mercury	38000	POUNDS	GENERATED	98
D039	Tetrachloroethylene	1545	GALLONS	GENERATED	98
D002	Solid waste that exhibits the characteristic of corrosivity	55	GALLONS	GENERATED	97
D003	Solid waste that exhibits the characteristic of reactivity	60	GALLONS	GENERATED	97
D008	Lead	5	GALLONS	GENERATED	97
B004	PCB Articles containing 50 ppm or greater of PCBs but less than 500 ppm PCBs.	9236	KILOGRAMS	GENERATED	96
B005	PCB Articles containing 500 ppm or greater of PCBs, excluding small capacitors.	4754	KILOGRAMS	GENERATED	96
D001	Solid waste that exhibits the characteristic of ignitability	519	POUNDS	GENERATED	96
B007	Other PCB Wastes including contaminated soil, solids, sludges, clothing, etc.	3822	KILOGRAMS	GENERATED	95
D004	Arsenic	55	GALLONS	GENERATED	95
D008	Lead	495	POUNDS	GENERATED	95
F001	Spent halogenated solvents used in degreasing	50	GALLONS	GENERATED	95
F002	Spent halogenated solvents	110	GALLONS	GENERATED	95
D011	Silver	300	GALLONS	GENERATED	94
D011	Silver	50	POUNDS	GENERATED	92
U226	Ethane, 1,1,1-trichloro-	6	GALLONS	GENERATED	92

Toxicity Information Summary

CHEMICAL NAME	CAS-NO	ACUTE TOX	TUMOR TOX	MUTAG TOX	REPRO TOX	IRRIT TOX	MCL
Mercury	7439976	X	X	X	X		.002mg/L*
Tetrachloroethylene	127184	X	X	X	X	X	5 ug/L
Lead	7439921	X	X	X	X		0.05mg/L*
PCB Articles containing 50 ppm or greater of PCBs but less t	1336363	X	X	X	X		5 ug/L
Arsenic	7440382	X	X	X	X		0.05mg/L*
Lead	7439921	X	X	X	X		0.05mg/L*

2. Although some theory suggests asbestos can not go above and beyond 40 floors, in this case we found asbestos-containing products were unintentionally used on floors higher than the 40th in a form that is even more hazardous. See attachment a.claiming U.S. Mineral provided CAFCO Blaze-Shield Type D spray-on fireproofing, with an 80% asbestos content, for use in the first 40 floors of the World Trade Center. The Port Authority said the damages were exacerbated when, after spending \$300,000 to switch to non-asbestos fireproofing, U.S. Mineral continued to sell it an 80% asbestos overcoat, Mark II Hardcoat, to go over the non-asbestos product. see attachment **B**
3. **Our independent testing** revealed 5% asbestos and 90% fiberglass on September 19th at Church and Vesey Street. see attachment **C**. Furthermore, there was not a single time we tested that we did not find measured levels of concern. Our most basic random testing has consistently shown actionable levels of asbestos, fiberglass, and lead.
4. **EPA Administrator Christine Todd Whitman** reported that the EPA was “greatly relieved to have learned that there appear to be no significant levels of asbestos dust in the air in New York City.” She further stated “ We are working closely with rescue crews to ensure that all appropriate precautions are taken. We will continue to monitor closely.” The reported ‘monitoring’ appeared to produce even better news, as Whitman reported on September 21. “[A] host of potential contaminants are either not detectable or are below the Agency’s concern levels.” ¹
5. **CONTRADICTION: EPA’S OWN DATA CONTRADICTS WHITMAN’S STATEMENTS.**
 - a. Through a Freedom of Information request, the New York Environmental Law & Justice Project discovered that EPA data reports disclosed elevated levels of several hazardous substances including dioxin, PCBs, lead, and chromium in air, soil and water around the site.

The following is a compilation of some of the data recorded by the EPA -revealing accedences of actionable levels.

WORLD TRADE CENTER INCIDENT ENVIRONMENTAL HEALTH CONCERNS

Information provided by U.S. Environemntal Protection Agency Region II

in response to FOIA request

submitted by New York Environemtnal Law & Justice Project

work in progress DRAFT

6. “97 samples taken. 71 were analyzed (26 could not be analyzed because the **filters became clogged**)” Z16 (Sept. 20, 2001)
7. “PCBs - The results of ten samples collected on October 2 showed detectable levels of PCBs in four of the samples. However, the levels were below the level at which EPA would take some type of action to reduce people’s exposure. This action level is based on a 30-year exposure scenario.” Z68 (Oct. 13, 2001)

¹ . EPA press release, “EPA Initiates Emergency Response Activities, Reassures Public About Environmental Hazards,” September 13, 2001, http://www.epa.gov/wtc/stories/headline_091301.htm

8. **"Dioxin** - Ten samples were collected on October 2 and analyzed for dioxin/furans. **Four** of the samples showed results above the guideline level at which EPA would take some type of action to reduce people's exposure." Z69 (Oct. 14, 2001)
9. "Carbon Monoxide - A direct reading of carbon monoxide was detected at the 19 parts per million (ppm) at one location (Greenwich and Liberty). This is above the National Ambient Air Quality Standard (NAAQS) 8-hour average of 9 ppm, but is below the NAASQ 1-hour average of 35 ppm and the OSHA permissible level of 50 ppm." Z70 (Oct. 14, 2001)
10. "Ambient Air Sampling: VOCs - Sampling for volatile organic compounds (VOCs) was conducted on Oct. 13 and Oct. 14 in the smoke plume within the debris pile at ground zero. **Benzene** exceeded the OSHA time-weighted average permissible level at two locations, on both days. Benzene was not detected in the breathing zone (approx. 5-6 feet above ground) at 3 locations several blocks from ground zero." Z71 (Oct. 15, 2001)
11. "Ambient Air Sampling Locations (Metals): NYC/ER (Sept. 23)
Chromium levels were identified at 3 locations (Barclay/West Broadway, Greenwich/Albany, Albany/South End) above the EPA Removal Action guidance levels. Does not exceed the most conservative NIOSH standard (1 ug/m³)" Z93 (Sept. 25, 2001)
12. Daily Summary: Air: Non-Fixed Samples in New York City : using special instruments to measure volatile organic compounds (VOCs) at various locations of the plume still emanating from the World Trade Center debris pile, EPA identified elevated levels of Benzene, (Sept.23) (Z29)
13. **EPA Daily Summary (Sept.21) Dust Samples:** Twenty four dust samples were analyzed between Sept.19 and 20, which included samples from the general area of Stuyvesant High School and Battery Park. **8. Twelve of the 24 samples showed asbestos levels slightly above the EPA levels of concern.**
14. EPA Sampling and Response Actions - (Sept.22) "Internal Use-" 13 new asbestos samples analyzed from the 13 (two new) fixed air monitors in lower Manhattan. **Five** of the 13 had levels above the EPA school standard. (Z28)
15. Daily Summary (SEPT. 26) AIR: Non-FIXED Samples in New York City Dioxin- Analysis of four air samples showed all samples were at or above EPA's removal action guidelines, which is based on a 30-year, 24 hour exposure risk scenario. However, there is no short-term exposure problem. These samples were captured at the plume still emanating from fires within the World Trade Centers debris pile. We expect that these levels measured will only persist for a few weeks =until the fires are extinguished. The air respirators EPA has provided for the recovery workers can prevent exposure to levels monitored at the site.
16. Metals - Analysis of ten samples showed **three elevated readings for lead** and three for **chromium**. While these are reading are considered elevated, they are **not a short-term concern**. The regulatory standards and guidelines for lead and chromium are based on long-term exposure. EPA will continue to monitor for these metals. (Z33)
17. Daily Summary (Sept 28) Ambient Air Non-foxed Monitors: Volatile Organic Compounds - 6 samples were taken on 9/16 in and around ground zero.... The one sample taken at ground level showed a benzene level above the OSHA standard. (Z36)

18. Daily Summary: (Oct. 2) Ambient Air Sampling: Metals- 10 samples were taken on September 27 within the vicinity of the emergency response operations. Of those, one sample at Barclay (sic) an West Broadway exceeded the National Ambient Air Quality standard for **lead**, but did not exceed the National Institute of Occupational Safety and Health (NIOSH) standard. Chromium was found to be above the EPA action guideline at nine locations. However, when adjusted for one year exposures, none of the levels exceed the most conservative NIOSH standard or the EPA removal action guideline. (Z55) > Volatile Organic Compounds -.. Two samples taken at ground level at Liberty and Greenwich Streets exceed OSHA level (0.5 ppm) for benzene. One sample taken at ground level at Liberty and Greenwich had a benzyl chloride reading that slightly exceed OSHA level (1.0 ppm) (Z56)

19. Daily Summary (Oct.3) Ambient Air Sampling: Dioxin- 10 dioxin samplings were taken on September 23 the vicinity of the emergency response operations, all samples were at or above EPA's removal action guideline, which is based on a 30-year, 24 hour exposure scenario. These results are believed to be attributable to the plume still emanating from the fires within the World trade Center debris pile. (Z57)
20. Wipe Samples Metals - On September 28, 8 samples were collected indoors at the Borough of Manhattan Community College, 1 sample exceeded the HUD criteria for lead (50 micrograms per square foot) Ambient Air Samples VOC- Sampling for volatile organic compounds (VOC) was conducted on Oct.2. Benzene was detected in increasing concentrations from previous samples in the plume on the debris pile. (Z58)
21. Daily Summary (Oct.4) Ambient Air Sampling: Metals - 10 samples were taken on October 2 within the vicinity of the emergency response operations. Of these chromium results for 4 samples exceeded EPA's removal guideline

Ambient Air Samples VOCs- .. Benzene was detected at three locations above the OSHA *limit* in the plume on the debris pile. Benzene was not detected at three parameter locations. (Z59)

22. Daily Summary (Oct.12) Ambient Air Sampling Dioxin - Ten samples were collected on September 27 and analyzed for dioxin/furans. Two of the samples showed results above guideline level at which EPA would take some type of action to reduce people's exposure... ..One of the samples (Location A at West Broadway and Barclay) was nominal above the EPA guideline level when adjusted to a 1 - year exposure duration. These levels do not pose a short term health effect but should be monitored if they persist for a longer period of time. (Z66)

23.

by New York Lab for USA- EPA Compliance Branch Analysis date 10/8/01 (W106)

NEW YORK ENVIRONMENTAL LAW & JUSTICE PROJECT

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Juan Gonzalez' aptly describes "ANATOMY OF A TOXIC NIGHTMARE" EXHIBIT D

6. On September 21, 2001, the Environmental Law and Justice Project requested, under the Freedom of Information Act, all monitoring data studies and reports of air, dust, and bulk, including but not limited to hazardous materials and water samples taken in lower Manhattan and Staten Island landfills in response to the WTC collapse. On October 19, the Project picked up more than 600 pages of testing results from EPA monitoring points and stations, primarily located at or near Ground Zero. What the documents revealed was that, in spite of their assurances to the contrary, EPA, OSHA and the various other health and environmental agencies - which met weekly throughout the crisis -- knew of the dangers present at Ground Zero and beyond, on the ground and in the air. EPA's own data listed findings above regulated levels -- information not posted on its website. (Later, the agency would claim this was an oversight.) The documents also revealed how high the concentration of dangerous contaminants remained even three weeks after the towers' collapse. After people were back in the area at EPA's urging, living and working full-time, the documents show that the following results were coming from the agency's downtown stations. **EXHIBIT - D1** SEE our website for all the daily reports and EPA data
<http://www.nyenvirolaw.org/nelj-epa-WTCTestsResults.htm>
7. **LAX WORKER PROTECTION ENFORCEMENT CREATED INSUFFICIENT TESTING AND MONITORING- OSHA ABDICATES RESPONSIBILITY**

- a. NIEHS Report-on WTC-Workers.pdf
- b. OSHA **had no right to abdicate enforcement role**
- c. the single additional authority cited by OSHA officials, a 1991 directive entitled "OSHA Response to Significant Events of Potentially Catastrophic Consequences," completely undermines their position. Paragraph F of that directive states "The OSH Act *requires* that OSHA respond to catastrophic events, whether or not subject to the NCP. [NATIONAL CONTINGENCY PLAN] *OSHA must be an active and forceful protector of employee safety and health during the clean-up, removal, storage and investigation phases of these incidents*, while maintaining a visible but limited role during the initial response phase." **exhibit E**
- d. Health-Study-of FreshKills-for NYC-Detectives .pdf **EXHIBIT F**

...They did however, give respirators to individuals who were obviously unqualified to wear respirators and who would not pass even the most rudimentary respirator fit check. Many of these individuals had full or partial beards that would make the respirator useless for asbestos or respirable dust. Upon further evaluation, it was determined that few individuals were fit-tested, had been given adequate training, had medical clearance to wear a respirator, nor met many of the basic good practice or requirements for using respiratory protection. ... The EPA has developed a Fresh Kill Landfill Site Safety Plan dated 20 Sept, 01 which covers *ESF-101, EPA and USCG Personnel only*. The EPA did tell Emilcott that they had a written air-sampling program that addresses our questions on exposure assessment. They did not have a copy of this plan on site and told us they would e-mail it to us ASAP. We have not received this plan to date. Neither of these plans cover NYPD personnel.

8. INDEPENDENT TEST RESULTS

- a. **333 Rector Place** —9-28-01 4.3% Chrysotile Asbestos at roof/play area; and 2.3%, ND, ND, 1.8%, 2.1%, trace, 3.2%, .0/.6, 2.2% **EXHIBIT G** But the distribution of many independent test results have been blocked and/continue to remain secret/classified.
- b. In contrast to the bad results that were kept secret, AMEX data reveals a diligent effort to ascertain proper and complete data; and to perform a thorough abatement. **Exhibit G-1**

9. DEP (delegated by EPA) had a scarcity of pertinent testing results

- a. DEP relied upon Landlords to report Asbestos levels in their buildings. DEP relinquished its responsibility to ascertain accurate assessments.
- b. Only 218 landlords out of 1700 landlords responded, with many of the responses being farcical. These landlords lacked the scientific tools and knowhow to accurately make claims upon the presences for asbestos.
- c. Moreover, only one Asbestos violation was found by DEP. **EXHIBIT H** SAMPLE RESPONSE TO DEP req for assessment.pdf

10. **FIRE TRUCKS WERE SHOWN TO CONTAIN ASBESTOS EVEN AFTER "DECONTAMINATION" BY CITY PAID CONTRACTORS**

- a. **MANY TRUCKS INDICATED UP TO 5% ASBESTOS LEVELS (Exhibits).** These "post-decontamination" trucks that contained asbestos were found in all parts of the city. **EXHIBIT I**
- b. **FIRE HOUSES CONTAINED WTC ASBESTOS-** The asbestos was carried in by Fire trucks, apparatuses and firefighting gear. Furthermore, the standard cleaning of firefighting apparatuses and the washing of firefighting gear (clothing etc.) led to the unwilling spread of asbestos. Families of firefighters whom washed their clothes were unknowingly exposed to asbestos. Ill families of firefighters only strengthen the concern that asbestos from the WTC had indeed traveled to firehouses and subsequently firefighters homes. (**EXHIBIT J** FDNY-ENGINE4-BERT-DUST.pdf)
- c. **POLICE** officers and thousands of other rescue workers were neither specifically nor generally given a public warning not to take their clothes home to be washed. (conversations with police union trustee)
- d. **The lack of public warning** caused sicknesses among thousands of families dutifully

washing asbestos-laded clothes. (see conversation, 90yearold grandmother etc..)

11. **American Journal of Respiratory and Critical Care Medicine. Vol 166 2002.**

Study: Acute Eosinophilic Pneumonia in a NYC Firefighter Exposed to the World Trade Center.

12. **INDUSTRY ASSOCIATION LAMBASTS LACK OF ENFORCEMENT AND EVALUATION**

National Insulation Association: The Asbestos Nightmare 7/30/02

- a. **Complacency of Government Officials** : Not only does complacency exist among building owners and managers, it also exists with regulatory and enforcement officials regarding asbestos in buildings. One need only look at the Environmental Protection Agency's (EPA) handling of the asbestos contamination associated with the collapse of the World Trade Center to understand how complacency has affected our regulators' ability to make logical, informed decisions. The EPA misreported the asbestos hazards that existed in the aftermath of the World Trade Center collapse by stating that there were very low levels of airborne asbestos detected. What they failed to do was to check the inside of nearby buildings that might have had asbestos-laden dust tracked into them. **exhibit K** —

13. **PARTICULATES AND TOXICS DID NOT OBEY EPA LINE DRAWN AT CHAMBERS STREET Wind-Borne Pollutants May Travel Thousands Of Miles**

- a. **COLLEGE STATION**, - Air pollution is not just a local problem. In fact, research by geoscientists at Texas A&M University find that pollutants can travel thousands of miles, so the air you breathe may contain pollutants brought by the wind. A team of geoscientists -- June-Soo Park, Steve Sweet, and Terry Wade -- at Texas A&M's Geochemical and Environmental Research Group (GERG) came to these conclusions while studying how pollutants such as polynuclear aromatic hydrocarbons (PAHs), pesticides, and polychlorinated biphenyls (PCBs) are transported in the atmosphere to Galveston and Corpus Christi bays and removed by rain and dust. The scientists also studied how gaseous pollutants are exchanged between the air and water.

They found that air pollutants could be transported over long distances instead of being trapped in the ocean or the soil, and that gaseous water pollutants could evaporate into the atmosphere instead of staying in the ocean. In both cases, the airborne pollutants could lead to deposition of pollutants long distances from where they were produced or used.

"Most scientists used to think that organic pollutants were not present as gas in the air," Wade says. "To our surprise, we have learned over the last 30 years that organic pollutants can be in the vapor phase, which means that they can be transported over long distances." - Texas A&M University

<http://www.sciencedaily.com/releases/2001/09/010920070914.htm> **EXHIBIT L**

Published weekly. 1725 K St., N.W., Ste 506, Washington, DC 20006-1401.

BODY

Two recent studies examining potential health risks linked to the World Trade Center disaster should provide some relief for Manhattan residents. Metals (lead, chromium and nickel) Only lead was found in elevated levels following the attack. On several days in late September 2001 and on two days in early October, lead concentrations exceeded the EPA National Air Quality Standard of 1.5 ug/[m.sup.3]. Again, concentrations rapidly decreased outside the site and by mid-October of 2001 all readings were below NAQS. The report notes, however, that while the general public should not experience any adverse health affects from lead exposure, pregnant women exposed in Ground Zero and the vicinity need special monitoring.

But the EPA did find chromium: In its Daily Summary Tuesday, October 2, 2001 states:

Ambient Air Sampling: Metals- 10 samples were taken on September 27 within the vicinity of the emergency response operations. Of those, one sample at Barclay (sic) an West Broadway exceeded the National Ambient Air Quality standard for **lead**, but did not exceed the National Institute of Occupational Safety and Health (NIOSH) standard. Chromium was found to be above the EPA action guideline at nine locations. However, when adjusted for one year exposures, none of the levels exceed the most conservative NIOSH standard or the EPA removal action guideline **ATTACHMENT**

14. **AT150 FRANKLIN STREET, DEP FINDS NON DETECT USING PLM- BUT EPA FINDS UP TO 5% ASBESTOS. EXHIBIT M**

- a. Note this EPA collected DATA was not included in original draft document

15. EPA/DOH Discounted Asbestos level results using Microvac testing despite its own use in determining levels at his own building. 105 Duane Street is only a half block from EPA building. **Exhibit N**(150 Duane results)(290 Broadway testing) **EXHIBIT O** (asbestos dust sampling- Ewing.pdf)
16. Synergy and additive effects
 - a. Wallace, Rodrick and Wallace, Deborah (2001) Predicting Health Impacts of the World Trade Center Disaster: 1. Halogenated hydrocarbons, symptom syndromes, secondary victimization, and the burdens of history.
 - i. **Abstract:** The recent attack on the World Trade Center, in addition to direct injury and psychological trauma, has exposed a vast population to dioxins, dibenzofurans, related endocrine disruptors, and a multitude of other physiologically active chemicals arising from the decomposition of the massive quantities of halogenated hydrocarbons and other plastics within the affected buildings. The impacts of these chemical species have been compounded by exposure to asbestos, fiberglass, crushed glass, concrete, plastic, and other irritating dusts. To address the manifold complexities of this incident we combine recent theoretical perspectives on immune, CNS, and sociocultural cognition with empirical studies on survivors of past large toxic fires, other community-scale chemical exposure incidents, and the aftereffects of war. Our analysis suggests the appearance of complex, but distinct and characteristic, spectra of synergistically linked social, psychosocial, psychological and physical symptoms among the 100,000 or so persons most directly affected by the WTC attack. The different 'eigenpatterns' should become increasingly comorbid as a function of exposure. The expected outcome greatly transcends a simple 'Post Traumatic Stress Disorder' model, and may resemble a particularly acute form of Gulf War Syndrome. We explore the role of external social factors in subsequent exacerbation of the syndrome -- secondary victimization -- and study the path-dependent influence of individual and community-level historical patterns of stress. We suggest that workplace and other organizations can act as ameliorating intermediaries. Those without access to such buffering structures appear to face a particularly bleak future. **EXHIBIT**
17. **The continual hazard posed by fires that burned for months was not adequately addressed.**
 - a. Document** "So what you've got is a smoldering situation," said George Miller, president of the National Association of State Fire Marshals. "Judging from my 32 years of experience, this could burn for a long time." **EXHIBIT** DailyNews-11-1-03-FireMaySmolderForMonths.pdf **EXHIBIT Q**
18. **Geographical proliferation** of risk posed by transportation of debris
 - a. Trucks transporting debris were inadequately covered.
 - b. Trucks carrying debris traveled through areas of lower Manhattan, Brooklyn, and Staten Island (Fresh Kills landfill). Actually caught on fire. (conversation with firefighters)
19. **The length of exposure to hazardous substances was underestimated.**
 - a. Contrary to sample levels of exposure used in the Draft Report, residents of lower Manhattan were exposed to pollution on a constant basis for a prolonged period of time.
20. **THE INCOMPLETE AND INSUFFICIENT USE OF AVAILABLE HEALTH DATA CONCERNING ADVERSE EFFECTS SUFFERED BY RESCUE WORKERS, WORKERS, AND RESIDENTS.**

- a. As of December 2002, more than 500 firefighters have sustained permanent disabilities that have forced them to retire.² Amazingly, this number has risen to over 1400 firefighters forced into illness related retirement according to Dr. Prezant, the deputy chief medical officer of the New York Fire Department. Furthermore, over 400 FDNY firefighters are currently in the process of receiving permanent disability for new-onset of post-WTC asthma and respiratory injury. These troubling numbers follow a report stating that 95 percent of Firefighters complained of new-onset respiratory symptoms during their first weeks working at the site. see **EXHIBITR**
- b. 25 percent of nurses examined at NYU Beekman hospital in July 2002 had serious respiratory disorders according to Dr. David Parkinson of Long Island Occupational and Environmental Health Clinic in Port Jefferson, NY. Remarkably, NYU experts during their numerous presentations to the public failed to mention this study. (*see our website for the study*)
- c. Reliance on incomplete data regarding changes in the health of rescue workers, workers, and residents over time.
- d. The sole baseline established was that of the firefighters.
 - i. This baseline, when applied by the Fire Department, indicated that a significant decrease in quality of health. (see Prezant discussion)
- 21. **LONG TERM HEALTH EFFECTS FIREFIGHTERS AND RESPONDERS**
 - a. Letter from David PREZANT MD, FDNY **EXHIBITR**
 - b.long term physical and mental health issues firefighters and EMS are facing due to their exposures during the rescue and recovery efforts to Ground Zero. By Septemebr 2003 the FDNY will have retired 1400 firefighters due to World Trade Center illnesses
- 22. Data obtained through monitors worn by municipal rescue workers was disregarded since levels were considered "too high." (Conversation with municipal workers)

The Public Health Fallout from September 11:

Official Deception and Long-Term Damage

By Joel R Kupferman To be published in Lost liberties: Ashcroft
and the Assault on Personal Freedom The New Press
<http://www.newpress.com>

The environmental and public health nightmare that began in New York City on September 11, 2001 was unprecedented in nature, and its scope is still being discovered – mainly without the help of the Bush Administration's environmental agencies. The persistent "WTC cough", hundreds of new cases of asthma, the broad wind-borne dissemination of toxic elements, a by-now unmanageable spread of toxic dust initially carried out of the World Trade Center and debris-collection sites by rescue workers and since spread by former rescue vehicles like city buses and fire trucks – these are some of the reasons why, at this writing, more than 500 firefighters have sustained permanent disabilities that have forced them to retire, why 25 percent of nurses examined at a downtown hospital in March 2002 had serious respiratory disorders, and why these cases are the tip of a very large iceberg.

The way the Environmental Protection Agency responded in the crisis was, sadly, an opportunity to glimpse the Bush Administration's larger attitude toward environmental policy and toward public access to key environmental information. The EPA, which misled the public about the health impact of asbestos found in the ambient air and also failed to investigate or

²-“Firefighters Newsletter,” Barasch, McGarry, Salzman, Penson and Lim, December 2002.

respond thoroughly on a range of crucial issues, led other federal, state and local authorities to rest easily with their own misdirected policies, affecting the long-term health of no one knows how many New Yorkers. In the context of the Bush Administration's broader hostility to civil liberties, and its particular, determined retreat from environmental protections and engagement, the environmental/public health story of the World Trade Center collapse is a chilling reminder of the damage that unaccountable government can do – damage that in this case will linger for generations. **Exhibit S** for the whole chapter

Conclusion:

The data and research we have provided is only a small part of an enormous amount of information suggesting inaccuracy and inconsistency with the conclusions drawn by the EPA report. The inaccurate conclusory statements by the EPA gave false assurances to workers and residents in lower Manhattan. These assurances resulted in wide-ranging illness amongst the rescue worker and the entire lower Manhattan community. Numerous questions must be answered before the EPA can make final assessments on the health risks of 9/11.

Our website, www.envirolaw.org contains additional research, studies, and data regarding the health effects of 9/11. Furthermore, the information on our website is updated on a frequent basis and we urge the panel to use this as a valuable resource in ascertaining critical information on the 9/11 health effects.

Submitted by Joel R. Kupferman August 1, 2003

Toxics Targeting Computerized Environmental Report

**WTC Complex
New York, NY 10048**

September 18, 2001

Table of Contents

Introduction..... 1

- *The Three Sections of Your Report*
- *How to Use Your Report*
- *Toxic Site Databases Analyzed In Your Report*
- *Limitations Of the Information In Your Report*

Section One: Your Report Summary..... 5

- *Table One: Number of Identified Toxic Sites By Distance Interval*
- *Table Two: Identified Toxic Sites By Direction*
- *Table Three: Identified Toxic Sites Ranked by Proximity*
- *Table Four: Identified Toxic Sites By Category*
- *Map One: On-Site Radius Close-up Map*

Section Two: Toxic Site Profiles

Section Three: Appendices

- *USEPA ERNS Check*
- *Unmappable Sites*
- *Hazardous Waste Codes*
- *How Toxic Sites Are Mapped*
- *Information Source Guide*

Introduction

Toxics Targeting has combined environmental database searches, extensive regulatory analysis and sophisticated mapping techniques to produce your *Computerized Environmental Report*. It checks for the presence of 17 categories of government-reported toxic sites and provides detailed, up-to-date information on each identified site. The findings of your report are presented in an easy-to-understand format that:

1. *Maps* the approximate locations of selected government-reported toxic sites identified on or near a specified target address.
2. *Estimates* the distance and direction between the target address and each identified toxic site.
3. *Reports* air and water permit non-compliance and other regulatory violations.
4. *Profiles* some aspects of the usage, manufacture, storage, handling, transport or disposal of toxic chemicals at individual sites.
5. *Summarizes* some potential health effect information and drinking water standards for selected chemicals reported at individual sites.

The Three Sections Of Your Report

The first section highlights your report's findings by summarizing identified sites according to: a) distance intervals, b) direction, c) proximity to the target address and d) individual site categories. In addition, an on-site map is provided of the target address and all the reported toxic sites that are identified within the specified on-site search area.

The second section of your report contains *Toxic Site Profiles* that provide detailed information on each identified toxic site. The information in each *Toxic Site Profile* varies according to its source. Some toxic site categories have extensive information, some have limited information. All the information is updated on a regular basis.

The third section of the report contains appendices that identify: 1) on-site spills reported to the national Emergency Response Notification System (ERNS), 2) various toxic sites that cannot be mapped due to incomplete or erroneous addresses or other mapping problems, 3) codes that characterize hazardous wastes reported at various facilities, 4) methods used to map toxic sites identified in your report and 5) information sources used in your report.

How to Use Your Report

- Check Table One to see the number of identified sites by distance intervals.
- Check Table Two to see identified sites sorted by direction.
- Check Table Three to see identified sites ranked by proximity to the target address.
- Check Table Four to see identified sites sorted by site categories.
- Refer to the various maps to see the locations of identified toxic sites. Refer to the *Toxic Site Profile* and *Appendix* sections for additional information.

Toxic Site Databases Analyzed In Your Report

Search Radius

On-Site



1) ***New York Inactive Hazardous Waste Disposal Site Registry***: a state listing of sites that can pose environmental or public health hazards requiring investigation or clean up.

On-Site



2) ***CERCLIS*** (Comprehensive Environmental Response, Compensation and Liability Information System): a federal listing of sites that can pose environmental or public health hazards requiring investigation or clean up.

On-Site



3) ***National Priority List for Federal Superfund Cleanup***: a listing of sites known to pose environmental or health hazards that are being investigated or cleaned up under the Federal Superfund program.

On-Site



4) ***New York Hazardous Substance Disposal Site Draft Study***: a state listing of sites contaminated with toxic substances that can pose environmental or public health hazards. These sites are not eligible for state clean up funding programs.

On-Site



5) ***New York Solid Waste Facilities Registry, including New York City 1934 Sites***: active and inactive landfills, incinerators, transfer stations or other solid waste management facilities.

On-Site



6) ***New York State Major Oil Storage Facilities***: sites with more than a 400,000 gallon capacity for storing petroleum products.

On-Site



7) ***New York and Federal Hazardous Waste Treatment, Storage or Disposal Facilities***: sites reported by the NYS manifest system and the USEPA's Resource Conservation and Recovery Act Information System.

- ***RCRA violations***: waste facilities with violations reported by the USEPA pursuant to the Resource Conservation and Recovery Act.
- ***RCRIS corrective action activity (CORRACTS)***: waste facilities with RCRIS corrective action activity reported by the USEPA.

On-Site



8a) ***Toxic Spills: active*** stationary source spills reported to state environmental authorities, including unremediated leaking underground storage tanks.

On-Site



8b) ***Toxic Spills: closed*** stationary and non-stationary source spills reported to state authorities, including remediated leaking underground storage tanks.

On-Site



9) ***New York and Local Petroleum Bulk Storage Facilities***: sites with more than an 1,100 gallon capacity for storing petroleum products.

On-Site



10) **New York and Federal Hazardous Waste Generators and Transporters:** sites reported by the NYS manifest system and the USEPA's Resource Conservation and Recovery Act Information System.

- **RCRA violations:** waste facilities with violations reported by the USEPA pursuant to the Resource Conservation and Recovery Act.
- **RCRIS corrective action activity (CORRACTS):** waste facilities with RCRIS corrective action activity reported by the USEPA.

On-Site



11) **New York Chemical Bulk Storage Facilities:** Sites storing hazardous substances listed in 6 NYCRR Part 597 in aboveground tanks with capacities of 185 gallons or more and/or underground tanks of any size

On-Site



12) **New York Toxic Release Inventory Facilities:** discharges of selected toxic chemicals to air, land, water or treatment facilities.

On-Site



13) **Historic New York City Utility Sites (1890's to 1940's):** power generating stations, manufactured gas plants, gas storage facilities, maintenance yards and other gas and electric utility sites.

On-Site



14) **Air Discharges:** Air pollution point sources monitored by U.S. EPA and/or state and local air regulatory agencies.

On-Site



15) **Federal Permit Compliance System Toxic Wastewater Discharges:** permitted toxic wastewater discharges.

On-Site



16) **Federal Civil Enforcement Docket:** civil judiciary cases filed on behalf of the U. S. Environmental Protection Agency by the Department of Justice.

Property only



17) **ERNS: Federal Emergency Response Notification System Spills:** a listing of federally reported spills.

Limitations Of The Information In Your Report

The information presented in your *Computerized Environmental Report* has been obtained from various local, state and federal government agencies. Please be aware that: 1) additional information on individual sites may be available, 2) newly discovered sites are continually reported and 3) all map locations are approximate. As a result, this report is intended to be the FIRST STEP in the process of identifying and evaluating possible environmental threats to specific properties and can only serve as a guide for conducting on-site visits or additional, more detailed toxic hazard research.

Toxics Targeting tries to ensure that the information in your report is presented accurately and with minimal alteration. The only systematic changes that are made correct obvious address errors in order to allow sites to be mapped. Any address changes that are made are noted in the map information section at the top of each corresponding *Toxic Site Profile*. Since the information presented in your report is not edited, please be aware that it can contain reporting errors or typographical mistakes made by the site owners/operators or government agencies that produced the information. Please be aware of some other limitations of the information in your report:

- The computerized map used by *Toxics Targeting* is the same one used by the U. S. Census. While the map is generally accurate, no map is perfect. In addition, *Toxics Targeting's* mapping methods estimate where toxic site addresses are located if the address is not specifically designated on the Census map. **FOR THESE REASONS, ALL MAP LOCATIONS OF ADDRESSES AND REPORTED TOXIC SITES SHOULD BE CONSIDERED APPROXIMATE AND SHOULD BE VERIFIED BY ON-SITE VISITS;**
- **UNDISCOVERED, UNREPORTED OR UNMAPPABLE TOXIC SITES MIGHT NOT BE IDENTIFIED BY THIS REPORT'S CHECK OF 17 TOXIC SITE CATEGORIES. TOXIC SITES REPORTED IN OTHER GOVERNMENT DATABASES MIGHT ALSO EXIST. FOR THESE REASONS, YOUR REPORT MIGHT NOT IDENTIFY ALL THE TOXIC SITES THAT EXIST IN THE AREA IT SEARCHES;**
- The appendix of your report contains a listing of sites that could not be mapped due to incomplete or erroneous address information or other mapping problems. This listing includes unmappable toxic sites in zip code areas within one mile of the target address as well as toxic sites without zip codes reported in the same county. **IF YOU WOULD LIKE INFORMATION ON ANY OF THE LISTED SITES, PLEASE CONTACT TOXICS TARGETING AND REFER TO THE SITE ID NUMBER.**
- Compass directions and distances are approximate. Compass directions are calculated from the subject property address to the mapped location of each identified toxic site. The compass direction does not necessarily refer to the closest property boundary of an identified toxic site. The compass direction also can vary substantially for toxic sites that are located very close to the subject property address.
- Some toxic sites identified in your report may be classified as **known hazards**. Most of the toxic sites identified in your report involve **potential hazards** related to the on-site use, manufacture, handling, storage, transport or disposal of toxic chemicals. Some of the toxic sites identified in your report may be the addresses of parties responsible for toxic sites located elsewhere. **YOU SHOULD ONLY CONCLUDE THAT TOXIC HAZARDS ACTUALLY EXIST AT A SPECIFIC SITE WHEN GOVERNMENT AUTHORITIES MAKE THAT DETERMINATION OR WHEN THAT CONCLUSION IS FULLY DOCUMENTED BY THE FINDINGS OF AN APPROPRIATE SITE INVESTIGATION UNDERTAKEN BY LICENSED PROFESSIONALS;**
- The information presented in your report is a summary of the information that *Toxics Targeting* obtains from government agencies on reported toxic sites. **YOU MAY BE ABLE TO OBTAIN ADDITIONAL INFORMATION ABOUT REPORTED SITES WITH THE FREEDOM OF INFORMATION REQUEST FORM LETTERS THAT ARE PROVIDED ON THE INSIDE OF THE BACK COVER.**

Section One:

Report Summary

- *Table One: Number of Identified Toxic Sites By Distance Interval*
- *Table Two: Identified Toxic Sites Ranked By Direction*
- *Table Three: Identified Toxic Sites Ranked By Proximity*
- *Table Four: Identified Toxic Sites By Category*
- *Map One: On-Site Radius Close-up Map*

NUMBER OF IDENTIFIED SITES BY DISTANCE INTERVAL

Database Searched	0 - 100 ft	100 ft - 1/8 mi	1/8 mi - 1/4 mi	1/4 mi - 1/2 mi	1/2 mi - 1 mi	Site(s) Category Totals
NYS Inactive Hazardous Waste Disposal Sites *****	0	Not searched	Not searched	Not searched	Not searched	0
CERCLIS Sites *****	1	Not searched	Not searched	Not searched	Not searched	1
National Priority List Sites *****	0	Not searched	Not searched	Not searched	Not searched	0
Hazardous Substance Waste Disposal Sites *****	0	Not searched	Not searched	Not searched	Not searched	0
NYS Solid Waste Facilities *****	0	Not searched	Not searched	Not searched	Not searched	0
NYS Major Oil Storage Facilities *****	0	Not searched	Not searched	Not searched	Not searched	0
RCRA Hazardous Waste Treatment, Storage, Disposal Sites *****	0	Not searched	Not searched	Not searched	Not searched	0
NYS Toxic Spills (incl. Leaking Undrgrnd Storage Tanks) *****	46	Not searched	Not searched	Not searched	Not searched	46(0)
Local & State Petroleum Bulk Storage Sites *****	6	Not searched	Not searched	Not searched	Not searched	6
RCRA Hazardous Waste Generators & Transporters *****	21	Not searched	Not searched	Not searched	Not searched	21
NYS Chemical Bulk Storage Sites *****	1	Not searched	Not searched	Not searched	Not searched	1
Toxic Release Inventory Sites (TRI) *****	0	Not searched	Not searched	Not searched	Not searched	0
Historic Utility Facilities *****	0	Not searched	Not searched	Not searched	Not searched	0
Permit Compliance System Toxic Wastewater Discharges *****	1	Not searched	Not searched	Not searched	Not searched	1
NYS Air Discharges *****	2	Not searched	Not searched	Not searched	Not searched	2
Civil Enforcement Docket Facilities *****	0	Not searched	Not searched	Not searched	Not searched	0
ERNS (Onsite) *****	0	Not searched	Not searched	Not searched	Not searched	0
Distance Interval Totals	78	0	0	0	0	78

Search Radius: * 1 Mile Search Radius ** 1/2 Mile Search Radius *** 1/4 Mile Search Radius **** 1/8 Mile Search Radius ***** on-site only

Numbers in () indicate spills not mapped and profiled, and are found in the tables at the end of the active and closed spills sections.
See these tables for a description of the parameters involved with identifying these spills.

Identified Toxic Sites by Direction

WTC Complex
New York, NY 10048

* Compass directions can vary substantially for sites located very close to the subject property address.

Sites less than 100 feet from subject property sorted by distance

Map Id#	Site Name	Site Street	Approximate Distance & Direction From Property	Toxic Site Category
1	US CUSTOMS SVC/MERCHANDISE CONTROL	6 WORLD TRADE CENTER ROOM 114	0 feet	CERCLIS Site
2	TRADE CENTER SUB-STATION	TRANSFORMER#7 BARCLAY ST	0 feet	Active Haz Spill (Unknown/Other Cause)
3	MANHOLE 60860	WEST ST AND VESEY ST	0 feet	Active Haz Spill (Unknown/Other Cause)
4	MANHOLE # 61027	66 BARKLEY ST	0 feet	Active Haz Spill (Unknown/Other Cause)
5	TRADE CENTER #1 SUB-STA.	TRADE CENTER #1	0 feet	Active Haz Spill (Misc. Spill Cause)
6	TRADE CENTER #1 SUB STA	66 BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
7	FEEDER 38M13	66 BARCKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
8	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
9	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
10	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
11	MANHOLE #59942	FULTON ST / CHURCH ST	0 feet	Active Haz Spill (Misc. Spill Cause)
12	TRADE CTR SUBSTATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
13	TRADE CENTER SUB STATION	66 BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
14	TRADE CENTER SUBSTATION	WORLD TRADE CENTER	0 feet	Active Haz Spill (Misc. Spill Cause)
15	TRADE CENTER SUBSTATION	BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
16	WEST ST AND LIBERTY ST	WEST ST AND LIBERTY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
17	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
18	WORLD TRADE CTR SUB-STAT.	BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
19	FEEDER 38M11	66 BARKLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
20	CON ED SUB STATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
21	BARCLAY ST & W BROADWAY	BARCLAY ST & W BROADWAY	0 feet	Active Haz Spill (Misc. Spill Cause)
22	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
23	TRANSFORMER 6	WORLD TRADE CENTER	0 feet	Active Haz Spill (Misc. Spill Cause)
24	SUB STATION	1 WORLD TRADE CENTER	0 feet	Active Haz Spill (Misc. Spill Cause)
25	TRADE CENTER # 1 SUBSTATI	66 BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
26	WORLD TRADE CENTER SUB	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
27	MANHOLE #61063	VESEY ST / WASHINGTON ST	0 feet	Closed Status Spill (Unk/Other Cause)
28	HUDSON RIVER	1 WORLD TRADE CENTER	0 feet	Closed Status Spill (Unk/Other Cause)
29	ONE WORLD TRANDE CENTER	1 WORLD TRADE CENTER	0 feet	Closed Status Spill (Unk/Other Cause)
30	NO.TOWER/WORLD TRADE CENT	NO TOWER/WORLD TRADE CENT	0 feet	Closed Status Spill (Unk/Other Cause)
31	1 WORLD TRADE CENTER/MANH	1 WORLD TRADE CTR/LEV B-5	0 feet	Closed Status Spill (Unk/Other Cause)
32	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
33	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
34	MH 47895	LIBERTY/WASHINGTON ST	0 feet	Closed Status Spill (Misc. Spill Cause)
35	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
36	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
37	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
38	WORLD TRADE CENTER SS	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
39	TRADE CENTER SUBSTATION	TRADE CENTER SUBSTATION	0 feet	Closed Status Spill (Misc. Spill Cause)
40	TRADE CENTER	66 BARCLAY STREET	0 feet	Closed Status Spill (Misc. Spill Cause)
41	TRADE CENTER SUB STATION	WORLD TRADE CENTER	0 feet	Closed Status Spill (Misc. Spill Cause)
42	MARIOTT HOTEL	3 RURAL TRADE CENTER	0 feet	Closed Status Spill (Misc. Spill Cause)

43	LIBERTY STREET	LIBERTY ST / GREENWICH ST	0 feet	Closed Status Spill (Misc. Spill Cause)
44	PORT AUTHORITY	WORLD TRADE CENTER	0 feet	Closed Status Spill (Misc. Spill Cause)
45	WEST & LIBERTY AVENUE	WEST & LIBERTY AVE.	0 feet	Closed Status Spill (Misc. Spill Cause)
46	WORLD TRADE CENTER/MANHAT	BARLY STREET	0 feet	Closed Status Spill (Misc. Spill Cause)
47		VESEY ST/WEST ST	0 feet	Closed Status Spill (Misc. Spill Cause)
48	SALOMON SMITH BARNEY	7 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
49	SEVEN WORLD TRADE CENTER	7 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
50	ONE WORLD TRADE CENTER	1 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
51	PORT AUTHORITY OF NEW YORK / N. JERSEY	1 WORLD TRADE CENTER 88TH FLOOR SOUTH	0 feet	Petroleum Bulk Storage Site
52	PORT AUTHORITY OF NY & NJ	5 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
53	BELL ATLANTIC	2 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
54	CONSOLIDATED EDISON CO	BARCLAY AND WASHINGTON	0 feet	Hazardous Waste Generator/Transporter
55	CONSOLIDATED EDISON OF NEW YORK	WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
56	S & F WAREHOUSE/U S CUSTOMS	WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
57	US CUSTOMS HOUSE	6 WORLD TRADE CENTER-ROOM #300	0 feet	Hazardous Waste Generator/Transporter
58	US CUSTOMS HOUSE	6 WORLD TRADE CENTER-BASEMENT	0 feet	Hazardous Waste Generator/Transporter
59	UNITED STATES CUSTOMS SERVICE	6 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
60	UNITED STATES CUSTOMS SERVICE LAB	6 WORLD TRADE CENTER R00M 867	0 feet	Hazardous Waste Generator/Transporter
61	PRUDENTIAL LINES INCORPORATED	1 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
62	WPIX	ONE WORLD TRADE CNETER	0 feet	Hazardous Waste Generator/Transporter
63	PORT AUTHORITY OF NEW YORK & NEW JERSEY	ONE WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
64	CHEMICAL BANK	1 WORLD TRADE CENTER 83RD FL	0 feet	Hazardous Waste Generator/Transporter
65	EVERGREEN MARINE CORP	1 WORLD TRADE CENTER RM 162	0 feet	Hazardous Waste Generator/Transporter
66	ZIM-AMERICAN ISRAELI SHIPPING CO INC	1 WORLD TRADE CTR STE 2969	0 feet	Hazardous Waste Generator/Transporter
67	NEDLLOYD INC	5 WORLD TRADE CENTER STE 617	0 feet	Hazardous Waste Generator/Transporter
68	VISTA INTERNATIONAL HOTEL	3 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
69	FUJI PHOTO FILM USA, INC	3 WORLD TRADE CTR - NY MARRIOT	0 feet	Hazardous Waste Generator/Transporter
70	MEXICAN LINES INCORPOARTED	2 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
71	TELESECTOR RESOURCES GROUP	2 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
72	NEW YORK STATE DEPT OF ENVIRONMENTAL	2 WORLD TRADE CENTER REGION 11	0 feet	Hazardous Waste Generator/Transporter
73	WORLD TRADE CENTER - RAYTHEON	2 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
74	EBASCO SERVICES	TWO WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
75	WORLD TRADE CENTER	RIVER WATER PUMP STATION	0 feet	Chemical Bulk Storage Facility
76	WORLD TRADE CENTER	ONE WORLD TRADE CENTER	0 feet	Wastewater Discharge Facility
77	ASBESTOS ABATE. TECH	2 WORLD TRADE CENTER	0 feet	Air Discharge Site
78	ASBESTOS ABATE TECH	2 WORLD TRADE CENTER	0 feet	Air Discharge Site

Sites between 100 ft and 400 ft from the subject property sorted by direction and distance

No sites found between 100 feet and 400 feet

Sites equal to or greater than 400 ft from subject property sorted by direction and distance

No sites found equal to or greater than 400 feet away

Identified Toxic Sites by Proximity

WTC Complex, New York, NY 10048

* Compass directions can vary substantially for sites located very close to the subject property address.

Map Id#	Site Name	Site Street	Approximate Distance From Property	Toxic Site Category
1	US CUSTOMS SVC/MERCHANDISE CONTROL	6 WORLD TRADE CENTER ROOM 114	0 feet	CERCLIS Site
2	TRADE CENTER SUB-STATION	TRANSFORMER#7 BARCLAY ST	0 feet	Active Haz Spill (Unknown/Other Cause)
3	MANHOLE 60860	WEST ST AND VESEY ST	0 feet	Active Haz Spill (Unknown/Other Cause)
4	MANHOLE # 61027	66 BARKLEY ST	0 feet	Active Haz Spill (Unknown/Other Cause)
5	TRADE CENTER #1 SUB-STA.	TRADE CENTER #1	0 feet	Active Haz Spill (Misc. Spill Cause)
6	TRADE CENTER #1 SUB STA	66 BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
7	FEEDER 38M13	66 BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
8	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
9	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
10	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
11	MANHOLE #59942	FULTON ST / CHURCH ST	0 feet	Active Haz Spill (Misc. Spill Cause)
12	TRADE CTR SUBSTATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
13	TRADE CENTER SUB STATION	66 BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
14	TRADE CENTER SUBSTATION	WORLD TRADE CENTER	0 feet	Active Haz Spill (Misc. Spill Cause)
15	TRADE CENTER SUBSTATION	BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
16	WEST ST AND LIBERTY ST	WEST ST AND LIBERTY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
17	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
18	WORLD TRADE CTR SUB-STAT.	BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
19	FEEDER 38M11	66 BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
20	CON ED SUB STATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
21	BARCLAY ST & W BROADWAY	BARCLAY ST & W BROADWAY	0 feet	Active Haz Spill (Misc. Spill Cause)
22	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
23	TRANSFORMER 6	WORLD TRADE CENTER	0 feet	Active Haz Spill (Misc. Spill Cause)
24	SUB STATION	1 WORLD TRADE CENTER	0 feet	Active Haz Spill (Misc. Spill Cause)
25	TRADE CENTER # 1 SUBSTATI	66 BARKLEY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
26	WORLD TRADE CENTER SUB	66 BARCLAY ST	0 feet	Active Haz Spill (Misc. Spill Cause)
27	MANHOLE #61063	VESEY ST / WASHINGTON ST	0 feet	Closed Status Spill (Unk/Other Cause)
28	HUDSON RIVER	1 WORLD TRADE CENTER	0 feet	Closed Status Spill (Unk/Other Cause)
29	ONE WORLD TRANDE CENTER	1 WORLD TRADE CENTER	0 feet	Closed Status Spill (Unk/Other Cause)
30	NO.TOWER/WORLD TRADE CENT	NO TOWER/WORLD TRADE CENT	0 feet	Closed Status Spill (Unk/Other Cause)
31	1 WORLD TRADE CENTER/MANH	1 WORLD TRADE CTR/LEV B-5	0 feet	Closed Status Spill (Unk/Other Cause)
32	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
33	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
34	MH 47895	LIBERTY/WASHINGTON ST	0 feet	Closed Status Spill (Misc. Spill Cause)
35	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
36	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
37	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
38	WORLD TRADE CENTER SS	66 BARCLAY ST	0 feet	Closed Status Spill (Misc. Spill Cause)
39	TRADE CENTER SUBSTATION	TRADE CENTER SUBSTATION	0 feet	Closed Status Spill (Misc. Spill Cause)
40	TRADE CENTER	66 BARCLAY STREET	0 feet	Closed Status Spill (Misc. Spill Cause)
41	TRADE CENTER SUB STATION	WORLD TRADE CENTER	0 feet	Closed Status Spill (Misc. Spill Cause)
42	MARIOTT HOTEL	3 RURAL TRADE CENTER	0 feet	Closed Status Spill (Misc. Spill Cause)
43	LIBERTY STREET	LIBERTY ST / GREENWICH ST	0 feet	Closed Status Spill (Misc. Spill Cause)
44	PORT AUTHORITY	WORLD TRADE CENTER	0 feet	Closed Status Spill (Misc. Spill Cause)
45	WEST & LIBERTY AVENUE	WEST & LIBERTY AVE.	0 feet	Closed Status Spill (Misc. Spill Cause)

46	WORLD TRADE CENTER/MANHAT	BARLY STREET	0 feet	Closed Status Spill (Misc. Spill Cause)
47		VESEY ST/WEST ST	0 feet	Closed Status Spill (Misc. Spill Cause)
48	SALOMON SMITH BARNEY	7 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
49	SEVEN WORLD TRADE CENTER	7 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
50	ONE WORLD TRADE CENTER	1 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
51	PORT AUTHORITY OF NEW YORK / N. JERSEY	1 WORLD TRADE CENTER 88TH FLOOR SOUTH	0 feet	Petroleum Bulk Storage Site
52	PORT AUTHORITY OF NY & NJ	5 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
53	BELL ATLANTIC	2 WORLD TRADE CENTER	0 feet	Petroleum Bulk Storage Site
54	CONSOLIDATED EDISON CO	BARCLAY AND WASHINGTON	0 feet	Hazardous Waste Generator/Transporter
55	CONSOLIDATED EDISON OF NEW YORK	WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
56	S & F WAREHOUSE/U S CUSTOMS	WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
57	US CUSTOMS HOUSE	6 WORLD TRADE CENTER-ROOM #300	0 feet	Hazardous Waste Generator/Transporter
58	US CUSTOMS HOUSE	6 WORLD TRADE CENTER-BASEMENT	0 feet	Hazardous Waste Generator/Transporter
59	UNITED STATES CUSTOMS SERVICE	6 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
60	UNITED STATES CUSTOMS SERVICE LAB	6 WORLD TRADE CENTER ROOM 867	0 feet	Hazardous Waste Generator/Transporter
61	PRUDENTIAL LINES INCORPORATED	1 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
62	WPIX	ONE WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
63	PORT AUTHORITY OF NEW YORK & NEW JERSEY	ONE WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
64	CHEMICAL BANK	1 WORLD TRADE CENTER 83RD FL	0 feet	Hazardous Waste Generator/Transporter
65	EVERGREEN MARINE CORP	1 WORLD TRADE CENTER RM 162	0 feet	Hazardous Waste Generator/Transporter
66	ZIM-AMERICAN ISRAELI SHIPPING CO INC	1 WORLD TRADE CTR STE 2969	0 feet	Hazardous Waste Generator/Transporter
67	NEDLLOYD INC	5 WORLD TRADE CENTER STE 617	0 feet	Hazardous Waste Generator/Transporter
68	VISTA INTERNATIONAL HOTEL	3 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
69	FUJI PHOTO FILM USA, INC	3 WORLD TRADE CTR - NY MARRIOT	0 feet	Hazardous Waste Generator/Transporter
70	MEXICAN LINES INCORPORATED	2 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
71	TELESECTOR RESOURCES GROUP	2 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
72	NEW YORK STATE DEPT OF ENVIRONMENTAL	2 WORLD TRADE CENTER REGION 11	0 feet	Hazardous Waste Generator/Transporter
73	WORLD TRADE CENTER - RAYTHEON	2 WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
74	EBASCO SERVICES	TWO WORLD TRADE CENTER	0 feet	Hazardous Waste Generator/Transporter
75	WORLD TRADE CENTER	RIVER WATER PUMP STATION	0 feet	Chemical Bulk Storage Facility
76	WORLD TRADE CENTER	ONE WORLD TRADE CENTER	0 feet	Wastewater Discharge Facility
77	ASBESTOS ABATE TECH	2 WORLD TRADE CENTER	0 feet	Air Discharge Site
78	ASBESTOS ABATE TECH	2 WORLD TRADE CENTER	0 feet	Air Discharge Site

Identified Toxic Sites by Category

WTC Complex
New York, NY 10048

* Compass directions can vary substantially for sites located very close to the subject property address.

CERCLIS Sites

MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
1	US CUSTOMS SVC/MERCHANDISE CONTROL	6 WORLD TRADE CENTER ROOM 114	0 feet

Active Haz Spills (Unknown Causes & Other Causes)

MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
2	TRADE CENTER SUB-STATION	TRANSFORMER#7 BARCLAY ST	0 feet
3	MANHOLE #60860	WEST ST AND VESEY ST	0 feet
4	MANHOLE # 61027	66 BARKEYLY ST	0 feet

Active Haz Spills (Miscellaneous Spill Causes)

MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
5	TRADE CENTER #1 SUB-STA.	TRADE CENTER #1	0 feet
6	TRADE CENTER #1 SUB STA	66 BARKEYLY ST	0 feet
7	FEEDER 38M13	66 BARCKLEY ST	0 feet
8	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet
9	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet
10	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet
11	MANHOLE #59942	FULTON ST / CHURCH ST	0 feet
12	TRADE CTR SUBSTATION	66 BARCLAY ST	0 feet
13	TRADE CENTER SUB STATION	66 BARKEYLY ST	0 feet
14	TRADE CENTER SUBSTATION	WORLD TRADE CENTER	0 feet
15	TRADE CENTER SUBSTATION	BARKEYLY ST	0 feet
16	WEST ST AND LIBERTY ST	WEST ST AND LIBERTY ST	0 feet
17	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet
18	WORLD TRADE CTR SUB-STAT.	BARKEYLY ST	0 feet
19	FEEDER 38M11	66 BARCLAY ST	0 feet
20	CON ED SUB STATION	66 BARCLAY ST	0 feet
21	BARCLAY ST & W BROADWAY	BARCLAY ST & W BROADWAY	0 feet
22	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet
23	TRANSFORMER 6	WORLD TRADE CENTER	0 feet
24	SUB STATION	1 WORLD TRADE CENTER	0 feet
25	TRADE CENTER # 1 SUBSTATI	66 BARKEYLY ST	0 feet
26	WORLD TRADE CENTER SUB	66 BARCLAY ST	0 feet

Closed Status Spills (Unknown Causes & Other Causes)

MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
27	MANHOLE #61063	VESEY ST / WASHINGTON ST	0 feet
28	HUDSON RIVER	1 WORLD TRADE CENTER	0 feet
29	ONE WORLD TRAND CENTER	1 WORLD TRADE CENTER	0 feet
30	NO.TOWERWORLD TRADE CENT	NO TOWERWORLD TRADE CENT	0 feet
31	1 WORLD TRADE CENTERMANH	1 WORLD TRADE CTRALEY B-5	0 feet

Closed Status Spills (Miscellaneous Spill Causes)

MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
32	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet
33	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet
34	MH 47895	LIBERTYWASHINGTON ST	0 feet
35	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet
36	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet
37	TRADE CENTER SUB STATION	66 BARCLAY ST	0 feet
38	WORLD TRADE CENTER SS	66 BARCLAY ST	0 feet
39	TRADE CENTER SUBSTATION	66 BARCLAY ST	0 feet
40	TRADE CENTER	TRADE CENTER SUBSTATION	0 feet
41	TRADE CENTER SUB STATION	66 BARCLAY STREET	0 feet
42	MARIOTT HOTEL	WORLD TRADE CENTER	0 feet
43	LIBERTY STREET	3 RURAL TRADE CENTER	0 feet
44	PORT AUTHORITY	LIBERTY ST / GREENWICH ST	0 feet
45	WEST & LIBERTY AVENUE	WORLD TRADE CENTER	0 feet
46	WORLD TRADE CENTERMANHAT	WEST & LIBERTY AVE.	0 feet
47		BARLY STREET	0 feet
		VESEY STWEST ST	0 feet

Petroleum Bulk Storage Sites

MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
48	SALOMON SMITH BARNEY	7 WORLD TRADE CENTER	0 feet
49	SEVEN WORLD TRADE CENTER	7 WORLD TRADE CENTER	0 feet
50	ONE WORLD TRADE CENTER	1 WORLD TRADE CENTER	0 feet

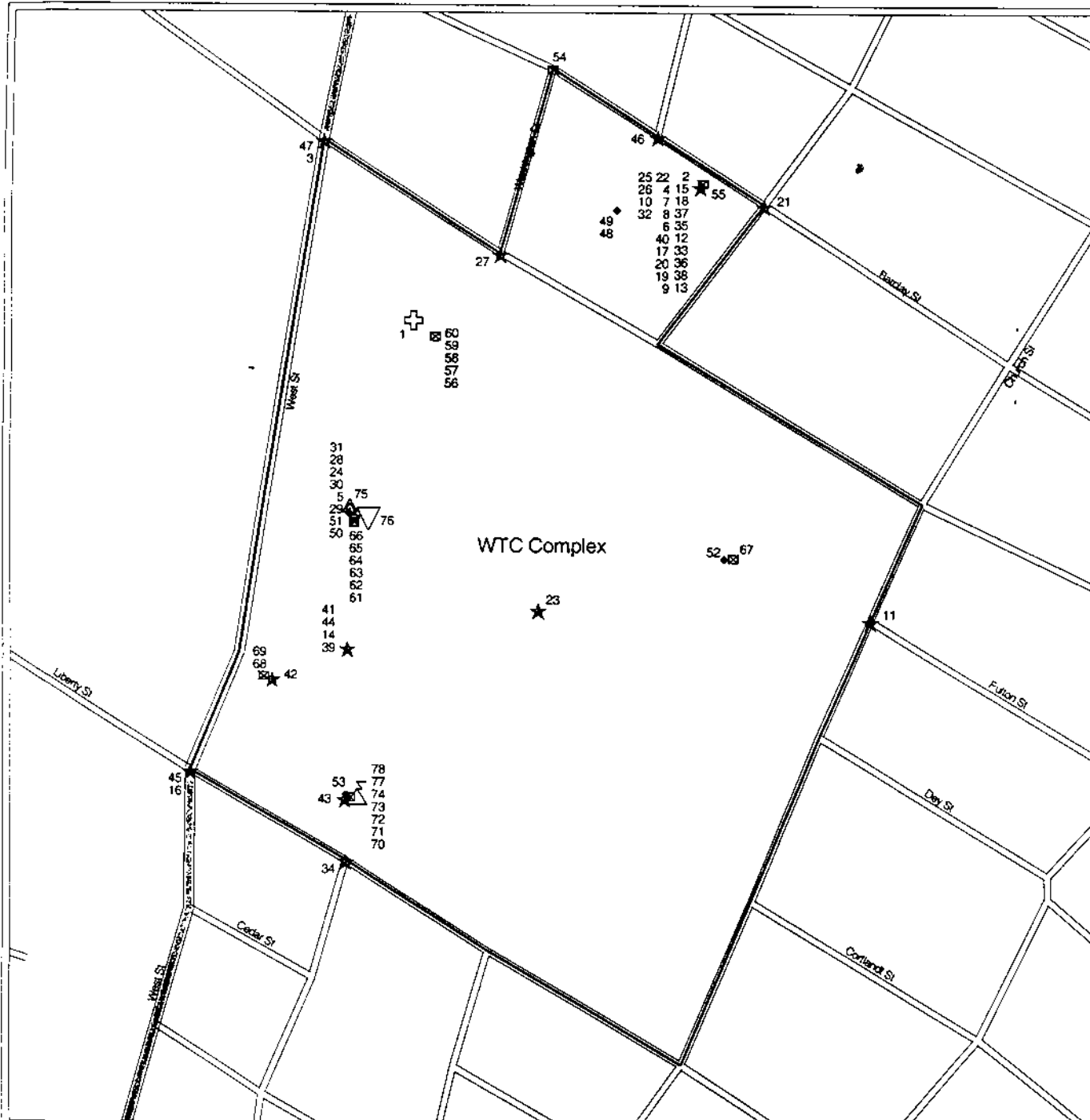
51	PORT AUTHORITY OF NEW YORK / N. JERSEY	1 WORLD TRADE CENTER 88TH FLOOR SOUTH	0 feet
52	PORT AUTHORITY OF NY & NJ	5 WORLD TRADE CENTER	0 feet
53	BELL ATLANTIC	2 WORLD TRADE CENTER	0 feet
Hazardous Waste Generators, Transporters			
MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
54	CONSOLIDATED EDISON CO	BARCLAY AND WASHINGTON	0 feet
55	CONSOLIDATED EDISON OF NEW YORK	WORLD TRADE CENTER	0 feet
56	S & F WAREHOUSE/US CUSTOMS	WORLD TRADE CENTER	0 feet
57	US CUSTOMS HOUSE	6 WORLD TRADE CENTER-ROOM #300	0 feet
58	US CUSTOMS HOUSE	6 WORLD TRADE CENTER-BASEMENT	0 feet
59	UNITED STATES CUSTOMS SERVICE	6 WORLD TRADE CENTER	0 feet
60	UNITED STATES CUSTOMS SERVICE LAB	6 WORLD TRADE CENTER ROOM 867	0 feet
61	PRUDENTIAL LINES INCORPORATED	1 WORLD TRADE CENTER	0 feet
62	WPILX	ONE WORLD TRADE CENTER	0 feet
63	PORT AUTHORITY OF NEW YORK & NEW JERSEY	ONE WORLD TRADE CENTER	0 feet
64	CHEMICAL BANK	1 WORLD TRADE CENTER 83RD FL	0 feet
65	EVERGREEN MARINE CORP	1 WORLD TRADE CENTER RM 162	0 feet
66	ZIM-AMERICAN ISRAELI SHIPPING CO INC	1 WORLD TRADE CTR STE 2969	0 feet
67	NEDLLOYD INC	5 WORLD TRADE CENTER STE 617	0 feet
68	VISTA INTERNATIONAL HOTEL	3 WORLD TRADE CENTER	0 feet
69	FUJI PHOTO FILM USA, INC	3 WORLD TRADE CTR - NY MARRIOTT	0 feet
70	MEXICAN LINES INCORPORATED	2 WORLD TRADE CENTER	0 feet
71	TELESECTOR RESOURCES GROUP	2 WORLD TRADE CENTER	0 feet
72	NEW YORK STATE DEPT OF ENVIRONMENTAL	2 WORLD TRADE CENTER REGION 11	0 feet
73	WORLD TRADE CENTER - RAYTHEON	2 WORLD TRADE CENTER	0 feet
74	EBASCO SERVICES	TWO WORLD TRADE CENTER	0 feet
Chemical Bulk Storage Facilities			
MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
75	WORLD TRADE CENTER	RIVER WATER PUMP STATION	0 feet
Wastewater Discharge Facilities			
MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
76	WORLD TRADE CENTER	ONE WORLD TRADE CENTER	0 feet
Air Discharge Sites			
MAP ID#	FACILITY NAME	FACILITY STREET	DISTANCE & DIRECTION
77	ASBESTOS ABATE TECH	2 WORLD TRADE CENTER	0 feet
78	ASBESTOS ABATE TECH	2 WORLD TRADE CENTER	0 feet

Toxics Targeting
Onsite Area Map
WTC Complex
New York, NY 10048



New York County

- NPL/CERCLIS/NYSDEC Inactive Hazardous Waste Disposal Site
- Hazardous Waste Treater, Storer, Disposer
- Hazardous Substance Waste Disposal Site
- Major Oil Storage Facility
- Chemical Storage Facility
- Toxic Release
- Wastewater Discharge
- Civil Enforcement Docket Facility
- Subject Area
- Minor Roads
- Major Roads
- Expressways
- MTBE Gasoline Additive Spill
- Solid Waste Facility
- Hazardous Material Spill
- Hazardous Waste Generator, Transp.
- Air Release
- Historic Utility Site
- Petroleum Bulk Storage Facility
- Waterbody
- County Border
- Railroad Tracks



Section Two: Toxic Site Profiles

The heading of each *Toxic Site Profile* refers to the site's map location and details:

- The facility name, address, city, state, and zip code (This information does not appear in the headings for Inactive Hazardous Waste Disposal Sites).
- Any changes that were made to a site's address in order to map its location.
- The site mapping method that was used (see *How Sites are Located*, at the end of this section for more information).

Toxic Site Profiles summarize information provided by site owners or operators and government agencies regarding various toxic chemical activities reported at each site, such as:

- Whether chemicals were stored, produced, transported, discharged or disposed of.
- The name of chemicals and their Chemical Abstract Series (CAS) numbers;
- The amount of chemicals and the units (gallons/pounds) the chemical was measured in.
- Whether the site or storage tanks at the site are currently active or inactive.
- Special codes used by government agencies to regulate hazardous waste activities at some sites
(A complete description of the codes follows the profiles section).

For selected individual chemicals reported at various toxic sites, some potential health effect summary information appears below the site profile. Each potential health effect summary identifies chemicals by name and by Chemical Abstract Series (CAS) Number. An "x" under each potential health effect heading indicates positive toxicity testing results reported by the National Institute of Occupational Safety and Health's Registry of Toxic Effects of Chemical Substances (RTECS). Some chemicals (mostly appearing in profiles of Hazardous Waste facilities), are reported as mixtures, and RTECS health effect information is only available for individual chemicals. In addition, RTECS only provides information on approximately 100,000 common chemicals. Consequently, the absence of potential health effect summary information for a particular chemical identified in a Toxic Site Profile does not necessarily mean that the chemical does not pose potential health effects.

The Maximum Contaminant Level (MCL) in drinking water allowed for selected chemicals is also noted. In most cases, the only applicable MCL has been set by the New York State Department of Health (NYSDOH). Where NYSDOH has not set an MCL, the federal standard, if one exists, is listed and is marked by an asterisk.

Presented below are column headings that describe the health effect definitions used in RTECS and applicable New York State and federal drinking water standards. Reference sources for information presented in this section are also provided.

ACUTE TOX: **Acute Toxicity:** Short-term exposure to this chemical can cause lethal and non-lethal toxicity effects not included in the following four categories.

TUMOR TOX: **Tumorigenic Toxicity:** The chemical can cause an increase in the incidence of tumors.

MUTAG TOX: **Mutagenic Toxicity:** The chemical can cause genetic alterations that are passed from one generation to the next.

REPRO TOX: **Reproductive toxicity:** May signify one of the following effects: maternal effects, paternal effects, effects on fertility, effects on the embryo or fetus, specific developmental abnormalities, tumorigenic effects, or effects on the newborn (only positive reproductive effects data for mammalian species are referenced)

IRRIT TOX: **Primary Irritant:** The chemical can cause eye or skin irritation

MCL: **Drinking Water Standard - Maximum Contaminant Level (MCL)** listed under Drinking Water Supplies, 10 NYCRR Part 5, Subparts 1.51(f),(g), and (h) for NYDOH MCL's and under the Safe Drinking Water Act, 40 CFR 141, Subparts B and G, (* indicates value for total trihalomethanes) for federal MCL's.

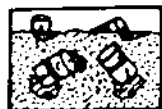
Reference Source for Toxicity Information: Registry of Toxic Effects of Chemical Substances (RTECS), NIOSH (on-line database); For further information, contact: NIOSH, 4676 Columbia Parkway, Cincinnati, OH, 45226, 800/35-NIOSH.

Reference Source for Drinking Water Standards: New York State Department of Health, Bureau of Toxic Substances Assessment, 2 University Place, Room 240, Albany, NY 12203, 518/458-6373.

U.S. Environmental Protection Agency, Office of Drinking Water, 401 M St SW, Mailstop WH-556, Washington, DC, 20460, 202/260-5700.

Inactive Hazardous Waste Disposal Site Classifications:

- 1 -- Causing or presenting an imminent danger of causing irreversible or irreparable damage to the public health or the environment -- immediate action required;
- 2 -- Significant threat to the public health or environment -- action required;
- 3 -- Does not Present a significant threat to the environment or public health -- action may be deferred;
- 4 -- Site properly closed --requires continued management;
- 5 -- Site properly closed, no evidence of present or potential adverse impact -- no further action required;
- 2a -- This temporary classification has been assigned to sites where there is inadequate data to assign them to the five classifications specified by law.
- D1, 2, 3 -- Delisted Site (1: hazardous waste not found; 2: remediated; 3: consolidated site or site incorrectly listed)



* NPL/CERCLIS/INACTIVE HAZARDOUS WASTE DISPOSAL SITES IDENTIFIED WITHIN THE SEARCH AREA *

PLEASE NOTE: * Compass directions can vary substantially for sites located very close to the subject property address.

Map Identification Number 1

US CUSTOMS SVC/MERCHANDISE CONTROL
6 WORLD TRADE CENTER ROOM 114

NEW YORK, NY 10048

EPA Facility Id: NY4470002433

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

SITE DESIGNATION: NPL - CERCLIS - X NYSDEC REGISTRY -

USEPA COMPREHENSIVE ENVIRONMENTAL RESPONSE
COMPENSATION AND LIABILITY INFORMATION SYSTEM (CERCLIS)

SITE INFORMATION

EPA-ID: NY4470002433
Site Name: US CUSTOMS SVC/MERCHANDISE CONTROL
Site Street: 6 WORLD TRADE CENTER ROOM 114
Site City/State/Zip: NEW YORK, NY 10048

Site-ID: 0203163

NFRAP (No Further Remedial Activity Planned) Indicator: NO FURTHER REMEDIAL ACTION PLANNED

Owner Indicator: Unknown
Incident Type:
Incident Category:
Federal Facility Flag: Federal Facility

NPL Status Indicator: Not on the NPL
USGS Hydrological Unit: 02030101
RCRA Flag:

Contact information:

Contact person: HELEN SHANNON
Contact person: ALIDA KARAS
Contact person: BOB WING

Phone: 2126374323
Phone: 2126374328
Phone: 2126374332

SITE ALIAS INFORMATION

Alias Name: US CUSTOMS SVC/MERCHANDISE CONTROL
Alias Street:
Alias City/State/Zip: NEW YORK, NY

Alias ID: 101

OPERABLE UNIT INFORMATION

Operable Unit ID: 00 Operable Unit Name: SITEWIDE

ACTION INFORMATION

Name: DISCOVERY
Lead: Federal Facilities
Qualifier:
Category:
Planning Status:
Anomaly Indicator:
IFMS Entry: No Entry into IFMS

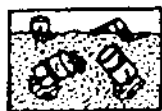
Current Plan Start Date:
Current Plan Completion Date:
Actual Start Date:
Actual Completion Date: 19890110
Operable Unit ID: 00
Financial Budget Source:

Name: PRELIMINARY ASSESSMENT
Lead: Federal Facilities
Qualifier: NFRAP (No Further Remedial Action Planned)
Category:
Planning Status:
Anomaly Indicator:
IFMS Entry: Both Intramural and Extramural Entry into IFMS

Current Plan Start Date:
Current Plan Completion Date:
Actual Start Date:
Actual Completion Date: 19890927
Operable Unit ID: 00
Financial Budget Source: Remedial

FINANCIAL INFORMATION

No financial information was provided



*** NO HAZARDOUS SUBSTANCE WASTE DISPOSAL SITES IDENTIFIED WITHIN THE SEARCH AREA ***



*** NO SOLID WASTE FACILITIES IDENTIFIED WITHIN THE SEARCH AREA ***



*** NO OIL STORAGE FACILITIES LARGER THAN 400,000 GALLONS IDENTIFIED WITHIN THE SEARCH AREA ***



*** NO HAZARDOUS WASTE TREATMENT/STORAGE/DISPOSERS IDENTIFIED WITHIN THE SEARCH AREA ***



HAZARDOUS MATERIAL SPILLS INTRODUCTION

The Hazardous Material Spills in this section are divided into eight spill cause groupings. These include:

Active Spills Section: Spills with incomplete paperwork that may or may not be cleaned up (See Date Cleanup Ceased)

- 1) Tank Failures
- 2) Tank Test Failures
- 3) Unknown Spill Cause or Other Spill Cause Hazardous Spills
- 4) Miscellaneous Spill Causes: Equipment Failure, Human Error, Tank Overfill, Deliberate Spill, Traffic Accidents, Housekeeping, Abandoned Drum, and Vandalism.

Closed Status Spills Section: Spills with completed paperwork that may or may not be cleaned up (See Date Cleanup Ceased)

- 5) Tank Failures
- 6) Tank Test Failures
- 7) Unknown Spill Cause or Other Spill Cause Hazardous Spills
- 8) Miscellaneous Spill Causes: Equipment Failure, Human Error, Tank Overfill, Deliberate Spill, Traffic Accidents, Housekeeping, Abandoned Drum, and Vandalism.

All spills within each spill cause category are presented in order of proximity to the subject site address.

Please note that spills reported within 0.25 mile (or one-eighth mile in Manhattan) are mapped and profiled.

Between 0.25 mile (or one-eighth mile in Manhattan) and 0.5 mile, only the following spills are mapped and profiled:

- * Tank Failures;
- * Tank Test Failures;
- * Unknown Spill Cause or Other Spill Cause;
- * Spills greater than 100 units of quantity; and
- * Spills reported in the NYSDEC Fall 1998 MTBE Survey.

A table at the end of each section presents a listing of reported Miscellaneous Spills with less than 100 units located between 0.25 mile (or one-eighth mile in Manhattan) and 0.5 mile. These spills are neither mapped nor profiled.



NO ACTIVE TANK FAILURES IDENTIFIED WITHIN THE SEARCH AREA



NO ACTIVE TANK TEST FAILURES IDENTIFIED WITHIN THE SEARCH AREA.



ACTIVE UNKNOWN CAUSE SPILLS AND OTHER CAUSE SPILLS IDENTIFIED WITHIN THE SEARCH AREA

* - Compass directions can vary substantially for sites located very close to the subject property address.

Map Identification Number 2 **TRADE CENTER SUB-STATION**
TRANSFORMER#7 BARCLAY ST

Spill Number: 9912810

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: **MANUAL MAPPING (3)**
 Approximate distance from property: **0 feet**

MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
 Revised street: **NO CHANGE**
 Revised zip code: **UNKNOWN**

Source of Spill: **OTHER COMM/INDUSTRIAL**
 Notifier Type: **RESPONSIBLE PARTY**
 Caller Name:
 DEC Investigator: **COMENALE**

Spiller: **CON ED**
 Notifier Name:
 Caller Agency:
 Contact for more spill info: **STEPHEN CRIBBINS**

Spiller Phone: () -
 Notifier Phone:
 Caller Phone:
 Contact Person Phone: **(212) 580-8576**

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
02/10/2000		UNKNOWN	ON LAND		NO		NO	
Material Spilled		Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID		PETROLEUM	1.00	GALLONS	NO	1.00	GALLONS	NO

Caller Remarks: **LEAKED FROM A DRAIN VALVE. 1 OZ SPILL. LEAKING AT 1 DROP PER DAY, REPAIRS PENDING DEENERGIZATION OF MACHINE. CON ED# 129928**

DEC Investigator Remarks: **NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.**

Map Identification Number 3 **MANHOLE 60860**
WEST ST AND VESEY ST

Spill Number: 9910133

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: **ADDRESS MATCHING**
 Approximate distance from property: **0 feet**

MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
 Revised street: **WEST ST / VESEY ST**
 Revised zip code: **NO CHANGE**

Source of Spill: **OTHER COMM/INDUSTRIAL**
 Notifier Type: **RESPONSIBLE PARTY**
 Caller Name: **BILL MURPHY**
 DEC Investigator: **COMENALE**

Spiller:
 Notifier Name:
 Caller Agency: **CON EDISON**
 Contact for more spill info: **BILL MURPHY**

Spiller Phone:
 Notifier Phone:
 Caller Phone: **(212) 580-6763**
 Contact Person Phone: **(212) 580-6763**

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards	Penalty Recommended	
11/21/1999		UNKNOWN	ON LAND		NO	NO	
Material Spilled		Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Unk Quantity Recovered ?
UNKNOWN MATERIAL		UNKNOWN	1.00	GALLONS	NO	0.00	GALLONS YES

Caller Remarks: 1 gal on 200gal of water - unk type of oil -- clean up pending sample results - con ed spill #129062

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 4 MANHOLE # 61027
66 BARKELY ST

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

Spill Number: 0003719
MANHATTEN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: 66 BARCLAY ST
Revised zip code: 10007

Close Date:

Source of Spill: UNKNOWN
Notifier Type: AFFECTED PERSONS
Caller Name:
DEC Investigator: O'CONNELL

Spiller: UNKNOWN
Notifier Name:
Caller Agency:
Contact for more spill info: BRAIN JOYCE

Spiller Phone: () -
Notifier Phone:
Caller Phone:
Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards	Penalty Recommended	
06/26/2000		UNKNOWN	ON LAND		NO	NO	
Material Spilled		Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Unk Quantity Recovered ?
UNKNOWN PETROLEUM		PETROLEUM	5.00	GALLONS	NO	0.00	GALLONS NO

Caller Remarks: ABOVE MATERIAL DISCOVERED AT ABOVE LOCATION ON TOP OF 3500 GALLONS OF WATER. SAMPLE TAKEN AND CLEANUP IS PENDING LAB RESULTS. LOCATION IS THE WORLD TRADE CENTER SUBSTATION. CON ED # 132033. NO CALL BACK REQUESTED.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.



ACTIVE HAZARDOUS SPILLS - MISC. SPILL CAUSES - EQUIPMENT FAILURE, HUMAN ERROR, TANK OVERFILL, DELIBERATE SPILL, TRAFFIC ACCIDENT, HOUSEKEEPING, ABANDONED DRUM, AND VANDALISM - IDENTIFIED WITHIN THE SEARCH AREA.

All spills mapped and profiled within 1/4 Mile. Between 1/4 Mile and 'THE SEARCH AREA' Mile, spills reported to be greater than 100 units and spills reported to be less than 100 units are listed in a table at the end of this section.

* - Compass directions can vary substantially for sites located very close to the subject property address.

Map Identification Number 5 **TRADE CENTER #1 SUB-STA.**
TRADE CENTER #1

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (3)

Approximate distance from property: 0 feet

Source of Spill: OTHER NON COMM/INSTITUTIONAL

Notifier Type: RESPONSIBLE PARTY

Caller Name:

DEC Investigator: O'CONNELL

Spiller: CON ED

Notifier Name:

Caller Agency:

Contact for more spill info: CALLER

Spill Number: 9913557

Close Date:

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: UNKNOWN

Spiller Phone: (212) 580-6763

Notifier Phone:

Caller Phone:

Contact Person Phone: () -

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
03/01/2000		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled		Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
UNKNOWN PETROLEUM		PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: CALLER REPORTED 3OZ SPILL FROM TRANSFORMER. UNK WHAT SUBSTANCE. CON ED # 130190. LEAK NEAR TAPECHANGER TRANSFORMER #1. SAMPLES.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 6 **TRADE CENTER #1 SUB STA**
66 BARKLEY ST

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

Spill Number: 9912803

Close Date:

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: 66 BARCLAY ST

Revised zip code: 10007

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name:
 DEC Investigator: COMENALE

Spiller: CON ED
 Notifier Name:
 Caller Agency:
 Contact for more spill info: JIMMY FOX

Spiller Phone: () -
 Notifier Phone:
 Caller Phone:
 Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
02/10/2000		EQUIPMENT FAILURE	ON LAND		NO		NO	

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: LEAK FROM BASE OF C POT HEAD - 1 OUNCE TOTAL SPILLED - CLEAN UP PENDING THE DE-ENERGIZING OF FEEDER - CON ED #129926

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 7 FEEDER 38M13
 66 BARCKLEY ST

MAP LOCATION INFORMATION
 Site location mapped by: ADDRESS MATCHING
 Approximate distance from property: 0 feet

Spill Number: 9911353
 MANHATTAN, NY NO ZIP PROVIDED
 ADDRESS CHANGE INFORMATION
 Revised street: 66 BARCLAY ST
 Revised zip code: 10007

Close Date:

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name: STEVE ROMERO
 DEC Investigator: COMENALE

Spiller: CON ED
 Notifier Name:
 Caller Agency: CON EDISON
 Contact for more spill info: CALLER

Spiller Phone: (212) 580-6763
 Notifier Phone:
 Caller Phone: (212) 580-6763
 Contact Person Phone: () -

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
12/28/1999		EQUIPMENT FAILURE	ON LAND		NO		NO	

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

 Caller Remarks: caller reported 2 oz. spill on bluestone, con ed #129412

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 8 **TRADE CENTER SUB STATION**
 66 BARCLAY ST

Spill Number: 9909027

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

Source of Spill: OTHER NON COMM/INSTITUTIONAL

Notifier Type: RESPONSIBLE PARTY

Caller Name: FRANK MASSERIA

DEC Investigator: ENGELHARDT

Spiller: CON ED

Notifier Name:

Caller Agency: CON EDISON

Contact for more spill info: CALLER

Spiller Phone: () -

Notifier Phone:

Caller Phone: (212) 580-6763

Contact Person Phone: () -

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
10/25/1999		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: connection failed to pump #2. con ed 128636.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 9 **TRADE CENTER SUBSTATION**
 66 BARCLAY ST

Spill Number: 9901876

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL

Notifier Type: RESPONSIBLE PARTY

Caller Name: STEVEN CRIBBIN

DEC Investigator: ENGELHARDT

Spiller: CON ED

Notifier Name: MR BOOMER

Caller Agency: CON EDISON

Contact for more spill info: STEVEN CRIBBIN

Spiller Phone: () -

Notifier Phone:

Caller Phone: (212) 580-6763

Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
05/18/1999		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	0	GALLONS	YES	0	GALLONS	NO

Caller Remarks: TRANSFORMER LEAK IS CONTAINED TOTALLING 2 OZ. CLEAN UP PENDING LAB RESULTS AND REPAIR OF TRANSFORMER VALVE.
CON ED 124-951

DEC Investigator Remarks: DEC INSPECTOR NOTES As of 8-30 no information on transformer repair/replacement. 8-26-99 E-Mailed ERTs for informaion on cleanup and transformer. CON ED E2MIS NOTES 6-17-99 Oil found leaking from Transformer #9. Absorbant pads were placed onto floor structure and a drip pan placed under oil sample valve. Spill contained, no sewer or waterway was affected, tag #S-00431 was hung and sample taken. Cleanup pending results. Note: drip rate is approx. 3 drips per min. Sample was taken due to leak on radiator drain valve. 5-20-99 Lab results indicates ,1ppm PCB

Map Identification Number 10 TRADE CENTER SUBSTATION
66 BARCLAY ST

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: NO CHANGE
Revised zip code: NO CHANGE

Close Date:

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: MIKE CESARE
DEC Investigator: ENGELHARDT

Spiller: TRADE CENTER SUBSTATION
Notifier Name: MIKE CESARE
Caller Agency: CON EDISON
Contact for more spill info: MIKE CESARE

Spiller Phone: (212) 580-6763
Notifier Phone: (212) 580-6763
Caller Phone: (212) 580-6763
Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
05/17/1999		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
TRANSFORMER OIL	PETROLEUM	0	GALLONS	YES	0	GALLONS	YES

Caller Remarks: 1 OUNCE ONTO CONCRETE PAD-HAS BEEN CLEANED UP-CON ED #124922

DEC Investigator Remarks: DEC INSPECTOR NOTES 8-20-99 E-Mailed ERTs for info on repair of leak. CON ED E2MIS NOTES 6-17-99 Approx. 1 oz. of transformer oil spilled onto concrete pad in Vault #9 FDR-38M14. Spill was contained, cleaned up, pan placed under leak. Leak is from a radiator drain valve. Estimated drop rate, 1 drop per day. No impact to waterway or sewer sign #S-00432 placed. No sample taken at this time. Repairs to be made by Transformer group when notified after this report. 5-20-99 Lab results indicate <1ppm PCB

Map Identification Number 11 MANHOLE #59942
FULTON ST / CHURCH ST

Spill Number: 9901604 Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: NO CHANGE
Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: RICHARD ROACH
DEC Investigator: ENGELHARDT

Spiller: CON EDISON
Notifier Name: CURTIS
Caller Agency: CON EDISON
Contact for more spill info:

Spiller Phone: () -
Notifier Phone:
Caller Phone: (212) 580-6763
Contact Person Phone:

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
05/11/1999		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: 16 OUNCES LEAKING FROM A JOINT ON THE CABLE - SAMPLE TAKEN - CASE #124799

DEC Investigator Remarks: CON ED E2MIS NOTES 6-01-99 5-11-99 Approx. 16 oz. of unknown fluid leaking out of splice joint. A pad was put down and sample taken. Tag #17222 was placed, contain ed did not enter waterway or sewer, no sump. 5-11-99 09:46 hrs. Lab Seq#99-04892 Aroclor 1260 PCb 17ppm in MH#59942 5-17-99 Cleanup complete Remvd 20 gals.of oil/water to <50 tanker generated 1 drum PPE Used flush truck to clean & rinse structure. Removed Spill tag upon completion.

Map Identification Number 12 **TRADE CTR SUBSTATION**
66 BARCLAY ST

Spill Number: 9812419

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: LISA PRIMEGGIA
DEC Investigator: O'CONNELL

Spiller: CON EDISON
Notifier Name: MR CARROLL
Caller Agency: CON EDISON
Contact for more spill info:

Spiller Phone: (212) 580-6764
Notifier Phone: (212) 580-6764
Caller Phone: (212) 580-6763
Contact Person Phone: () -

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended		
01/07/1999		EQUIPMENT FAILURE	ON LAND	NO	NO		
Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
TRANSFORMER OIL	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: CON EDISON #1122300 TRANSFORMER #1 DRAINPLUG LEAKED ON BLUESTONE.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 13 **TRADE CENTER SUB STATION**
66 BARKLEY ST

Spill Number: 9811342

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: 66 BARCLAY ST
Revised zip code: 10007

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: RICHARD ROACH
DEC Investigator: ENGELHARDT

Spiller: CON ED
Notifier Name: JOHN HEFFERNEN
Caller Agency: CON EDISON
Contact for more spill info: RICHARD ROACH

Spiller Phone: (212) 580-6763
Notifier Phone:
Caller Phone: (212) 580-6763
Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
12/09/1998		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
TRANSFORMER OIL	PETROLEUM	1.00	GALLONS	NO	1.00	GALLONS	NO

Caller Remarks: from a drain pulg on #8 transformer about 2oz's. ref #121826

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 14 **TRADE CENTER SUBSTATION**
WORLD TRADE CENTER

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (3)
 Approximate distance from property: 0 feet

Spill Number: 9809816

Close Date:

MANHATTEN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
 Revised zip code: 10048

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name: TONY CONSTANTINE
 DEC Investigator: ENGELHARDT

Spiller: CON ED
 Notifier Name: MR HEFFNER
 Caller Agency: CON EDISON
 Contact for more spill info: TONY CONSTANTINE

Spiller Phone:
 Notifier Phone: (212) 580-6763
 Caller Phone: (212) 580-6763
 Contact Person Phone: (212) 580-6763

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
11/04/1998		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	0	GALLONS	YES	0	GALLONS	NO

Caller Remarks: THE PRESSURE TUBING SWITCH FAILED CAUSING THE 1 OZ SPILL. CLEAN UP PENDING LAB RESULTS. CON ED 121-044.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 15 **TRADE CENTER SUBSTATION**
BARKLEY ST

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (3)
 Approximate distance from property: 0 feet

Spill Number: 9808989

Close Date:

NEW YORK CITY, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: BARCLAY ST
 Revised zip code: 10007

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name: STEVE ROMERO
 DEC Investigator: ENGELHARDT

Spiller: CON EDISON
 Notifier Name: MR.BRUNS
 Caller Agency: CON EDISON
 Contact for more spill info: STEVE ROMERO

Spiller Phone: (212) 580-6763
 Notifier Phone: (212) 338-3352
 Caller Phone: (212) 580-6763
 Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
10/19/1998		EQUIPMENT FAILURE	ON LAND		NO		NO	

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
TRANSFORMER OIL	PETROLEUM	1.00	GALLONS	NO	1.00	GALLONS	NO

Caller Remarks: TRANSFORMER FAILURE AT ABOVE LOCATION. MATERIAL BELIEVED TO BE LESS THAN 1 OUNCE AND ALL WAS RECOVERED.
 TRANSFORMER #8. CON EDISON #120620. NO CALL BACK REQUESTED.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 16 WEST ST AND LIBERTY ST
 WEST ST AND LIBERTY ST

MAP LOCATION INFORMATION
 Site location mapped by: ADDRESS MATCHING
 Approximate distance from property: 0 feet

Spill Number: 9708178
 MANHATTAN, NY NO ZIP PROVIDED
 ADDRESS CHANGE INFORMATION
 Revised street: WEST ST / LIBERTY ST
 Revised zip code: NO CHANGE

Close Date:

Source of Spill: COMMERCIAL VEHICLE
 Notifier Type: OTHER
 Caller Name: GLEN KATZ
 DEC Investigator: ENGELHARDT

Spiller: BUTLER-FLEET SERVICES
 Notifier Name: JOE BELONGIS
 Caller Agency: MILRO ASSOCIATES
 Contact for more spill info:

Spiller Phone: (212) 714-2437
 Notifier Phone: (212) 714-2437
 Caller Phone: (516) 379-1500
 Contact Person Phone:

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
10/10/1997		EQUIPMENT FAILURE	ON LAND		NO		NO	

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
HYDRAULIC OIL	PETROLEUM	50.00	GALLONS	NO	0.00	GALLONS	YES

Caller Remarks: CABLE PULLING TRUCK RUPTURED HYDROLIC LINE SPILLING ONTO PAVEMENT. CONTAINED AND SPILL RESPONSE CREW IS ENROUTE.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 17 TRADE CENTER SUB STATION
66 BARCLAY ST

Spill Number: 9603838

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: NO CHANGE
Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: TIM SOLICH
DEC Investigator: ENGELHARDT

Spiller: CON ED
Notifier Name: TOM OBRIEN
Caller Agency: CON ED
Contact for more spill info: TOM OBRIEN

Spiller Phone: (212) 580-6764
Notifier Phone: (212) 460-3839
Caller Phone: (212) 580-6763
Contact Person Phone: (212) 460-3839

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
06/20/1996		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
TRANSFORMER OIL	PETROLEUM	10.00	GALLONS	NO	10.00	GALLONS	NO

Caller Remarks: TRANSFORMER 1 SELECTOR COMPT DRAIN VALVE LEAKED ONTO BLUE STONE - SPILL CONTAINED WITH ABSORBANTS - SPILL SHOULD BE CLEANED UP BY 16:00HRS

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 18 WORLD TRADE CTR SUB-STAT.
BARCLAY ST

Spill Number: 9602772

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: 66 BARCLAY ST
Revised zip code: 10007

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name: STEVE ROMERO
 DEC Investigator: ENGELHARDT

Spiller: WORLD TRADE CTR SUB-STAT.
 Notifier Name: MR PELLEGRINO
 Caller Agency: CON ED
 Contact for more spill info: MR PELLEGRINO

Spiller Phone: (212) 460-3849
 Notifier Phone: (212) 460-3849
 Caller Phone: (212) 580-6763
 Contact Person Phone: (212) 460-3849

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
05/28/1996		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?	
DIELECTRIC FLUID	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO	

Caller Remarks: CALLER STATED THERE IS 'A LEAKY PIECE OF EQUIPMENT' ON BLUE STONE SCHEDULED FOR CLEAN UP AT 1600

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 19 FEEDER 38M11
 66 BARKLAY ST

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
 Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED
 ADDRESS CHANGE INFORMATION
 Revised street: 66 BARCLAY ST
 Revised zip code: 10007

Close Date:

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name: TIM SOLICH
 DEC Investigator: O'CONNELL

Spiller: CON EDISON
 Notifier Name: MISS MARKS
 Caller Agency: CON ED
 Contact for more spill info: CALLER

Spiller Phone: (212) 560-6763
 Notifier Phone: (212) 338-4028
 Caller Phone: (212) 580-6763
 Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
04/24/1996		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled		Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID		PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: fedder #38m11 b-phase pot head is wet and dripping 1 drop per day onto blue stone clean up to be scheduled - absorbant pads being used to contain wetness on pot head

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 20 CON ED SUB STATION
66 BARCLAY ST

Spill Number: 9600536

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL

Notifier Type: RESPONSIBLE PARTY

Caller Name: JOE DEVOTI

DEC Investigator: ENGELHARDT

Spiller: CON EDISON

Notifier Name: MR BRYAN

Caller Agency: CON EDISON

Contact for more spill info: JOE DEVOTI

Spiller Phone: (212) 560-6763

Notifier Phone: (212) 580-6763

Caller Phone: (212) 580-6763

Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
04/11/1996		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
D-2	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	YES

Caller Remarks: 1/2 gal die electric fluid spilled and is contained

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 21 BARCLAY ST & W BROADWAY
BARCLAY ST & W BROADWAY

Spill Number: 8810172

Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: BARCLAY ST / W BROADWAY

Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL

Notifier Type: RESPONSIBLE PARTY

Caller Name:

DEC Investigator: ENGELHARDT

Spiller: CON ED

Notifier Name:

Caller Agency:

Contact for more spill info:

Spiller Phone:

Notifier Phone:

Caller Phone:

Contact Person Phone:

Spill Class: KNOWN RELEASE THAT CREATES POTENTIAL FOR FIRE OR HAZARD;DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
08/25/1988		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled	Material Class		Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM		3000	GALLONS	NO	0	GALLONS	NO

Caller Remarks: Reported by Con Ed as required under Consent Order.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 22 TRADE CENTER SUB STATION
66 BARCLAY ST

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

Spill Number: 0103304
MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: NO CHANGE
Revised zip code: UNKNOWN

Close Date:

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name:
DEC Investigator: FOLEY

Spiller: CON ED
Notifier Name:
Caller Agency:
Contact for more spill info: CALLER

Spiller Phone: () -
Notifier Phone:
Caller Phone:
Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
06/26/2001		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled	Material Class		Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
UNKNOWN MATERIAL	UNKNOWN		1.00	GALLONS	NO	1.00	GALLONS	NO

Caller Remarks: 1 oz unknown oily liquid leaked from a con ed light fixture mounted to outside wall of substation onto a con ed mailbox mounted to outside wall. The material was cleaned up. Treated as over 50 ppm pcb's. Sample will be taken. con ed #137875

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 23 **TRANSFORMER 6**
WORLD TRADE CENTER

Spill Number: 0101962 **Close Date:**

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (6)
 Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
 Revised zip code: UNKNOWN

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name:
 DEC Investigator: FOLEY

Spiller: CON ED
 Notifier Name:
 Caller Agency:
 Contact for more spill info: CHARLIE MCCARTHY

Spiller Phone: () -
 Notifier Phone:
 Caller Phone:
 Contact Person Phone: (212) 580-6765

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended		
05/21/2001		EQUIPMENT FAILURE	ON LAND	NO	NO		
Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: 2 ounces, none hit the ground. no sewer/water. con ed#137199

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 24 **SUB STATION**
1 WORLD TRADE CENTER

Spill Number: 0101830 **Close Date:**

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
 Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
 Revised zip code: 10007

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name:
 DEC Investigator: O'CONNELL

Spiller: CON ED
 Notifier Name:
 Caller Agency:
 Contact for more spill info: CHARLIE MCCARTHY

Spiller Phone: () -
 Notifier Phone:
 Caller Phone:
 Contact Person Phone: (212) 580-6765

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
05/17/2001		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	1.00	GALLONS	NO	1.00	GALLONS	NO

Caller Remarks: leaking switch on c phase ref #137146

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 25 TRADE CENTER # 1 SUBSTATI
66 BARKLEY ST

Spill Number: 0010228 Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

MANHATTEN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: 66 BARCLAY ST

Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL

Notifier Type: RESPONSIBLE PARTY

Caller Name:

DEC Investigator: FOLEY

Spiller: CON EDISON

Notifier Name:

Caller Agency:

Contact for more spill info: RICHARD ROACH

Spiller Phone: (212) 580-6763

Notifier Phone:

Caller Phone:

Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
12/12/2000		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	0	GALLONS	YES	0	GALLONS	NO

Caller Remarks: active leak...crew enroute to fix problem...ref #134725.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 26 WORLD TRADE CENTER SUB
66 BARCLAY ST

Spill Number: 0006479 Close Date:

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name:
 DEC Investigator: O'CONNELL

Spiller: CON ED
 Notifier Name:
 Caller Agency:
 Contact for more spill info: CALLER

Spiller Phone: () -
 Notifier Phone:
 Caller Phone:
 Contact Person Phone: () -

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
08/31/2000		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
UNKNOWN PETROLEUM	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: cable failure spilling 1 oz of fluid clean up pending test results

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

THE FOLLOWING ACTIVE SPILLS FOR THIS CATEGORY WERE REPORTED BETWEEN 1/4 MILE AND THE SEARCH AREA MILE FROM THE SUBJECT ADDRESS. THESE SPILL WERE REPORTED TO BE LESS THAN 100 UNITS IN QUANTITY AND CAUSED BY: EQUIPMENT FAILURE, HUMAN ERROR, TANK OVERFILL, DELIBERATE SPILL, TRAFFIC ACCIDENT, HOUSEKEEPING, ABANDONED DRUM, OR VANDALISM. THESE SPILLS ARE NEITHER MAPPED NOR PROFILED IN THIS REPORT.

FACILITY ID FACILITY NAME
 No dropped spills found for this category

STREET

CITY



NO CLOSED STATUS TANK FAILURES IDENTIFIED WITHIN THE SEARCH AREA



NO CLOSED STATUS TANK TEST FAILURES IDENTIFIED WITHIN THE SEARCH AREA



CLOSED STATUS UNKNOWN CAUSE SPILLS AND OTHER CAUSE SPILLS IDENTIFIED WITHIN THE SEARCH AREA

* - Compass directions can vary substantially for sites located very close to the subject property address.

Map Identification Number 27 **MANHOLE #61063**
 VESEY ST / WASHINGTON ST

Spill Number: 9901819 Close Date: 09/15/1999

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
 Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
 Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name: MIKE CESARE
 DEC Investigator: O'CONNELL

Spiller: CON EDISON
 Notifier Name: HEFFERNAN
 Caller Agency: CON EDISON
 Contact for more spill info:

Spiller Phone: (212) 580-6763
 Notifier Phone: (212) 580-6764
 Caller Phone: (212) 580-6763
 Contact Person Phone:

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
05/17/1999		UNKNOWN	ON LAND		NO		NO	
Material Spilled	Material Class		Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
UNKNOWN PETROLEUM	PETROLEUM		20.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: CASE #124926

DEC Investigator Remarks: con ed e2mis notes: Approx 20 gals of unknown oil mixed with approx 2000 gals of water. No observed visual movement, no entry to waterway or sewer, foundational cracks not verified, sump not verified, pcb sample was taken and tag was placed. No Pilc in this structure. PCb count <1ppm J.Tyndall reports clean up complete in mh. N/S Vesey St. 36' E/O Washington St. on 5/18/99 @ 22:00 hrs. The clean up was started on 5/17/99 @ 15:00 hrs. A total of 12,800 gals was removed to tankers due to a fresh water leak at the time of the clean up. DEP was on location to investigate and repair the leak. The cleanup was started as >50 pending PCB analysis. Lab report <1ppm pcb Crews then changed over to the <50 ppm clean up procedures. generated 2 drums PPE. Used flush truck to clean and rinse structure. Unknown oil 20 gal AROCLOR 1254 20 GAL PCB 0PPM AROCLOR 1242 1PPM AROCLOR 1254 1PPM AROCLOR 1260 1PPM

Map Identification Number 28 **HUDSON RIVER**
1 WORLD TRADE CENTER

Spill Number: 9815253

Close Date: 03/24/1999

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

NEW YORK, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: 10048

Source of Spill: UNKNOWN
 Notifier Type: CITIZEN
 Caller Name: JOE VILARDO
 DEC Investigator: ZHAO

Spiller: UNKNOWN
 Notifier Name: JOE VILARDO
 Caller Agency: CITIZEN

Contact for more spill info:

Spiller Phone:
 Notifier Phone: (212) 938-7055
 Caller Phone: (212) 938-7055
 Contact Person Phone:

Spill Class: POSSIBLE REL WITH MIN POTENTIAL FOR FIRE OR HAZARD (OR KNOWN REL W/ NO DAMAGE);NO DEC RESP;WILLING RP;CORR ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended		
03/24/1999		UNKNOWN	SURFACE WATER	NO	NO		
Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
UNKNOWN PETROLEUM	PETROLEUM	0	GALLONS	YES	0	GALLONS	YES

Caller Remarks: CALLER WAS LOOKING OUT WINDOW AT WORK AND NOTICED A BLUISH/TAN SHEEN IN RIVER.

DEC Investigator: REFERRED TO NYCDEP.
 Remarks:

Map Identification Number 29 **ONE WORLD TRADE CENTER**
1 WORLD TRADE CENTER

Spill Number: 9412434

Close Date: 12/16/1997

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

NEW YORK CITY, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: 10048

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: OTHER
 Caller Name: PAUL MAULLO
 DEC Investigator:

Spiller: EX-TENANT
 Notifier Name:
 Caller Agency: PORT AUTHORITY OF NY&NJ
 Contact for more spill info:

Spiller Phone: (212) 435-5571
 Notifier Phone:
 Caller Phone: (201) 216-2893
 Contact Person Phone:

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
12/16/1994	12/16/1997	UNKNOWN	ON LAND	YES	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
UNKNOWN PETROLEUM	PETROLEUM	20.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: PIN HOLE IN 55 GAL. DAR. -CONCRETE FLOOR, CLEANING UP WITH SPEEDY DRY.

DEC Investigator 10/10/95: This is additional information about material spilled from the translation of the old spill
Remarks: file: HYDRO AERO CARBONS.

Map Identification Number 30 NO.TOWER/WORLD TRADE CENT
NO TOWER/WORLD TRADE CENT

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

Spill Number: 8903689
NEW YORK CITY, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: 1 WORLD TRADE CENTER
Revised zip code: 10048

Close Date: 07/13/1989

Source of Spill: UNKNOWN
Notifier Type: CITIZEN
Caller Name: GERALD GREGORY
DEC Investigator: SIGONA

Spiller: UNKNOWN
Notifier Name:
Caller Agency: 73FL/WORLD TRADE CENTER
Contact for more spill info:

Spiller Phone:
Notifier Phone:
Caller Phone: (212) 466-8716
Contact Person Phone:

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
07/13/1989	07/13/1989	UNKNOWN	SURFACE WATER	UNKNOWN	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
UNKNOWN PETROLEUM	PETROLEUM	-1.00	UNKNOWN	NO	0.00	UNKNOWN	NO

Caller Remarks: POSSIBLE OIL SLICK SPOTTED AT BOAT MARINA NEAR WORLD TRADE CENTER, 2000FT X 150FT AREA, POSSIBLY COMING FROM BARGE IN AREA.

DEC Investigator 07/13/89: DEC NOTIFIED USCG (WASSERMAN). 07/13/89: USCG WILL NOT INVESTIGATE OIL SHEEN DUE TO RAINY WEATHER
Remarks: CONDITIONS. 10/10/95: This is additional information about material spilled from the translation of the old spill file: OIL SLICK.

Map Identification Number 31 1 WORLD TRADE CENTER/MANH
1 WORLD TRADE CTR/LEV B-5

Spill Number: 8900023

Close Date: 06/20/1995

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

NEW YORK CITY, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: 1 WORLD TRADE CENTER

Revised zip code: 10048

Source of Spill: OTHER NON COMM/INSTITUTIONAL

Notifier Type: RESPONSIBLE PARTY

Caller Name: LOU NORCIA

DEC Investigator: FINGER

Spiller: PORT AUTHORITY OF NY & NJ

Notifier Name:

Caller Agency: PORT AUTHORITY OF NY & NJ

Contact for more spill info:

Spiller Phone:

Notifier Phone:

Caller Phone: (212) 466-8461

Contact Person Phone:

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
04/03/1989	06/20/1995	UNKNOWN	ON LAND	UNKNOWN	NO

NO MATERIAL INFORMATION GIVEN FOR THIS SITE

Caller Remarks: MOMOMETER WAS BROKEN CAUSING (1) OUNCE OF MERCURY TO SPILL ON FLOOR, WENT THROUGH GRATING FROM LEVEL B-5 TO B-6, RADIAC TO DO CLEAN UP, NYCDEP NOTIFIED,NO AFFECT ON DRAINS OR VENTILATION SYSTEM.

DEC Investigator Remarks: 10/10/95: This is additional information about material spilled from the translation of the old spill file: MERCURY (1) OUNCE.



CLOSED STATUS HAZARDOUS SPILLS - MISC. SPILL CAUSES - EQUIPMENT FAILURE, HUMAN ERROR, TANK OVERFILL, DELIBERATE SPILL, TRAFFIC ACCIDENT, HOUSEKEEPING, ABANDONED DRUM, AND VANDALISM - IDENTIFIED WITHIN THE SEARCH AREA.

All spills mapped and profiled within 1/4 Mile. Between 1/4 Mile and 'THE SEARCH AREA' Mile, spills reported to be greater than 100 units and spills reported to be less than 100 units are listed in a table at the end of this section.

* - Compass directions can vary substantially for sites located very close to the subject property address.

Map Identification Number 32**TRADE CENTER SUB STATION**

66 BARCLAY ST

Spill Number: 9906461

Close Date: 09/30/1999

MANHATTAN, NY NO ZIP PROVIDED

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL

Notifier Type: RESPONSIBLE PARTY

Caller Name: MARK SCHLEGEL

DEC Investigator: O'CONNELL

Spiller: TRADE CENTER SUB STATION

Notifier Name: MARK SCHLEGEL

Caller Agency: CON ED

Contact for more spill info: MARK SCHLEGEL

Spiller Phone: (212) 580-6763

Notifier Phone: (212) 580-6763

Caller Phone: (212) 580-6763

Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
08/31/1999		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled		Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
HYDRAULIC OIL		PETROLEUM	0	GALLONS	YES	0	GALLONS	YES

Caller Remarks: 2 ounce leak from hose under an equipment lift-Spill is contained CON ED #127511

DEC Investigator Remarks: con ed e2mis notes: Approx 2-ounces hydraulic fluid on concrete floor...hydraulic fluid is leaking from hose under an equipment lift...spill contained and cleaned up. Pigs have been placed around equipment lift to control leak. Repairs to be made by manufacturer or substation maintenance. Cleanup was completed at 8:40hrs. Initial report was incorrect. The cleanup could not be completed due to the fact that some oil made its way under the equipment and it could not be reached. Some parts will have to be taken apart in order to complete the cleanup. The contractor who installed the machine will be brought in to make repairs and complete the cleanup.

Map Identification Number 33 **TRADE CENTER SUBSTATION**
66 BARCLAY ST

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

Spill Number: 9902540 **Close Date: 05/18/2000**
MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: NO CHANGE
Revised zip code: NO CHANGE

Source of Spill: COMMERCIAL VEHICLE
Notifier Type: RESPONSIBLE PARTY
Caller Name: STEVEN CRIBBIN
DEC Investigator: ENGELHARDT

Spiller: CON EDISON
Notifier Name: MR MCHUGH
Caller Agency: CON EDISON
Contact for more spill info: STEVEN CRIBBIN

Spiller Phone: (212) 580-6763
Notifier Phone: (212) 338-3352
Caller Phone: (212) 580-6763
Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
06/04/1999		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
TRANSFORMER OIL	PETROLEUM	1.00	GALLONS	NO	1.00	GALLONS	NO

Caller Remarks: leaked from high voltage test set-truck #40777- con ed #125332-unknown pcb count-1/2ounce product spilled which was cleaned up-sample taken

DEC Investigator Remarks: Con ed e2mis notes: Approx 1/2 oz has leaked onto the concrete floor. The affected area has been cleaned.

Map Identification Number 34 **MH 47895**
LIBERTY/WASHINGTON ST

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

Spill Number: 9900381 **Close Date: 04/26/1999**
MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: LIBERTY ST / WASHINGTON ST
Revised zip code: 10006

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: AFFECTED PERSONS
Caller Name: BILL MURPHY
DEC Investigator: O'CONNELL

Spiller: CON ED
Notifier Name: MR MARCY
Caller Agency: CON EDISON
Contact for more spill info: CALLER

Spiller Phone: () -
Notifier Phone: (212) 338-3352
Caller Phone: (212) 580-6763
Contact Person Phone: () -

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
04/10/1999		EQUIPMENT FAILURE	ON LAND	NO	NO

green and absorbents. What type of surface was the spill to? Metal/Cement. What clean-up procedure is being used? Scrubbing the affected areas with a degreaser and absorbents. What is the planned time of clean-up? The area was cleaned and pads were placed for containment. These pads will be removed when the repairs are made. This will be considered the final cleanup. Cleanup was completed on 3/4/99 at 10:30am.

Map Identification Number 36 **TRADE CENTER SUB STATION**
66 BARCLAY ST

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

Spill Number: 9813899 **Close Date: 02/25/1999**
MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: STEPHEN CRIBBIN
DEC Investigator: O'CONNELL

Spiller: CON ED
Notifier Name: MR CROWE
Caller Agency: CON ED
Contact for more spill info: STEPHEN CRIBBIN

Spiller Phone: (212) 580-6763
Notifier Phone: () -
Caller Phone: (212) 580-6763
Contact Person Phone: (212) 580-8576

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
02/16/1999		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
TRANSFORMER OIL	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: leak from the pump contained to concrete pad ref#123056

DEC Investigator Remarks: Con ed e2mis notes: 4 oz (rate - 1 drop per day) of transformer dielectric fluid from 138K transformer #1 at trade center sub station. Leaked on to transformer concrete pad, placed absorb pads did not enter bluestone, sewer or waterways. Leak was from a oil pump main body. Initial cleanup was completed. Oil is assumed 50-499 ppm pcb pending lab results. Repairs have been made by the transformer group. The transformer group was here today and repaired and cleaned up the oil leak on TR 1 oil pump. The flange was tightened on the defective pump. The affected area was scrubbed with simple green and absorbents. Assuming 50-499 ppm pcb (pending results of lab samples taken). Sample Type, oil, AROCLOR none: <1.00 ppm

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	2.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: leaking feeder con ed 124147 feeder is 18m34 sample taken clean up poss prior to sample results if ppm is -449

DEC Investigator Remarks: Con ed e2mis notes: Approximately 2 gallons of dielectric cable oil on top of 300 gallons of water. No smoke , no fire no sump running, no sewer connection. AROCLOR : None PCB <1.00ppm Removed 500 gals water to tanker. Generated 2 drums PPE Used flush truck to clean and rinse structure. Removed spill tag upon completion.

Map Identification Number 35 TRADE CENTER SUB STATION
66 BARCLAY ST

MAP LOCATION INFORMATION
Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

Spill Number: 9814191
MANHATTAN, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: NO CHANGE
Revised zip code: NO CHANGE

Close Date: 03/09/1999

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: TONY CONSTANTINE
DEC Investigator: O'CONNELL

Spiller: TRADE CENTER SUB STATION
Notifier Name: TONY CONSTANTINE
Caller Agency: CON EDISON
Contact for more spill info: TONY CONSTANTINE

Spiller Phone: (212) 580-6763
Notifier Phone: (212) 580-6763
Caller Phone: (212) 580-6763
Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
02/25/1999		EQUIPMENT FAILURE	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	YES

Caller Remarks: 1 OUNCE SPILLED ONTO CONCRETE-REPAIS AND CLEANUP TO FOLLOW-LAB SAMPLES WERE TAKEN. CON ED #123281

DEC Investigator Remarks: Con ed e2mis notes: Approx 1 ounce of dielectric fluid leaking from pump#1 in the oil pump house #1 in the T.C station. Cleaned up spill and installed oil absorbant pads under leak. Drip rate is 1 drop per day. Sample taken and tag installed. Found while responding to oil alarm. No entry into sewer or waterways contained no release. They also said that the leak is part of the design of the pump to lubricate the pump. It is designed to have one drop a day while it is running in hand position. The mtc are going to correct this by making up permanent drip pans to collect the oil to avoid any leak. Today they are going to change the pads and come back when the drip pans are made. How was the spill cleaned? Area wiped clean with simple

Map Identification Number 37 **TRADE CENTER SUB STATION**
66 BARCLAY ST**MAP LOCATION INFORMATION**

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED
Spill Number: 9804562
ADDRESS CHANGE INFORMATION
Revised street: NO CHANGE
Revised zip code: NO CHANGE**Close Date: 08/20/1998**Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: MIKE CESARE
DEC Investigator: ENGELHARDTSpiller: CON EDISON
Notifier Name: BOSZE
Caller Agency: CON EDISON
Contact for more spill info: MIKE CESARESpiller Phone: (212) 580-6763
Notifier Phone: (212) 580-6763
Caller Phone: (212) 580-6763
Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
07/10/1998		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?	
TRANSFORMER OIL	PETROLEUM	5.00	GALLONS	NO	0.00	GALLONS	YES	

Caller Remarks: TRANSFORMER # 8 AT TRADE CENTER LEAKED ABOUT 5 OZ OIL ONTO SOIL PART TIGHTENED UP AND RECOVERY IN PROCESS.

DEC Investigator Remarks: 8/3/98 e-mail from ERT Lukshides responding to previous inquiry: PCB concentration? 10 PPM PCB. Spill cleaned? Clean up complete 30 JUL 98 @ 1400. How? Transformer was replaced, concrete pad steamed and bluestone removed.

Map Identification Number 38 **WORLD TRADE CENTER SS**
66 BARCLAY ST**MAP LOCATION INFORMATION**

Site location mapped by: ADDRESS MATCHING

Approximate distance from property: 0 feet

MANHATTAN, NY NO ZIP PROVIDED
Spill Number: 9804167
ADDRESS CHANGE INFORMATION
Revised street: NO CHANGE
Revised zip code: NO CHANGE**Close Date: 08/27/1998**Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: MIKE CESARE
DEC Investigator: O'CONNELLSpiller: CON ED
Notifier Name: BOSE
Caller Agency: CON EDISON
Contact for more spill info:Spiller Phone: (212) 580-6763
Notifier Phone: (212) 580-6763
Caller Phone: (212) 580-6763
Contact Person Phone:

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
07/02/1998		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled		Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID		PETROLEUM	0	GALLONS	YES	0	GALLONS	YES

Caller Remarks: CALLER REPORTING A LEAK IN OIL PRESSURE SWITCH. THIS WILL BE CORRECTED ON 7/3/98.

DEC Investigator Remarks: 8/27/98: Update from ERT Perez - E2MIS # 118007 Resp. Organization: Trade Center Substation. Final Leak amount 2 Drops on cement, the rest collected in pan. Cleanup completed on 7/2/98. Leaky valve tightened on 7/29/98.

Map Identification Number 39 TRADE CENTER SUBSTATION
TRADE CENTER SUBSTATION

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (3)
Approximate distance from property: 0 feet

Spill Number: 9707175

Close Date: 10/14/1997

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: UNKNOWN

Source of Spill: OTHER NON COMM/INSTITUTIONAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: MIKE CESARE
DEC Investigator: O'CONNELL

Spiller: CON ED
Notifier Name: MIKE CESARE
Caller Agency: CON EDISON
Contact for more spill info: CALLER

Spiller Phone: (212) 580-6764
Notifier Phone: (212) 580-6763
Caller Phone: (212) 580-6763
Contact Person Phone: (212) 580-6763

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
09/17/1997		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled		Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID		PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: pot head leaking / 1 oz.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 40 **TRADE CENTER**
66 BARCLAY STREET

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: STEVE ROMERO
DEC Investigator: ENGELHARDT

Spiller: CON EDISON
Notifier Name: MR ABLE
Caller Agency: CON ED
Contact for more spill info: SAME

Spill Number: 9706616**Close Date: 07/16/1998**

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: NO CHANGE

Spiller Phone:
Notifier Phone: (212) 338-4029
Caller Phone: (212) 580-6763
Contact Person Phone:

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
09/03/1997		EQUIPMENT FAILURE	ON LAND		NO		NO	
Material Spilled		Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
NON PCB OIL		PETROLEUM	-1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: CON ED REPORTS FAILURE OF A FEEDER LINE CAUSED THE LEAK.

DEC Investigator 7/16/98 E2MIS Report indicates 2 oz. spilled contained with pads and pan/
Remarks:

Map Identification Number 41 **TRADE CENTER SUB STATION**
WORLD TRADE CENTER

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (3)
Approximate distance from property: 0 feet

Source of Spill: OTHER COMM/INDUSTRIAL
Notifier Type: RESPONSIBLE PARTY
Caller Name: LISA PRIMEGGIA
DEC Investigator: ENGELHARDT

Spiller: CON ED
Notifier Name: LISA PRIMEGGIA
Caller Agency: CON ED
Contact for more spill info:

Spill Number: 9706554**Close Date: 09/02/1997**

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: 10048

Spiller Phone: (212) 580-6764
Notifier Phone: (212) 580-6763
Caller Phone: (212) 580-6763
Contact Person Phone:

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected		Meets Cleanup Standards		Penalty Recommended	
09/01/1997		EQUIPMENT FAILURE	ON LAND		NO		NO	

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIELECTRIC FLUID	PETROLEUM	2.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: TRANSFORMER PRIMARY POT HEAD LEAKED OIL ON CEMENTE AND BLUE STONE CLEAN CREW HAS BEEN CONTACTED

DEC Investigator: CLEANED BY CE.
Remarks:

Map Identification Number 42 **MARIOTT HOTEL**
3 RURAL TRADE CENTER

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

Spill Number: 9514293
MANHATTEN, NY NO ZIP PROVIDED

Close Date: 02/09/1996

ADDRESS CHANGE INFORMATION
Revised street: 3 WORLD TRADE CTR
Revised zip code: 10048

Source of Spill: PASSENGER VEHICLE
Notifier Type: POLICE DEPARTMENT
Caller Name: MR PAUGH
DEC Investigator: KRIMGOLD

Spiller: LONNYS HACKING CORP
Notifier Name: SECURITY
Caller Agency: PORT AUTHORITY
Contact for more spill info:

Spiller Phone: (212) 586-3835
Notifier Phone: (212) 435-3540
Caller Phone: (212) 435-3540
Contact Person Phone: (212) 938-2312

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
02/09/1996		TRAFFIC ACCIDENT	ON LAND	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
WASTE OIL	PETROLEUM	1.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: car ran into hotel spilled engine oil.

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 43 **LIBERTY STREET**
LIBERTY ST / GREENWICH ST

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

Spill Number: 9414473
2 WORLD TRD. CTR. NYC, NY NO ZIP PROVIDED
ADDRESS CHANGE INFORMATION
Revised street: 2 WORLD TRADE CENTER
Revised zip code: 10048

Close Date: 02/02/1995

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: RESPONSIBLE PARTY
 Caller Name: ANNIE RICHA
 DEC Investigator: K. TANG

Spiller: ATTARO
 Notifier Name:
 Caller Agency: NYCDEP
 Contact for more spill info:

Spiller Phone: (212) 435-3541
 Notifier Phone:
 Caller Phone: (718) 595-6777
 Contact Person Phone:

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
02/02/1995	02/02/1995	HUMAN ERROR	IN SEWER	UNKNOWN	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIESEL	PETROLEUM	30.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: FROM A 55 GALLON DRUM, SPILL WEST TO THE SEWER SYSTEM. CALLED PORT AUTHORITY POLICE, ONLY 15'-20' SIDEWALK SUSPECTED, TURNER CONSTRUCTION TOGETHER WITH PORT AUTHORITY IS CLEANING UP SPILL, DEP NOTIFI

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 44 PORT AUTHORITY
 WORLD TRADE CENTER

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
 Approximate distance from property: 0 feet

Spill Number: 9410257
 Close Date: 11/01/1994
 WEST STREET, NY NY, NY NO ZIP PROVIDED
 ADDRESS CHANGE INFORMATION
 Revised street: WEST STREET
 Revised zip code: NO CHANGE

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: OTHER
 Caller Name: TOM CANCELLIERE
 DEC Investigator: tomasello

Spiller: BANK OF AMERICA
 Notifier Name:
 Caller Agency: PORT AUTHORITY OF NY & NJ
 Contact for more spill info:

Spiller Phone: () -
 Notifier Phone:
 Caller Phone: (212) 435-8518
 Contact Person Phone:

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
11/01/1994	11/01/1994	EQUIPMENT FAILURE	ON LAND	UNKNOWN	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIESEL	PETROLEUM	100.00	GALLONS	NO	0.00	GALLONS	NO
DIESEL	PETROLEUM	0	UNKNOWN	NO	0	UNKNOWN	NO

Caller Remarks: DIESEL LEAKED FROM TAN, NY FIRE DEPT. ON SCENE. NOTIFIED FUEL SUPPLIER FIRE & FUEL CO. TO CLEAN TONIGHT. NO CALL BACK REQUESTED.

DEC Investigator Remarks: 11/01/94: TOMASELLO CALLED PA OPPS CENTER SPILL IN PROGRESS. NO SEWERS AFFECTED SPILL ON CONCRETE. VERIFIED BY FIRE.

Map Identification Number 45 **WEST & LIBERTY AVENUE**
WEST & LIBERTY AVE.

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
Approximate distance from property: 0 feet

Source of Spill: TANK TRUCK
Notifier Type: RESPONSIBLE PARTY
Caller Name: LELAND POWERS
DEC Investigator: CAMMISA

Spiller: MYSTIC TRANSPORTATION
Notifier Name:
Caller Agency: MYSTIC TRANSP.
Contact for more spill info:

Spiller Phone:
Notifier Phone:
Caller Phone: (800) 635-3835
Contact Person Phone:

Spill Number: 9310244

Close Date: 11/23/1993

MANHATTAN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION
Revised street: WEST ST / LIBERTY ST
Revised zip code: 10006

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
11/23/1993	11/23/1993	EQUIPMENT FAILURE	ON LAND	UNKNOWN	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
#2 FUEL OIL	PETROLEUM	20.00	GALLONS	NO	0.00	GALLONS	NO

Caller Remarks: SUSPECT VIBRATION LOOSENED PIPE OR HOSE - OIL LEAKED TO PAVED ST. - SERVICE CREW ENROUTE TO CLEAN SPILL - LEAK IS STOPPED BY CLOSING CONTROL VALVES - NYC PD & NYCFD & NYC DEP NOTIFIED CLEAN BY SPILLER

DEC Investigator Remarks: NO DEC INVESTIGATOR REMARKS GIVEN FOR THIS SPILL.

Map Identification Number 46 **WORLD TRADE CENTER/MANHAT**
BARLY STREET

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (6)
Approximate distance from property: 0 feet

Spill Number: 8902448

Close Date: 06/08/1989

NEW YORK CITY, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION
Revised street: BARCLAY ST
Revised zip code: 10048

Source of Spill: COMMERCIAL VEHICLE
 Notifier Type: RESPONSIBLE PARTY
 Caller Name: LEWIS MARCIA
 DEC Investigator: TOMASELLO

Spiller: PORT AUTHORITY
 Notifier Name:
 Caller Agency: PORT AUTHORITY
 Contact for more spill info:

Spiller Phone:
 Notifier Phone:
 Caller Phone: (212) 466-8461
 Contact Person Phone:

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
06/08/1989	06/08/1989	HUMAN ERROR	ON LAND	UNKNOWN	NO

NO MATERIAL INFORMATION GIVEN FOR THIS SITE

Caller Remarks: SPILL AT FLOATING DOCK, EPA, DEP NOTIFIED, FIRE DEPT HAZ MAT ON SCENE, FIRE DEPT WASHING DOCK, CONTRACTOR TO REMOVE REMAINING BOTTLES, SPILL WASHED DOWN DRAIN, DEP WILL OVERSEE BOTTLE REMOVAL.

DEC Investigator Remarks: 10/10/95: This is additional information about material spilled from the translation of the old spill file: AMMOMIUM HYROXIDE.

Map Identification Number 47

VESEY ST/WEST ST

MAP LOCATION INFORMATION

Site location mapped by: ADDRESS MATCHING
 Approximate distance from property: 0 feet

Spill Number: 0102939

Close Date: 06/17/2001

MANHATTEN, NY NO ZIP PROVIDED

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
 Revised zip code: UNKNOWN

Source of Spill: OTHER COMM/INDUSTRIAL
 Notifier Type: FIRE DEPARTMENT
 Caller Name:
 DEC Investigator: DEMEO

Spiller: UNKNOWN
 Notifier Name:
 Caller Agency:
 Contact for more spill info: NYC FIRE DEPT

Spiller Phone: () -
 Notifier Phone:
 Caller Phone:
 Contact Person Phone: (212) 570-4261

Spill Class: KNOWN RELEASE WITH MINIMAL POTENTIAL FOR FIRE OR HAZARD;NO DEC RESPONSE;WILLING RP;CORRECTIVE ACTION TAKEN

Spill Date	Date Cleanup Ceased	Cause of Spill	Resource Affected	Meets Cleanup Standards	Penalty Recommended
06/16/2001		EQUIPMENT FAILURE	IN SEWER	NO	NO

Material Spilled	Material Class	Quantity Spilled	Units	Unk Quantity Spilled ?	Quantity Recovered	Units	Unk Quantity Recovered ?
DIESEL	PETROLEUM	30.00	GALLONS	NO	0.00	GALLONS	YES

Caller Remarks: FIRE DEPT ON SCENE OF ABOVE SPILL. MATERIAL CAUSED BY LEAK IN A GENERATOR. CLEANUP IS IN PROGRESS AT TIME OF CALL.

DEC Investigator All spilled material on concrete. Cleanup started by NYFD and completed by RP using absorbents.

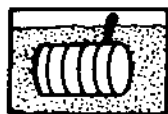
Remarks:

THE FOLLOWING CLOSED SPILLS FOR THIS CATEGORY WERE REPORTED BETWEEN 1/4 MILE AND THE FROM THE SUBJECT ADDRESS. THESE SPILLS WERE REPORTED TO BE LESS THAN 100 UNITS IN QUANTITY AND CAUSED BY: EQUIPMENT FAILURE, HUMAN ERROR, TANK OVERFILL, DELIBERATE SPILL, TRAFFIC ACCIDENT, HOUSEKEEPING, ABANDONED DRUM, OR VANDALISM. THESE SPILLS ARE NEITHER MAPPED NOR PROFILED IN THIS REPORT.

FACILITY ID FACILITY NAME
No dropped spills found for this category

STREET

CITY



*** PETROLEUM BULK STORAGE FACILITIES LESS THAN 400,000 GALLONS IDENTIFIED WITHIN THE SEARCH AREA ***

PLEASE NOTE: * Compass directions can vary substantially for sites located very close to the subject property address.

Map Identification Number 48

SALOMON SMITH BARNEY
7 WORLD TRADE CENTER

Facility Id 2-601553

Source: NYS DEC

NEW YORK, NY 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: NO CHANGE

Expiration Date of the facility's registration certificate: 07/27/2003
Facility Phone Number: (212) 783-6252

TANK NUMBER	TANK STATUS	TANK CONTENT	CAPACITY GALLONS	TANK LOCATION	INSTALL DATE	TEST DATE	CLOSE DATE
001	IN SERVICE	DIESEL	6000	UNDERGROUND			
002	IN SERVICE	DIESEL	6000	UNDERGROUND			

Toxicity Information Summary

CHEMICAL NAME	CAS-NO	ACUTE TOX	TUMOR TOX	MUTAG TOX	REPRO TOX	IRRIT TOX	MCL
DIESEL	68334305	X	X			X	

Map Identification Number 49

SEVEN WORLD TRADE CENTER
7 WORLD TRADE CENTER

Facility Id 2-602283

Source: NYS DEC

NEW YORK, NY 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: NO CHANGE

Expiration Date of the facility's registration certificate: 05/24/2004
Facility Phone Number: (212) 619-6569

TANK NUMBER	TANK STATUS	TANK CONTENT	CAPACITY GALLONS	TANK LOCATION	INSTALL DATE	TEST DATE	CLOSE DATE
001	IN SERVICE	#1 2 OR 4 FUEL OIL	11690	UNDERGROUND	12/01/1987		

002 IN SERVICE #1 2 OR 4 FUEL OIL 11690 UNDERGROUND 12/01/1987

Map Identification Number 50 ONE WORLD TRADE CENTER Facility Id 2-602234 Source: NYS DEC
 1 WORLD TRADE CENTER NEW YORK, NY 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
 Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
 Revised zip code: NO CHANGE

Expiration Date of the facility's registration certificate: 06/12/2005
 Facility Phone Number: (212) 310-4843

TANK NUMBER	TANK STATUS	TANK CONTENT	CAPACITY GALLONS	TANK LOCATION	INSTALL DATE	TEST DATE	CLOSE DATE
001	IN SERVICE	#1 2 OR 4 FUEL OIL	2500	ABOVEGROUND	08/01/1993		
002	IN SERVICE	#1 2 OR 4 FUEL OIL	2500	ABOVEGROUND	08/01/1993		

Map Identification Number 51 PORT AUTHORITY OF NEW YORK / N. JERSEY Facility Id 2-293563 Source: NYS DEC
 1 WORLD TRADE CENTER 88TH FLOOR SOUTH NEW YORK, NY 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
 Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: 1 WORLD TRADE CENTER
 Revised zip code: NO CHANGE

Expiration Date of the facility's registration certificate: 07/14/2002
 Facility Phone Number: (212) 435-8518

TANK NUMBER	TANK STATUS	TANK CONTENT	CAPACITY GALLONS	TANK LOCATION	INSTALL DATE	TEST DATE	CLOSE DATE
001	IN SERVICE	#1 2 OR 4 FUEL OIL	10000	ABOVEGROUND ON LEGS RACKS ETC			
002	IN SERVICE	#1 2 OR 4 FUEL OIL	5000	ABOVEGROUND ON LEGS RACKS ETC	03/01/1984		
003	IN SERVICE	#1 2 OR 4 FUEL OIL	275	ABOVEGROUND ON LEGS RACKS ETC	05/01/1970		
004	IN SERVICE	#1 2 OR 4 FUEL OIL	275	ABOVEGROUND ON LEGS RACKS ETC	03/01/1984		
005	IN SERVICE	#1 2 OR 4 FUEL OIL	1080	ABOVEGROUND			
006	CLOSED-RMVD FROM GROUND	EMPTY	55	NO INFO GIVEN			
007	IN SERVICE	#1 2 OR 4 FUEL OIL	275	ABOVEGROUND			

Map Identification Number 52 **PORT AUTHORITY OF NY & NJ**
5 WORLD TRADE CENTER

Facility Id 2-604231
NEW YORK, NY 10048

Source: NYS DEC

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: FIVE WORLD TRADE CENTER
Revised zip code: NO CHANGE

Expiration Date of the facility's registration certificate: 09/17/2004
Facility Phone Number: (212) 435-8518

TANK NUMBER	TANK STATUS	TANK CONTENT	CAPACITY GALLONS	TANK LOCATION	INSTALL DATE	TEST DATE	CLOSE DATE
008	IN SERVICE	#1 2 OR 4 FUEL OIL	10000	ABOVEGROUND ON LEGS RACKS ETC	06/01/1999		
009	IN SERVICE	#1 2 OR 4 FUEL OIL	10000	ABOVEGROUND ON LEGS RACKS ETC	06/01/1999		

Map Identification Number 53 **BELL ATLANTIC**
2 WORLD TRADE CENTER

Facility Id 2-344737
NEW YORK, NY 10048

Source: NYS DEC

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: NO CHANGE

Expiration Date of the facility's registration certificate: 08/23/2003
Facility Phone Number: (888) 696-3973

TANK NUMBER	TANK STATUS	TANK CONTENT	CAPACITY GALLONS	TANK LOCATION	INSTALL DATE	TEST DATE	CLOSE DATE
001	IN SERVICE	DIESEL	10000	ABOVEGROUND			
002	IN SERVICE	DIESEL	275	ABOVEGROUND			
003	IN SERVICE	DIESEL	275	ABOVEGROUND			
004	IN SERVICE	DIESEL	275	ABOVEGROUND			
005	IN SERVICE	DIESEL	100	ABOVEGROUND			

Toxicity Information Summary

CHEMICAL NAME	CAS-NO	ACUTE TOX	TUMOR TOX	MUTAG TOX	REPRO TOX	IRRIT TOX	MCL
DIESEL	68334305	X	X			X	

Map Identification Number 57**US CUSTOMS HOUSE**

6 WORLD TRADE CENTER-ROOM #300

NEW YORK, NY 10048

Facility Id: NY0001036573

EPA (FINDS) Name:

US CUSTOMS HOUSE

EPA (FINDS) Address:

6 WORLD TRADE CENTER - BASEMEN

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: 6 WORLD TRADE CENTER

Revised zip code: NO CHANGE

US EPA RCRA (Resource Conservation and Recovery Act) information not reported; Site information reported by NYS DEC.

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
D008	Lead	500	POUNDS	GENERATED	95

Toxicity Information Summary

CHEMICAL NAME	CAS-NO	ACUTE TOX	TUMOR TOX	MUTAG TOX	REPRO TOX	IRRIT TOX	MCL
Lead	7439921	X	X	X	X		0.05mg/L*

Map Identification Number 58**US CUSTOMS HOUSE**

6 WORLD TRADE CENTER-BASEMENT

NEW YORK, NY 10048

Facility Id: NY1470057802

EPA (FINDS) Name:

US CUSTOMS HOUSE

EPA (FINDS) Address:

6 WORLD TRADE CENTER-BASEMENT

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: 6 WORLD TRADE CENTER

Revised zip code: NO CHANGE

US EPA RCRA Type: Generator: SMALL QUANTITY GENERATOR

Land Disposal(LDF):

Incinerator:

Transporter:

Storage/Treatment (TSF):

Receives offsite waste:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
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NONE Site reported by US EPA. No hazardous waste activity reported to NYS.

Map Identification Number 59 UNITED STATES CUSTOMS SERVICE

6 WORLD TRADE CENTER

NEW YORK, NY 10048

Facility Id: NY4470002433

EPA (FINDS) Name:

US CUSTOMS SERVICE

EPA (FINDS) Address:

6 WORLD TRADE CENTER

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: 10006

US EPA RCRA Type: Generator:

Land Disposal(LDF):

Incinerator:

Storage/Treatment (TSF):

Receives offsite waste:

Transporter:

US EPA RCRA Violations: Violation Area: GENERATOR-ALL REQUIREMENTS

Violation Number: 1

Violation Class: 2

Violation Type:

Responsible Agency: STATE
Violation Determination Date: 08/26/94
Violation Priority:
Regulation:

Violation Area: GENERATOR-LAND BAN REQUIREMENTS

Violation Number: 2

Violation Class: 2

Violation Type:

Responsible Agency: STATE
Violation Determination Date: 08/26/94
Violation Priority:
Regulation:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
D001	Solid waste that exhibits the characteristic of ignitability	1800	GALLONS	GENERATED	94

Map Identification Number 60 UNITED STATES CUSTOMS SERVICE LAB

EPA (FINDS) Name:

6 WORLD TRADE CENTER ROOM 867

NEW YORK CITY, NY 10048

Facility Id: NYD078892510

EPA (FINDS) Address:

US CUSTOMS LABORATORY
6 WORLD TRADE CENTER RM 867

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: 10006

US EPA RCRA Type: Generator: SMALL QUANTITY GENERATOR

Land Disposal(LDF):

Incinerator:

Transporter:

Storage/Treatment (TSF):

Receives offsite waste:

US EPA RCRA Violations: Violation Area: GENERATOR-ALL REQUIREMENTS

Violation Number: 1

Violation Class: 2

Violation Type:

Responsible Agency: STATE

Violation Determination Date: 08/26/94

Violation Priority:

Regulation:

Violation Area: GENERATOR-LAND BAN REQUIREMENTS

Violation Number: 2

Violation Class: 2

Violation Type:

Responsible Agency: STATE

Violation Determination Date: 08/26/94

Violation Priority:

Regulation:

Violation Area: GENERATOR-MANIFEST REQUIREMENTS

Violation Number: 3

Violation Class: 2

Violation Type:

Responsible Agency: STATE

Violation Determination Date: 08/26/94

Violation Priority:

Regulation:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
D001	Solid waste that exhibits the characteristic of ignitability	2255	POUNDS	GENERATED	98
D002	Solid waste that exhibits the characteristic of corrosivity	146	POUNDS	GENERATED	98
D003	Solid waste that exhibits the characteristic of reactivity	15	POUNDS	GENERATED	98
D005	Barium	8	POUNDS	GENERATED	98
D008	Lead	25	GALLONS	GENERATED	98
D022	Chloroform	200	POUNDS	GENERATED	98
U036	Chlordane, alpha & gamma isomers	50	POUNDS	GENERATED	98
U052	Cresol (Cresylic acid)	106	POUNDS	GENERATED	98
U144	Acetic acid, lead(2+) salt	6	POUNDS	GENERATED	98
U188	Phenol	25	POUNDS	GENERATED	98
U211	Carbon tetrachloride	45	POUNDS	GENERATED	98

D001	Solid waste that exhibits the characteristic of ignitability	22	GALLONS	GENERATED	97
D002	Solid waste that exhibits the characteristic of corrosivity	8	GALLONS	GENERATED	97
D006	Cadmium	90	POUNDS	GENERATED	97
D007	Chromium	50	POUNDS	GENERATED	97
D008	Lead	485	POUNDS	GENERATED	97
D009	Mercury	18	POUNDS	GENERATED	97
D042	2,4,6-Trichlorophenol	350	POUNDS	GENERATED	97
U135	Hydrogen sulfide	40	POUNDS	GENERATED	97
F001	Spent halogenated solvents used in degreasing	5	GALLONS	GENERATED	96
F003	Spent non-halogenated solvents	620	POUNDS	GENERATED	95
D004	Arsenic	1025	POUNDS	GENERATED	92

Toxicity Information Summary

CHEMICAL NAME	CAS-NO	ACUTE TOX	TUMOR TOX	MUTAG TOX	REPRO TOX	IRRIT TOX	MCL
Barium	7440393						1mg/L*
Lead	7439921	X	X	X	X		0.05mg/L*
Chloroform	67663	X	X	X	X	X	0.10 mg/L
Chlordane, alpha & gamma isomers	57749	X	X	X	X		5 ug/L
Cresol (Cresylic acid)	1319773	X	X				
Acetic acid, lead(2+) salt	301042	X	X	X	X		
Phenol	108952	X	X	X	X	X	50 ug/L
Carbon tetrachloride	56235	X	X	X	X	X	5 ug/L
Cadmium	7440439	X	X	X	X		.010mg/L*
Chromium	7440473	X	X				50ug/L*
Lead	7439921	X	X	X	X		0.05mg/L*
Mercury	7439976	X	X	X	X		.002mg/L*
2,4,6-Trichlorophenol	88062	X	X	X	X	X	5 ug/L
Hydrogen sulfide	7783064	X			X		
Arsenic	7440382	X	X	X	X		0.05mg/L*

Map Identification Number 61 PRUDENTIAL LINES INCORPORATED
1 WORLD TRADE CENTER

NEW YORK CITY, NY 10048

Facility Id: NYP000778688

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: 10006

US EPA RCRA (Resource Conservation and Recovery Act) information not reported; Site information reported by NYS DEC.

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
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NONE No hazardous waste activity reported to NYS 1/89 to 1/1/99.

Map Identification Number 62

WPIX

NEW YORKC TIY, NY 10048

Facility Id: NYD982281412

EPA (FINDS) Name:

ONE WORLD TRADE CNETER

EPA (FINDS) Address:

WPIX FM & TV TRANSMITTER

NEW YORK, 10048

#1 WORLD TRADE CENTER

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: 10006

US EPA RCRA Type: Generator: SMALL QUANTITY GENERATOR

Land Disposal(LDF):

Incinerator:

Transporter:

Storage/Treatment (TSF):

Receives offsite waste:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
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NONE No hazardous waste activity reported to NYS 1/89 to 1/1/99.

Map Identification Number 63

PORT AUTHORITY OF NEW YORK & NEW JERSEY

NEW YORK CITY, NY 10047

Facility Id: NYD981077480

EPA (FINDS) Name:

ONE WORLD TRADE CENTER

EPA (FINDS) Address:

WORLD TRADE CENTER OPERATIONS

NEW YORK, 10048

1 WORLD TRADE CENTER B2-107

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: 10006

US EPA RCRA Type: Generator: LARGE QUANTITY GENERATOR

Land Disposal(LDF):

Incinerator:

Transporter:

Storage/Treatment (TSF):

Receives offsite waste:

US EPA RCRA Violations: Violation Area: GENERATOR-ALL REQUIREMENTS
 Violation Number: 1
 Violation Class: 1
 Violation Type:

Responsible Agency: STATE
 Violation Determination Date: 01/27/87
 Violation Priority:
 Regulation:

Violation Area: GENERATOR-ALL REQUIREMENTS
 Violation Number: 2
 Violation Class: 1
 Violation Type:

Responsible Agency: STATE
 Violation Determination Date: 08/13/90
 Violation Priority:
 Regulation:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
D001	Solid waste that exhibits the characteristic of ignitability	102	GALLONS	GENERATED	98
D002	Solid waste that exhibits the characteristic of corrosivity	12600	POUNDS	GENERATED	98
D009	Mercury	38000	POUNDS	GENERATED	98
D039	Tetrachloroethylene	1545	GALLONS	GENERATED	98
D002	Solid waste that exhibits the characteristic of corrosivity	55	GALLONS	GENERATED	97
D003	Solid waste that exhibits the characteristic of reactivity	60	GALLONS	GENERATED	97
D008	Lead	5	GALLONS	GENERATED	97
B004	PCB Articles containing 50 ppm or greater of PCBs but less than 500 ppm PCBs.	9236	KILOGRAMS	GENERATED	96
B005	PCB Articles containing 500 ppm or greater of PCBs, excluding small capacitors.	4754	KILOGRAMS	GENERATED	96
D001	Solid waste that exhibits the characteristic of ignitability	519	POUNDS	GENERATED	96
B007	Other PCB Wastes including contaminated soil, solids, sludges, clothing, etc.	3822	KILOGRAMS	GENERATED	95
D004	Arsenic	55	GALLONS	GENERATED	95
D008	Lead	495	POUNDS	GENERATED	95
F001	Spent halogenated solvents used in degreasing	50	GALLONS	GENERATED	95
F002	Spent halogenated solvents	110	GALLONS	GENERATED	95
D011	Silver	300	GALLONS	GENERATED	94
D011	Silver	50	POUNDS	GENERATED	92
U226	Ethane, 1,1,1-trichloro-	6	GALLONS	GENERATED	92

Toxicity Information Summary

CHEMICAL NAME	CAS-NO	ACUTE TOX	TUMOR TOX	MUTAG TOX	REPRO TOX	IRRIT TOX	MCL
Mercury	7439976	X	X	X	X		.002mg/L*
Tetrachloroethylene	127184	X	X	X	X	X	5 ug/L
Lead	7439921	X	X	X	X		0.05mg/L*
PCB Articles containing 50 ppm or greater of PCBs but less t	1336363	X	X		X		5 ug/L
Arsenic	7440382	X	X	X	X		0.05mg/L*
Lead	7439921	X	X	X	X		0.05mg/L*

Silver	7440224		X					0.05mg/L*
Ethane, 1,1,1-trichloro-	71556	X	X	X	X	X		5 ug/L

Map Identification Number 64 **CHEMICAL BANK** **Facility Id: NYD986895084**
1 WORLD TRADE CENTER 83RD FL NEW YORK, NY 10048
EPA (FINDS) Name: CHEMICAL BANK
EPA (FINDS) Address: 1 WORLD TRADE CENTER 83RD FL NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: 1 WORLD TRADE CENTER

Revised zip code: NO CHANGE

US EPA RCRA Type: Generator: LARGE QUANTITY GENERATOR

Land Disposal(LDF):

Incinerator:

Transporter:

Storage/Treatment (TSF):

Receives offsite waste:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
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NONE Site reported by US EPA. No hazardous waste activity reported to NYS.

Map Identification Number 65 **EVERGREEN MARINE CORP** **Facility Id: NYD078863602**
1 WORLD TRADE CENTER RM 162 NEW YORK, NY 10048
EPA (FINDS) Name: EVERGREEN MARINE CORP.
EPA (FINDS) Address: ONE WORLD TRADE CENTER RM 162 NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: ONE WORLD TRADE CENTER

Revised zip code: NO CHANGE

US EPA RCRA Type: Generator:

Land Disposal(LDF):

Incinerator:

Transporter: YES

Storage/Treatment (TSF):

Receives offsite waste:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE WASTE
CODE DESCRIPTION

WASTE WASTE
AMOUNT UNITS

TRANSACTION
TYPE

YEAR

NONE Site reported by US EPA. No hazardous waste activity reported to NYS.

Map Identification Number 66 **ZIM-AMERICAN ISRAELI SHIPPING CO INC**
1 WORLD TRADE CTR STE 2969
EPA (FINDS) Name: ZIM-AMERICAN ISRAELI SHIPPING CO INC
EPA (FINDS) Address: ONE WORLD TRADE CTR SUITE 2969

NEW YORK, NY 10048

Facility Id: NYD044708550

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: ONE WORLD TRADE CTR
Revised zip code: NO CHANGE

US EPA RCRA Type: Generator:

Land Disposal(LDF):

Storage/Treatment (TSF):

Incinerator:

Receives offsite waste:

Transporter: YES

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE WASTE
CODE DESCRIPTION

WASTE WASTE
AMOUNT UNITS

TRANSACTION
TYPE

YEAR

NONE Site reported by US EPA. No hazardous waste activity reported to NYS.

Map Identification Number 67 **NEDLLOYD INC**
5 WORLD TRADE CENTER STE 617
EPA (FINDS) Name: NEDLLOYD INC
EPA (FINDS) Address: 5 WORLD TRADE CENTER SUITE 617

NEW YORK, NY 10048

Facility Id: NYD045441615

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: 5 WORLD TRADE CENTER
Revised zip code: NO CHANGE

US EPA RCRA Type: Generator: LARGE QUANTITY GENERATOR

Land Disposal(LDF):

Storage/Treatment (TSF):

Incinerator:

Receives offsite waste:

Transporter: YES

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
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NONE Site reported by US EPA. No hazardous waste activity reported to NYS.

Map Identification Number 68

VISTA INTERNATIONAL HOTEL

3 WORLD TRADE CENTER

NEW YORK, NY 10048

Facility Id: NYD047043856

EPA (FINDS) Name:

VISTA INTERNATIONAL HOTEL

EPA (FINDS) Address:

3 WORLD TRADE CTR

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: 10006

US EPA RCRA Type: Generator: SMALL QUANTITY GENERATOR

Land Disposal(LDF):

Incinerator:

Transporter:

Storage/Treatment (TSF):

Receives offsite waste:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
F002	Spent halogenated solvents	730	POUNDS	GENERATED	98
F001	Spent halogenated solvents used in degreasing	787	POUNDS	GENERATED	92

Map Identification Number 69

FUJI PHOTO FILM USA, INC

3 WORLD TRADE CTR - NY MARRIOTT

NEW YORK, NY 10048

Facility Id: NYR000039487

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: 3 WORLD TRADE CTR

Revised zip code: NO CHANGE

US EPA RCRA Type: Generator:

Land Disposal(LDF):

Incinerator:

Transporter:

Storage/Treatment (TSF):

Receives offsite waste:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
D011	Silver	240	POUNDS	GENERATED	97

Toxicity Information Summary

CHEMICAL NAME	CAS-NO	ACUTE TOX	TUMOR TOX	MUTAG TOX	REPRO TOX	IRRIT TOX	MCL
Silver	7440224		X				0.05mg/L*

Map Identification Number 70 **MEXICAN LINES INCORPORATED**
2 WORLD TRADE CENTER

NEW YORK, NY 10003

Facility Id: NYP000852608

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: 10006

US EPA RCRA (Resource Conservation and Recovery Act) information not reported; Site information reported by NYS DEC.

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
NONE	No hazardous waste activity reported to NYS 1/89 to 1/1/99.				

Map Identification Number 71 **TELESECTOR RESOURCES GROUP**
2 WORLD TRADE CENTER
EPA (FINDS) Name: NYNEX MATERIEL ENTERPRISES CO
EPA (FINDS) Address: 2 WORLD TRADE CENTER

NEW YORK, NY 10048

Facility Id: NYD986896462

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

US EPA RCRA Type: Generator: SMALL QUANTITY GENERATOR
 Land Disposal(LDF): Incinerator:
 Storage/Treatment (TSF): Receives offsite waste:

Transporter:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
B002	Petroleum oil or other liquid containing 50 ppm < PCBs < 500 ppm	1043	KILOGRAMS	GENERATED	90
F002	Spent halogenated solvents	195	POUNDS	GENERATED	90
F003	Spent non-halogenated solvents	35	GALLONS	GENERATED	90
F003	Spent non-halogenated solvents	400	POUNDS	GENERATED	90

Toxicity Information Summary

CHEMICAL NAME	CAS-NO	ACUTE TOX	TUMOR TOX	MUTAG TOX	REPRO TOX	IRRIT TOX	MCL
Petroleum oil or other liquid containing 50 ppm < PCBs < 500	1336363	X	X		X		5 ug/L

Map Identification Number 72

NEW YORK STATE DEPT OF ENVIRONMENTAL
2 WORLD TRADE CENTER REGION 11

61ST FLOOR NEW YORK CITY, NY 10047

Facility Id: NYX000851105

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
 Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: 2 WORLD TRADE CENTER
 Revised zip code: 10006

US EPA RCRA (Resource Conservation and Recovery Act) information not reported; Site information reported by NYS DEC.

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
NONE	No hazardous waste activity reported to NYS 1/89 to 1/1/99.				

Map Identification Number 73 **WORLD TRADE CENTER - RAYTHEON**
2 WORLD TRADE CENTER
EPA (FINDS) Name: WORLD TRADE CENTER - RAYTHEON
EPA (FINDS) Address: 2 WORLD TRADE CENTER - 77TH FL

NEW YORK, NY 10048

Facility Id: NYR000021105

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

US EPA RCRA Type: Generator: LARGE QUANTITY GENERATOR

Land Disposal(LDF):

Incinerator:

Transporter:

Storage/Treatment (TSF):

Receives offsite waste:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
D002	Solid waste that exhibits the characteristic of corrosivity	9600	POUNDS	GENERATED	96

Map Identification Number 74 **EBASCO SERVICES**
TWO WORLD TRADE CENTER
EPA (FINDS) Name: EBASCO SERVICES INC
EPA (FINDS) Address: TWO WORLD TRADE CENTER - B1 &

NEW YORK, NY 10048

Facility Id: NYD986997930

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

US EPA RCRA Type: Generator: SMALL QUANTITY GENERATOR

Land Disposal(LDF):

Incinerator:

Transporter: YES

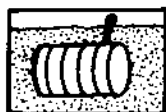
Storage/Treatment (TSF):

Receives offsite waste:

NYS DEC Manifested Waste Summary:

Waste Codes, Waste Units, and Transaction Types are only shown for the most recent year reported.

WASTE CODE	WASTE DESCRIPTION	WASTE AMOUNT	WASTE UNITS	TRANSACTION TYPE	YEAR
D001	Solid waste that exhibits the characteristic of ignitability	523	POUNDS	GENERATED	98



*** CHEMICAL STORAGE FACILITIES IDENTIFIED WITHIN THE SEARCH AREA ***

PLEASE NOTE: * Compass directions can vary substantially for sites located very close to the subject property address.

Map Identification Number 75 **WORLD TRADE CENTER**
RIVER WATER PUMP STATION

NEW YORK, NY 10048

Facility Id 2-000204

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: ONE WORLD TRADE CENTER
Revised zip code: 10006

Expiration Date of the facility's registration certificate: 09/28/2000

Operator Name: LEANDRO ZUCCHI

Site Status: ACTIVE

Facility Phone #: (212) 435-5798

Site Type: UTILITY (I.E. WASTEWATER TREATMENT PLANT)

TANK NUMBER	TANK STATUS	CHEMICAL NAME	CAPACITY GALLONS	TANK LOCATION	INSTALL DATE	DATE CLOSED
001	CLOSED-REMOVED	SODIUM HYPOCHLORITE	2000	ABOVEGROUND	10/69	08/95
001	CLOSED-REMOVED	SODIUM HYPOCHLORITE	2000	ABOVEGROUND	09/95	04/95
001	TEMP OUT OF SERVICE	SODIUM HYPOCHLORITE	2000	ABOVEGROUND ON LEGS RACKS ETC	09/95	
002	CLOSED-REMOVED	SODIUM HYPOCHLORITE	2000	ABOVEGROUND	10/69	08/95
002	CLOSED-REMOVED	SODIUM HYPOCHLORITE	2000	ABOVEGROUND	09/95	04/95
002	TEMP OUT OF SERVICE	SODIUM HYPOCHLORITE	2000	ABOVEGROUND ON LEGS RACKS ETC	09/95	
003	CLOSED-REMOVED	SODIUM HYPOCHLORITE	2000	ABOVEGROUND	10/69	08/95

Toxicity Information Summary

CHEMICAL NAME	CAS-NO	ACUTE TOX	TUMOR TOX	MUTAG TOX	REPRO TOX	IRRIT TOX	MCL
SODIUM HYPOCHLORITE	7681529	X	X	X		X	



*** NO TOXIC AIR, LAND AND WATER RELEASES IDENTIFIED WITHIN THE SEARCH AREA ***

**** NO HISTORIC UTILITY SITES IDENTIFIED WITHIN THE SEARCH AREA ****



*** WASTEWATER DISCHARGES IDENTIFIED WITHIN THE SEARCH AREA ***

PLEASE NOTE: * Compass directions can vary substantially for sites located very close to the subject property address.

Map Identification Number 76

WORLD TRADE CENTER

ONE WORLD TRADE CENTER

EPA (FINDS) Name: WORLD TRADE CENTER

EPA (FINDS) Address: ONE WORLD TRADE CENTER

Facility Id: NY0006033

EPA(FINDS) Id: NYD001794205

NEW YORK, NY 10048

NEW YORK, 10048

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)

Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE

Revised zip code: NO CHANGE

STANDARD INDUSTRIAL
CODE DESCRIPTION

FACILITY
TYPE

DISCHARGE
INDICATOR

FACILITY
STATUS

PERMIT ISSUED
DATE

NONCLASSIFIABLE ESTABLISHMENTS

INDUSTRIAL

MINOR

ACTIVE

092685



*** AIR DISCHARGE FACILITIES IDENTIFIED WITHIN THE SEARCH AREA ***

PLEASE NOTE: * Compass directions can vary substantially for sites located very close to the subject property address.

Map Identification Number 77

**ASBESTOS ABATE. TECH
2 WORLD TRADE CENTER**

NEW YORK, NY 10048

FINDS Id: NYD986935880

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: NO CHANGE

This site was identified in the EPA FINDS database. No air pollutant information given here.

Map Identification Number 78

**ASBESTOS ABATE TECH
2 WORLD TRADE CENTER**

NEW YORK, NY 10048

FINDS Id: NYD986935880

MAP LOCATION INFORMATION

Site location mapped by: MANUAL MAPPING (2)
Approximate distance from property: 0 feet

ADDRESS CHANGE INFORMATION

Revised street: NO CHANGE
Revised zip code: NO CHANGE

This site was identified in the EPA FINDS database. No air pollutant information given here.

Unmappable facilities for 'New York' County

NPL/CERCLIS/NYSDEC Inactive Hazardous Waste Facilities

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
NYD980531578	LEROY SHOT & LEAD WORKS	UNKNOWN	NEW YORK	UNKNOWN

Hazardous Substance Waste Sites

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
NY0081	ROUTE 9A - MANHATTAN	WEST SIDE HIGHWAY	NEW YORK CITY	UNKNOWN

Solid Waste Facilities

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
31T06	N.Y. CARTING T.S.			UNKNOWN
31D02	PENN CENTRAL DEMO			UNKNOWN
31D01	CENTRAL PARK DEMO			UNKNOWN

Hazardous Spills - UNKNOWN CAUSE OR OTHER CAUSES - Active

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
9912263	UNKNOWN LOCATION ON AN	UNDERGROUND FEEDER	M51 49TH ST SUB	UNKNOWN
9703206	607 FEET OFF WASHINGTON	AVE	MAHATTEN	UNKNOWN
9815191		MANHOLE 60653	MANHATTAN	UNKNOWN
9815188		MANHOLE 60651	MANHATTAN	UNKNOWN
9705558	FEEDER #69M73	UNKNOWN	MANHATTAN	UNKNOWN
9605265	BATTERY BUILDING TO THE N	O COVE MARINA	MANHATTAN	UNKNOWN
8503107	MANHATTAN	MANHATTAN	MANHATTAN	UNKNOWN
0004965	MANHOLE #49439	WEST ST/VERICK ST	MANHATTAN	UNKNOWN
9814861	SPRAINBROOK SUB STATION	TO WEST 49TH ST STATION	MANHATTEN	UNKNOWN
9905530	VARIOUS LOCAIONS	CITY AND WESTCHESTER	NEW YORK	UNKNOWN
9611244	BTWN EAST 13TH TO 637	WEST 49TH ST	NEW YORK	UNKNOWN
0010293	W 49TH ST SUBST.-TUCKOHOE	RD SUBSTATION	NEW YORK	UNKNOWN
9815046	BTWN W.49TH ST STATION	SPRAINBRROK SUB STATION	NEW YORK CITY AREA	UNKNOWN
9810397	UNK LOCATION	UNK LOCATION	UNKNOWN	UNKNOWN
9912656	FEEDER M52	SPRAINBROOK TO W.49TH SS	YONKERS	UNKNOWN

Hazardous Spills - MISC. SPILL CAUSES - Active

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
9912351	FEEDER FROM MANHATTAN	FEEDER FROM MANHATTAN	MANHATTAN	UNKNOWN
9906932	DELANCEY ST AND	2ND AVE TRACK 3 F LINE	MANHATTAN	UNKNOWN
9702769	600 FT FROM	WASHINGTON AVE	MANHATTAN	UNKNOWN
9609444	NYC PARKS - BATTERY PARK	IN PARKS & RECREATION LOT	MANHATTAN	UNKNOWN
9308954	BET.VERNON & WATERSIDE	BET. VERNON & WATERSIDE	MANHATTAN	UNKNOWN
0100974	FEEDER M51	WEST 49TH ST-SPRAINBROOK	MANHATTAN	UNKNOWN
0012470		CHURCH ST/WEST 43RD ST	MANHATTAN	UNKNOWN
0010963	FEEDER 52	SPRAINBROOK TO WEST 49TH	MANHATTAN	UNKNOWN
0004534	FEEDER M52	WEST 49TH & SPRINGBROOK	MANHATTAN	UNKNOWN
0004011	FEEDER TUB FROM YONKERS	TO 49TH ST	MANHATTAN	UNKNOWN
9902333	FEEDER CABLE M52	W 49TH ST TO SPRAINBROOK	MANHATTAN/YONKERS	UNKNOWN
9910467	MANHOLE #V3159	5761 BROADWAY	MANHATTEN	UNKNOWN
9812964	M52 FEEDER LINE	SPRAINBRROK TO WEST 49TH	NEW YORK	UNKNOWN
9930008	VARIOUS LOCATIONS	DRUMS	NEW YORK CITY	UNKNOWN
9606764	FEEDER #71	DUNWOODIE TO RAINEY	NEW YORK CITY	UNKNOWN

Hazardous Spills - UNKNOWN CAUSE OR OTHER CAUSES - Closed

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
9907053	IN FRONT OF WATERSIDE	GENERATING STATION	MANHATTAN	UNKNOWN
9307242	BRIDGE TO B'WAY.EXPRESSWA	BRIDGE TO B'WAY.EXPRESSWA	MANHATTAN	UNKNOWN
9306692	ACROSS FROM WORLD TRADE C	ACROSS FROM WORLD TRADE C	MANHATTAN	UNKNOWN

9303111	TUNNEL VENTILATOR	TUNNEL VENTILADOR	MANHATTAN	UNKNOWN
8504758	MANHATTAN	MANHATTAN	MANHATTAN	UNKNOWN
8503796	MANHATTAN	MANHATTAN	MANHATTAN	UNKNOWN
8503779	MANHATTAN	MANHATTAN	MANHATTAN	UNKNOWN
8503506	MANHATTAN	MANHATTAN	MANHATTAN	UNKNOWN
8503421	MANHATTAN	MANHATTAN	MANHATTAN	UNKNOWN
8503366	MANHATTAN, NYC	MANHATTAN	MANHATTAN	UNKNOWN
8503301	MANHATTAN	MANHATTAN	MANHATTAN	UNKNOWN
9006769	RESTAURANT/UNK ADDRESS	UNKNOWN	MANHATTEN	UNKNOWN
9400226	UNK	UNK	NEW YORK	UNKNOWN
8604519	NEW YORK	NEW YORK	NEW YORK	UNKNOWN
8907255	HERTZ RENT A CAR/MANH		NEW YORK CITY	UNKNOWN
8606984	UNKNOWN ADDRESS !	UNKNOWN	NEW YORK CITY	UNKNOWN
8607173	UNK	UNK	UNK	UNKNOWN

Hazardous Spills - MISC. SPILL CAUSES - Closed

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
9907607	CANAL	SANITATION	MANHATTAN	UNKNOWN
9906600	FEEDER BTWN ASTORIA SUB S	TA AND EAS13TH SUB STA	MANHATTAN	UNKNOWN
9906471	MANHOLE #TM3387	WEST 3RD 7 WEST BROADWAY	MANHATTAN	UNKNOWN
9502798	SOUTH TUNNEL/NJ - NYC	SOUTH TUNNEL/ NJ - NYC	MANHATTAN	UNKNOWN
9402295	LOWER LEVEL EB #12	LOWER LEVER EB #12	MANHATTAN	UNKNOWN
0012765	BETWEEN W49TH SUBSTATION	& SPRAINBROOK SUBSTATION	MANHATTAN	UNKNOWN
9713418	UNKNOWN	UNKNOWN	MANHATTEN	UNKNOWN
9706884	ISLAND ST	SOUTH OF HUSTON ST	NEW YORK	UNKNOWN
8701129	WEST STREET / MANHATTEN	WEST STREET	NEW YORK CITY	UNKNOWN
9501840	UNKNOWN LOCATION	UNKNOWN LOCATION	WESTCHESTER	UNKNOWN

Petroleum Bulk Storage Facilities

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
2-157856	MOBIL S/S 1 JWBWT ARDOR GARAGE	MOBIL S/S 1 (JBWBT ARDOR GARAGE)	NY	UNKNOWN

Hazardous Waste Generation or Transport Facilities

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
NYP004024105	CON ED	MH5143 LIBERTY AVE		UNKNOWN
NYP004016234	CONED - V4603	V4603/100 TRINITY PLACE		UNKNOWN
NYP004016226	CONED - V3714	V3714/1 TRINITY PLACE		UNKNOWN
NYP004014551	CON ED	V 508 -C/O VERDALE & 57 R		UNKNOWN
NYP004010854	CON ED	MH 60652 - EAST SIDE		UNKNOWN
NYP000918558	NEW YORK CITY TRANSIT AUTHORITY			UNKNOWN
NYP000007732	NEW YORK CITY TRANSIT AUTHORITY			UNKNOWN
NYN20002A347				UNKNOWN
NY0000010363	NEW YORK CITY DEPT OF TRANSPORTATION			UNKNOWN
NYP000926717	NYNEX	BAYARD AND BROADWAY	MANHATTAN	UNKNOWN
NYP004039633	CON ED	VS0618-N/S	N/S	UNKNOWN
NYP004034559	CON ED	V8114-BROADWAY	N/S	UNKNOWN
NYP004034377	CON ED	SQ50-FARMERS S/S	N/S	UNKNOWN
NYP004034328	CON ED	V4646-BARCLAY ST	N/S	10007
NYP004033585	CON ED	V1648-6201 LAKE	N/S	UNKNOWN
NYP004033411	CON ED	V0155	N/S	UNKNOWN
NYP004029294	CON ED	V8449-WASHINGT5ON ST	N/S	UNKNOWN
NYP004029039	CON ED	MH2073-?	N/S	UNKNOWN
NYP004028551	CON ED	MAINBODY-ALLEY PD PK UNIT SS	N/S	UNKNOWN
NYP004020566	CON ED	V5715-READERS DIGEST	N/S	UNKNOWN
NYR000057794	AMERICAN BUILDING MAINTENANCE	26 FEDERAL PLAZA	NEW YORK	UNKNOWN
NYP010000628	NEW YORK CITY DEPT OF ENVIRONMENTAL	PROTECT POLICE RANGE	NEW YORK	UNKNOWN
NYP000918482	NYNEX	BENNETT/HUBERTON	NEW YORK	UNKNOWN
NY0005000575	JOHN DOE	DELETE	NEW YORK	UNKNOWN
NYP004004594	CON ED	MH 4468	VANDERBILT	UNKNOWN

Air Releases

FACILITY ID	FACILITY NAME	STREET	CITY	ZIP
3606180051	FEILER BROS CORP	ROOM 1700	NEW YORK	UNKNOWN
3606160154	NYCDEP	MUNICIPAL BUILDING	NEW YORK	10007
3606100552	ACADEMY CONSTRUCTION	NO STREET ADDRESS	NEW YORK	UNKNOWN
3606100495	FEILER BROS CORP	ROOM 1700	NEW YORK	UNKNOWN
3606100444	NYCDEP	MUNICIPAL BUILDING	NEW YORK	10007
3606100442	BATTERY PK RES RCV	NO STREET ADDRESS	NEW YORK	UNKNOWN
3606100129	NAVY DIST COMMANDER	NO STREET ADDRESS	NEW YORK	UNKNOWN
3606100080	NYCHA-FOSTER HOUSING	NO STREET ADDRESS	NEW YORK	UNKNOWN
3606187013	SOS INTERNATIONAL	CHURCH STAT	NEW YORK CITY	10007
3606100558	SOS INTERNATIONAL	BOX 2976 CHURCH STAT	NEW YORK CITY	UNKNOWN
3606100070	USCG-LIGHT	NEGRO POINT	NEW YORK CITY	10007
NY061X5WJ	101 COOPER ST CO	NO STREET ADDRESS	NO CITY NAME	UNKNOWN
NY061X351	ESTATE OF ADOLPH TAUSIK	NO STREET ADDRESS	NO CITY NAME	UNKNOWN
NY061X2DR	UNI HAB CO	NO STREET ADDRESS	NO CITY NAME	UNKNOWN
NY061X0NP	MIDTOWN HOLDING CO	NO STREET ADDRESS	NO CITY NAME	UNKNOWN

Hazardous waste codes presented in individual Toxic Information Profiles are defined below.

- B002 Petroleum oil or other liquid containing 50 ppm or greater of PCBs but less than 500 ppm PCBs. This includes oil from electrical equipment whose PCB concentration is unknown, except for circuit breakers, reclosers and cable.
- B004 PCB Articles containing 50 ppm or greater of PCBs but less than 500 ppm PCBs excluding, small capacitors. This includes oil filled electrical equipment whose PCB concentration is unknown, except for circuit breakers, reclosers and cable
- B005 PCB Articles containing 500 ppm or greater of PCBs, excluding small capacitors.
- B007 Other PCB Wastes including contaminated soil, solids, sludges, clothing, rags, and dredge material.
- D001 Solid waste that exhibits the characteristic of ignitability, but is not listed under any other hazardous waste code.
- D002 Solid waste that exhibits the characteristic of corrosivity, but is not listed under any other hazardous waste code.
- D003 Solid waste that exhibits the characteristic of reactivity, but is not listed under any other hazardous waste code.
- D004 Arsenic
- D005 Barium
- D006 Cadmium
- D007 Chromium
- D008 Lead
- D009 Mercury
- D011 Silver
- D018 BENZENE
- D022
- D039 Tetrachloroethylene
- D042 2,4,6-Trichlorophenol
- F001 The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons: all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005: and still bottoms from the recovery of these spent solvents and spent solvent mixtures. (T)

- F002 The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane: all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005: and still bottoms from the recovery of these spent solvents and spent solvent mixtures. (T)
- F003 The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol: all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents: and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005: and still bottoms from the recovery of these spent solvents and spent solvent mixtures. (I)*
- U036 Chlordane, alpha & gamma isomers
- U052 Cresol (Cresylic acid)
- U135 Hydrogen sulfide
- U144 Acetic acid, lead(2+) salt
- U188 Phenol
- U211 Carbon tetrachloride
- U226 Ethane, 1,1,1-trichloro-

Source: U. S. Environmental Protection Agency

How Toxic Site Locations Are Mapped

Toxics Targeting maps toxic site locations on a computerized version of the U. S. Census map using addresses and map coordinates provided by site owners/operators or government agencies. In order to allow site locations to be verified independently, the information used to map each site is presented in the first section of each *Toxic Site Profile*, along with a description of the mapping technique used and any address corrections that were made in order to locate toxic sites with incomplete or inadequate site location information. The mapping process is explained below.

Map Identification Number: 12

Site Name: Acme World Manufacturing, Inc.

Site Address: 55 Main Street

Anytown, NY 11797

MAP LOCATION INFORMATION

Site location mapped by:

Address Matching

1) Most toxic sites are mapped by matching addresses provided by site owners/operators or government agencies with locations on a computerized version of the U. S. Census map. These site locations are identified "address-matched."

Note: Some sites have an address match location *and* a map coordinate location. Both locations are mapped because they can be equally correct.

or Map Coordinate

2) Some toxic sites are located using map coordinates provided by site owners/operators or government agencies. These site locations are identified "map coordinate." Map coordinates for Toxics Wastewater Discharges, Toxic Release Inventory sites and Major Oil Storage Facilities should be considered suspect.

or Manual Mapping

or Site Visit

3) Incomplete addresses or map coordinates require some site locations to be determined by commercial street maps (manual mapping), site visits, map coordinates from other databases and address location services. Application of any of these methods is identified accordingly.

ADDRESS CHANGE INFORMATION

Revised Street: NO CHANGE

Revised zip code: NO CHANGE

4) Site addresses are sometimes corrected to eliminate obvious errors that prevent sites from being mapped. All address corrections are noted here.

**** NO CIVIL ENFORCEMENT DOCKET FACILITIES IDENTIFIED WITHIN THE SEARCH AREA ****

U.S. EPA EMERGENCY RESPONSE NOTIFICATION SYSTEM (ERNS)
AT THE LOCATION OR POTENTIALLY AT THE LOCATION OF
WTC Complex
New York, NY 10048

* Any ERNS Spills listed below are NOT mapped in this report *

ONSITE ERNS (A count of these spills can be found in the distance interval table):
THIS SITE IS NOT FOUND IN THE ERNS DATABASE

POTENTIALLY ONSITE ERNS:
THIS SITE IS NOT FOUND IN THE ERNS DATABASE

Information Source Guide

Toxics Targeting's Computerized Environmental Reports contain government and other information compiled on 17 categories of reported known or potential toxic sites. Each toxic site database is described below with information detailing a) the source of the information, b) the date when each database is covered to and c) when *Toxics Targeting* obtained the information..

1) **Inactive Hazardous Waste Disposal Site Registry:** New York State database that maintains information and aids decision making regarding the investigation and cleanup of toxic sites. The Registry's data includes two-page profiles noting site name, ID number, description, classification, cleanup status, types of cleanup, owner information, types and quantities of contaminants, and assessment of health and environmental problems. ASTM required.* Fannie Mae required.** Source: New York State Department of Environmental Conservation.²

Profile data updated through: 5/24/2000.

Data obtained by Toxics Targeting: 10/5/2000.

New Facilities updated to: 5/24/2000.

Data obtained by Toxics Targeting: 10/5/2000.

2) **CERCLIS:** Toxic sites listed in the Federal Comprehensive Environmental Response, Compensation and Liability Information System. NPL sites are also included in CERCLIS. ASTM required.* Fannie Mae required.**

Source: U. S. Environmental Protection Agency.¹

Profile data updated through: 12/28/2000.

Data obtained by Toxics Targeting: 2/4/2001.

New Facilities updated through: 12/28/2000.

Data obtained by Toxics Targeting: 2/4/2001.

3) **National Priority List for Federal Superfund Cleanup:** Toxic sites nominated for cleanup under the Federal Superfund program. Annual compilation of special two-page detailed profiles of NPL sites. ASTM required.* Fannie Mae required.**

Source: U. S. Environmental Protection Agency.¹

Profile data updated from: 6/2000-9/2000.

Data obtained by Toxics Targeting: 2/1/2001.

New Facilities updated through: 12/19/2000.

Data obtained by Toxics Targeting: 2/1/2001.

4) **Hazardous Substance Waste Disposal Site Study:** NYS database of waste disposal sites that may pose threats to public health or the environment, but cannot be remediated using monies from the Hazardous Waste Remedial Fund.

Source: New York State Department of Environmental Conservation.²

Data updated to: 5/16/2000.

Data obtained by Toxics Targeting: 5/16/2000.

5) **Solid Waste Facilities:** NYS database of solid waste facilities, including, but not limited to, landfills, incinerators, transfer stations, recycling centers. ASTM required.* Fannie Mae required.**

Source: New York State Department of Environmental Conservation.²

Data updated to: 1/01/1998.

Data obtained by Toxics Targeting: 6/30/1998.

Also includes a listing of solid waste disposal sites operated by New York City municipal authorities circa 1934.

Source: City of New York Department of Sanitation (1984). Waste Disposal Problem in New York City: A Proposal For Action.

6) **Major Oil Storage Facilities:** NYS database of facilities licensed pursuant The to Article 12 of the Navigation Law, 6NYCRR Parts 610 and 17NYCRR Part 30, such as onshore facilities or vessels, with petroleum storage capacities equal to or greater than four hundred thousand gallons. Fannie Mae required.**

Source: New York State Department of Environmental Conservation.² Data update schedule: rolling basis.

New facilities updated through: 7/1/2000.

New facilities data obtained by Toxics Targeting: 7/17/2000.

Tank data updated through: 7/1/2000.

Tank data obtained by Toxics Targeting: 7/17/2000.

7) **RCRA Hazardous Waste Treatment, Storage or Disposal Facility Databases:**

(a) **Manifest Information:** New York State database of hazardous waste facilities and shipments regulated by the DEC's Bureau of Hazardous Waste Facility Compliance pursuant to New York State Law and the Resource Conservation and Recovery Act (RCRA).

ASTM required.* Fannie Mae required.**

Source: New York State Department of Environmental Conservation.²

Manifest transactions data updated to: 1/01/1999. Manifest transactions data obtained by Toxics Targeting: 3/27/1999.

New facilities updated through: 1/01/1999.

New facilities obtained by Toxics Targeting: 3/27/1999.

(b) **Notifier Information:** U. S. Environmental Protection Agency database of hazardous facilities regulated pursuant to the Resource Conservation and Recovery Act (RCRA).

ASTM required.* Fannie Mae required.**

Source: U. S. Environmental Protection Agency¹

New facilities updated through: 3/26/1998.

Data obtained by Toxics Targeting: 4/9/1998.

Data attributes updated through: 12/22/1998.

Data obtained by Toxics Targeting: 3/30/1999.

(c) RCRA Violations Information:

U. S. Environmental Protection Agency database of violations data reported for facilities regulated pursuant to the Resource Conservation and Recovery Act (RCRA).

Source: U. S. Environmental Protection Agency¹

New facilities updated through: 3/26/1998.

Data obtained by Toxics Targeting: 4/9/1998.

Data attributes updated through: 12/23/1998.

Data obtained by Toxics Targeting: 12/30/1998.

(d) RCRIS Corrective Action Activity (CORRACTS) Information: U. S. Environmental Protection Agency (EPA) database of hazardous waste facilities with corrective action activity. This data is part of the RCRIS National Oversight database.

Source: U. S. Environmental Protection Agency¹

Data updated through: 4/20/2000.

Data obtained by Toxics Targeting: 5/10/2000.

8) Spills Information Database: Spills reported to the DEC as required by one or more of the following: Article 12 of the Navigation Law, 6 NYCRR Section 613.8 (from Petroleum Bulk Storage Regulations) or 6 NYCRR Section 595.2 (from Chemical Bulk Storage Regulations). The database includes *active* and *closed* spills reported between 4/1/1986 and 7/1/2001. ASTM required.* Fannie Mae.** Source: NYS Department of Environmental Conservation.²
New spill additions data updated through: 07/01/2001. New spill additions data obtained by Toxics Targeting: 07/23/2001.
Spill attribute data updated through: 07/01/2001. Spill attribute data obtained by Toxics Targeting: 07/23/2001.

Active spills: paperwork not completed.

Closed spills: paperwork completed.

Both active and closed spills may or may not have been cleaned up (see Date Cleanup Ceased in spill profiles).

9) Petroleum Bulk Storage Facilities: Local and State databases of aboveground and underground petroleum storage facilities with a combined storage capacity over 1,100 gallons. ASTM required.* Fannie Mae required.**

All New York Counties except Cortland, Nassau, Rockland, and Suffolk:

Source: NYS Department of Environmental Conservation.²

Update schedule: rolling basis, with summary compilations made available approximately every three months

Facility data updated through: 1/1/2001 (10/1/98 for Westchester Co.). Facility data obtained by Toxics Targeting: 2/16/2001.

Tank data updated through: 1/1/2001 (10/1/98 for Westchester Co.). Tank data obtained by Toxics Targeting: 2/16/2001.

Nassau County:

Heat producing products and other products with less than 1,000 gallons storage capacity:

Source: Nassau County Department of Health.³ Data update schedule: rolling basis

Data updated through: 10/4/2000.

Data obtained by Toxics Targeting: 11/5/2000.

Generally non-heat producing products with more than 1,000 gallons storage capacity:

Source: Nassau County Fire Marshall.⁴ Data update schedule: rolling basis with annual update

Data updated through: 9/27/1996.

Data obtained by Toxics Targeting: 11/20/1996.

Rockland County:

Source: Rockland County Department of Health.⁵

Data updated through: 8/11/1998.

Data obtained by Toxics Targeting: 8/17/1998.

Suffolk County:

Source: Suffolk County Department of Health Services.⁶

Data updated through: 1/12/1999.

Data obtained by Toxics Targeting: 2/26/1999.

10. RCRA Hazardous Waste Generators and/or Transporters Databases:

(a) Manifest Information: New York State database of hazardous waste facilities and shipments regulated by the New York State Department of Environmental Conservation's Bureau of Hazardous Waste Facility Compliance pursuant to New York State Law. ASTM required.* Fannie Mae required.**

Source: New York State Department of Environmental Conservation.²

Manifest transactions data updated to: 1/01/1999. Manifest transactions data obtained by Toxics Targeting: 3/27/1999.

New facilities updated through: 1/01/1999. New facilities obtained by Toxics Targeting: 3/27/1999.

(b) RCRA Notifier Information: U. S. Environmental Protection Agency database of hazardous waste facilities regulated pursuant to the Resource Conservation and Recovery Act (RCRA).

Source: U. S. Environmental Protection Agency¹

New facilities updated through: 3/26/1998.

Data obtained by Toxics Targeting: 4/9/1998.

Data attributes updated through: 12/22/1998.

Data obtained by Toxics Targeting: 3/30/1999.

Asbestos Litigation Reporter January 22, 1999
Vol. 20; No. 24; Pg. 5
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CASE: Judgment:Port Authority of New York and New Jersey v. Allied Corp.

HEADLINE: \$66M Jury Award Reduced in World Trade Center Asbestos Case

BODY:

In a judgment order entered without explanation, a federal court judge in White Plains, NY, has reduced a \$66 million jury verdict returned against U.S. Mineral Products Co., the defendant in the World Trade Center asbestos property liability case. Port Authority of New York and New Jersey et al. v. Allied Corp. et al. , No. 91 CIV 0310 (CLB) (SD NY, judgment entered Jan. 6, 1999); see Asbestos LR , Dec. 4, 1998, P. 3.

The verdict, considered by some to be the largest award ever rendered in an asbestos property liability action, was reduced by U.S. District Court Judge Charles L. Brieant to \$42,673,422.

According to Edward J. Westbrook, who represents the Port Authority, the court decided not to award pre-judgment interest on future costs. Westbrook said the court felt such an award would prove a windfall to the Port Authority.

The verdict came in a suit by the Port Authority of New York and New Jersey, **claiming U.S. Mineral provided CAFCO Blaze-Shield Type D spray-on fireproofing, with an 80% asbestos content, for use in the first 40 floors of the World Trade Center. The Port Authority said the damages were exacerbated when, after spending \$300,000 to switch to non-asbestos fireproofing, U.S. Mineral continued to sell it an 80% asbestos overcoat, Mark II Hardcoat, to go over the non-asbestos product.**

The jury found **both of the coatings defectively designed** and concluded USM had **fraudulently misrepresented the asbestos content of Mark II** after the Port Authority **specified the switch to non-asbestos products.**

Judge Brieant entered a judgment against U.S. Mineral in the sum of \$14,109,926, plus costs. He also ordered U.S. Mineral or its insurer to deliver to the Port Authority an annuity with a total estimated present value of \$28,563,496

The Port Authority is represented by Edward J. Westbrook and Robert M. Turkewitz with Ness, Motley, Loadholt, Richardson & Poole in Charleston, SC. U.S. Mineral is represented by Kenneth Neal and Paul Slater with Danaher, Tedford, Langnese & Neal in New York City.

(Call 800-345-1101 for copies of the two-page order.)

Environmental & Toxicology International

Bulk Asbestos Report

Client Name & Address Joel Kupferman, ESQ NY Envir Law & Justice Project 315 Broadway, S 200 New York, NY 10007-1121	Date Collected: 091901	Report No 211171
	Date Received: 092401	Date Reported 092501
	Date Analyzed: 092401	
	Job Location: World Trade Center After September 11, 2001; Dust and Debris Near Ground Zero	

Sample No.	Lab No.	Asbestos Present (a) (c)	Percentage
NYELJ-2	211171-2	Chrysotile	2% (c)
Location: gray fluffy dust and gray particulate			
Description: homogeneous, friable, fibrous, non-cementitious material with 50% fibrous glass, 15% other fibers and about 30% miscellaneous binders.			
NYELJ-4	211171-4	Chrysotile	TRACE (d)
Location: gray-black carbonaceous, granular material, some water.			
Description: non-homogeneous, semi-friable, semi-fibrous, cementitious material with 10% fibrous glass, 2% cellulose, 5-10% other fibers and about 75-80% miscellaneous binders.			
NYELJ-5	211171-5	Chrysotile	2-3% (c)
Location: gray fluffy dust			
Description: homogeneous, friable, fibrous, non-cementitious material with 75% fibrous glass, 2% cellulose, 5% other fibers and about 15% miscellaneous binders.			
NYELJ-6	211171-6	Chrysotile	Trace-1% (c, d)
Location: gray fluffy dust			
Description: homogeneous, friable, fibrous, non-cementitious material with 80% fibrous glass, 5% other fibers and about 5% miscellaneous binders.			

Environmental & Toxicology International**Bulk Asbestos Report**

NYELJ-7	211171-7A	Chrysotile	2 % (c)
Location: fluffy debris on gold strands of hair-like fibers			
Description: homogeneous, friable, fibrous, non-cementitious material with 50% fibrous glass, 5% cellulose, 25% other fibers and about 18% miscellaneous binders.			
NYELJ-7	211171-7B	NONE	N. D. (b)
Location: gold strands of hair-like fibers			
Description: homogeneous, friable, fibrous, non-cementitious material with 95 % fibrous glass, and 5% cellulose.			
NYELJ-7	211171-7C	Chrysotile	5 % (c)
Location: white fluffy debris on gold strands of hair-like fibers			
Description: homogeneous, friable, fibrous, non-cementitious material with 90% fibrous glass and 5% cellulose.			
NYELJ-8	211171-8A	Insufficient Sample	_____
Location: green plant leaves that did not contain visible residue.			
Description: None			
NYELJ-9	211171-9A	Chrysotile	Trace (d)
Location: gray fluffy dust in debris			
Description: homogeneous, friable, fibrous, non-cementitious material with 75% fibrous glass, 5% cellulose, 10% other fibers and about 10% miscellaneous binders.			
NYELJ-9	211171-9B	NONE	N. D. (d)
Location: long white fibers			
Description: homogeneous, non-friable, fibrous, non-cementitious material with 100 % cotton fibers.			

Environmental & Toxicology International

Bulk Asbestos Report

Location: white foam-like globules and residue in dust.

Description: homogeneous, friable, fibrous, non-cementitious material with 50% fibrous glass, 5% cellulose, 20% other fibers and about 25% miscellaneous binders.

NYELJ-10

211171-10

Chrysotile

Trace (d)

Location: gray fluffy dust

Description: homogeneous, friable, fibrous, non-cementitious material with 80% fibrous glass, 2% cellulose, 8% other fibers and about 10% miscellaneous binders.

Footnotes

(a) All samples analyzed by ETI Laboratory utilizing Polarized Light Microscopy with Dispersion Staining as per EPA-600/R-93/116. Laboratory Director: Robert K. Simon, Ph.D. AIHA Laboratory 100453.

(b) ND = None Detected above one percent (1%).

(c) The limit of detection for asbestos fibers in bulk sample is 1% by visual estimation. The EPA definition of asbestos is a material containing 1% or greater asbestos.

(d) Trace is < 1 %.

NEW YORK ENVIRONMENTAL LAW & JUSTICE PROJECT NYELJP

Joel R Kupferman, Esq. ; Executive Director
Kimberly Flynn: Policy Analyst

315 Broadway Suite 200 New York NY 10007-1121
917-414-1983 fax: 646-349-2622

nyelj@justice.com www.nyenvirolaw.org

ATC Associates Inc.

104 E. 25th St., 10th Floor, New York, NY 10010-2917

(212) 353-8280 Fax (212) 353 8306

BULK ASBESTOS ANALYSIS RESULTS

Client : New York Environmental Law
315 Broadway #200

New York

NY

Batch # : 2962A

Date Collected : 9/18/01

Page : 1

SAMPLE INFORMATION		Asbestos Result	Fibrous Material	Non-Fibrous Material	NOB Result
Field # : 2 Color : Tan Location : Type of Mat: Homogeneity : Y Method : ELAP+EPA PLM	Date Analyzed: 9/19/01 By : MW	NONE-DETECTED	15 % Cellulose Trace% Fiberglass	85 % Mineral Filler	
		Comment:			
Field # : 4 Color : Tan Location : Type of Mat: Homogeneity : Y Method : ELAP+EPA PLM	Date Analyzed: 9/19/01 By : MW	2.1 % CHRYSOTILE	17.9 % Cellulose 15.0 % Fiberglass	65 % Mineral Filler	
		Comment:			
Field # : 6 Color : Tan Location : Type of Mat: Homogeneity : Y Method : ELAP+EPA PLM	Date Analyzed: 9/19/01 By : MW	NONE-DETECTED	15 % Cellulose 10 % Fiberglass	75 % Mineral Filler	
		Comment:			
Field # : 10 Color : Tan Location : Type of Mat: Homogeneity : Y Method : ELAP+EPA PLM	Date Analyzed: 9/19/01 By : MW	NONE-DETECTED	15 % Cellulose 10 % Fiberglass	75 % Mineral Filler	
		Comment:			

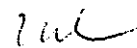
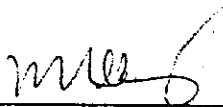
Legend: TRACE = LESS THAN LIMIT OF QUANTITATION (<0.25%)

Note 1: For point counts the limit of quantitation of 0.25% is based on one asbestos point counted over 400 non-empty points.

Note 2: > 1% asbestos by weight is considered an ACM (Asbestos Containing Material).

Analyst:

Reviewed and Signed for the Company by:



Director of Laboratory Services

Environmental & Toxicology International

Bulk Asbestos Report

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Environmental & Toxicology International**Bulk Asbestos Report**

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Description: homogeneous, non-friable, fibrous, non-cementitious material with 100 % cotton fibers.			

Environmental & Toxicology International

Bulk Asbestos Report

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NYELJ-10

211171-10

Chrysotile

Trace (d)

Location: gray fluffy dust

Description: homogeneous, friable, fibrous, non-cementitious material with 80% fibrous glass, 2% cellulose, 8% other fibers and about 10% miscellaneous binders.

Footnotes

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NEW YORK ENVIRONMENTAL LAW & JUSTICE PROJECT NYELJP

Joel R Kupferman, Esq. ; Executive Director
Kimberly Flynn: Policy Analyst

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BULK ASBESTOS ANALYSIS RESULTS

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New York

NY

Batch # : 2962A

Date Collected : 9/18/01

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Homogeneity : Y	By : MW				
Method : ELAP+EPA PLM					
Comment:					
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Color : Tan					
Location :					
Type of Mat:					
Homogeneity : Y	By : MW				
Method : ELAP+EPA PLM					
Comment:					
Field # : 6	Date Analyzed: 9/19/01	NONE-DETECTED	15 % Cellulose 10 % Fiberglass	75 % Mineral Filler	
Color : Tan					
Location :					
Type of Mat:					
Homogeneity : Y	By : MW				
Method : ELAP+EPA PLM					
Comment:					
Field # : 10	Date Analyzed: 9/19/01	NONE-DETECTED	15 % Cellulose 10 % Fiberglass	75 % Mineral Filler	
Color : Tan					
Location :					
Type of Mat:					
Homogeneity : Y	By : MW				
Method : ELAP+EPA PLM					
Comment:					

Legend: TRACE = LESS THAN LIMIT OF QUANTITATION (<0.25%)

Note 1: For point counts the limit of quantitation of 0.25% is based on one asbestos point counted over 400 non-empty points.

Note 2: > 1% asbestos by weight is considered an ACM (Asbestos Containing Material).

Analyst:

Reviewed and Signed for the Company by:





Director of Laboratory Services

leased in the World Trade Center fire in far greater quantities—toluene, mercury, phenols, lead, xylene, chromium, zinc, vinyl chloride.

Unfortunately, in the early days after the collapse, as we shall see, officials in charge at Ground Zero failed to fully grasp the immense health risks emergency workers faced and did not provide those workers with sufficient protection. Nor did federal health officials honestly convey to the public how little they knew about the safety situation for those returning to their homes and jobs in the area.

Fallout

The Environmental Consequences of the World Trade Center Collapse
by Juan Gonzalez
The New Press, New York, 2002
ISBN 1-56584-754-7 (hc)

Anatomy of a Toxic Nightmare

JUST WHAT WERE the toxic substances released by the collapse and the fires? What do we know about the size of those releases or their potential threat to human health? What did the EPA and OSHA discover in their own environmental testing and what did they report to the public or withhold from it? There has been much confusion and a good deal of misinformation dispensed about these issues since September 11. Some of the confusion is understandable, given the enormous number of chemicals released and the relative ignorance among ordinary citizens about the effects of such releases on human health. In addition, the federal government has standards for only a finite number of toxic substances, and often these have been devised more for occupational exposure than for exposure in ambient air.

What follows is my own assessment of the extent of con-

tamination, potential and real, that occurred on September 11 and in the weeks that followed. It is based on scores of discussions during the six months following the event with government health officials, scientists, industrial hygienists, experts in commercial office equipment, and environmental safety advocates, on reviews of thousands of pages of monitoring reports of the various agencies involved, on testimony in various public hearings that have addressed the catastrophe, and on interviews with local residents and victims of the attack. The list is only a preliminary sketch; it does not deal with every major contaminant that was released, such as fiberglass or sulfur dioxide or freon, but focuses instead on those substances that may end up causing the greatest long-term health effects, and especially on those about which the public has received incomplete or misleading information from government officials.

ASBESTOS

A mentioned earlier, asbestos received the most attention from health officials and the press, even though it was only one of hundreds of hazardous substances present in building materials at the Twin Towers. Estimates of how much the two skyscrapers contained vary from 400 to 1,000 tons. Such estimates do not include **the** asbestos insulation **around** the

labyrinth of steam pipes and other utility conduits that were destroyed beyond the immediate vicinity of the towers, or the asbestos contained in other buildings in the complex that suffered major **damage**

To put that amount in perspective, we would do well to compare it with another major asbestos disaster in New York City more than a decade earlier. Around **6:30** on the evening of **August** 19, 1989, a twenty-four-inch underground steam pipe exploded in the Gramercy Park section of Manhattan, leaving a ten-foot-wide crater in the middle of East **20th** Street. Three people were killed, twenty-four were injured, and thousands of residents were evacuated as a roaring geyser of scalding steam shot high into the air for hours, blanketing the street and nearby buildings with a thick **layer** of mud and debris. Con Edison, which owned the pipe, did not reveal until four days later that the mud was contaminated with asbestos, by which time residents had already returned to their apartments and begun their own cleanup. Tests by city officials found no elevated levels of asbestos in the air, but fearing that any disturbance of the asbestos-laden dry mud and dust would make the fibers airborne, the city again evacuated 350 people from five buildings, cordoned off the area, and ordered an extensive cleanup of each apartment. The work took more than seven months, with Con Edison spending \$90 million for both abatement and

compensation to residents who lost property. The company and two top officials were eventually indicted and convicted on criminal charges of **lying** about the asbestos contamination.

The astonishing aspect of this story is the amount of asbestos that created the furor: **only** 200 pounds were released in the Gramercy Park tragedy. The simple presence of asbestos in mud and dust (remember, none was detected in the air) triggered a massive seven-month cleanup.

Compare the reaction of health officials in that incident with the World Trade Center collapse, which involved up to 1,000 tons, and where high levels of asbestos were detected in the open in dozens of the first monitoring tests, as well as in a high percentage of dust samples from all over lower Manhattan, and you begin to understand how the EPA and other agencies **simply** turned their backs on the problem. To avoid a massive government-financed asbestos cleanup of lower Manhattan, say critics inside and outside of the EPA, the agency's top brass effectively violated federal law and their own regulations on asbestos removal. To justify their inaction, as we will see in the next chapter, they lied to the public about what constitutes a dangerous level of asbestos, and **they** then refused for months to address the problem of asbestos contamination inside many downtown Manhattan buildings.

LEAD

As mentioned **previously** anywhere from 200,000 to 400,000 pounds of lead were present in the thousands **of per-**sonal computers that were instantly destroyed when the Twin Towers crumbled to the **ground**. An unknown but significant quantity of lead was also inside thousands of batteries, on countless electrical soldering connections, in water and steam pipes throughout the **complex**. Much of that lead became pulverized into microscopic dust **by** the enormous force of the collapse. When released into the air, lead easily attaches itself to other particulates and can travel long distances before settling to the ground. Pure lead does not break down, but lead compounds can be changed by sunlight, air, water, or fire. Once on the ground, the metal can migrate into bodies of water.

Exposure to lead can damage almost any part of the body, especially **the** central nervous and reproductive systems and kidneys. Most at risk are infants and unborn children, who can suffer developmental problems and brain damage. In addition, some lead compounds have been declared carcinogenic by the U.S. Department of Health and Human Services.

According to EPA records, between September 16 and October 2, **the agency** collected thirty-four air samples for

lead in the area immediately around the trade center. Six of those samples, or 17.5 percent, showed lead levels above the federal safety standard of 1.5 micrograms of lead per cubic meter of air. When I reported the positive findings, health officials referred to these and other high readings of contaminants as temporary "spikes" or as "snapshots in time" that posed no long-term health concerns. In the case of lead, however, the federal standard is based on only three months of continuous exposure to those levels. More important, these and many other tests the agency conducted were "grab samples," i.e., a specific quantity of air was collected for a short duration of time and then analyzed, as opposed to testing for an extended twenty-four- or seventy-two-hour period. So it is entirely possible that in other spots that were not tested, or even in the same spot at a different hour of the day, the lead levels were higher. The fact that a significant percentage of the agency's tests were showing lead levels above federal safety standards was at least cause for concern. True, those elevated levels were found only within a "red zone," which at the time was off-limits to all but rescue and recovery workers, but that was because the agency was conducting virtually all its tests for heavy metals within that red zone. Only months later would New Yorkers learn that a twenty-four-hour air-monitoring station set up by a team of scientists

from the University of California at Davis had registered elevated lead levels in the air a mile north of Ground Zero.

Furthermore, even if all the lead results had been low or nondetectable, no one had any inkling of how much lead was in the original September 11 dust clouds. Pregnant women exposed to those massive dust clouds, for instance, should have been given an immediate advisory about possible lead exposure. When lead first enters the body it migrates into the blood, but within two weeks it gets deposited in the bones.

"In the case of pregnant women, you want them to up their calcium since the fetus in the woman's body can't tell the difference between calcium and lead," one scientist told me. "If you give the mother a big dose of calcium immediately the fetus will up its intake of the calcium instead of the lead. But I guess they [government officials] were afraid of upsetting everyone with advice like that."

MERCURY

Mercury is another heavy metal that is extremely toxic to humans and especially dangerous to children, since it accumulates in the body.

Short-term exposure to high levels of metallic mercury

vapors can cause lung **damage**, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation, according to the federal Agency for Toxic Substance Disease Registry. Organic or inorganic mercury can also damage the brain, the kidneys, and a developing fetus. In the brain, effects can result in irritability, tremors, changes in vision or hearing, and memory **problems**.

For decades mercury has been routinely used in thermometers and thermostats, power and telephone switching systems, batteries, liquid crystal computer monitors, and one of the most common fixtures of the modern building, fluorescent bulbs. The average four-foot fluorescent bulb contains about 21 milligrams of mercury, though a few environmentally engineered models use considerably less. That is a tiny amount that would fit on a pencil dot. Nonetheless, "there is enough mercury in any lamp to become a serious environmental problem if it is released uncontrolled," according to Paul Abernathy, a California businessman who recycles mercury.

The mercury contained in twenty-five lamps can pollute a twenty-acre lake. It is so toxic that all discarded lamps are considered hazardous waste and cannot be disposed of in landfills or incinerated, but must be properly recycled or sent to specific **dumps**.

"Any lamp has more mercury in it than you want to

breathe," said **Abernathy**, who has testified as an expert witness in numerous court cases involving mercury releases. "If you break thousands of them all at one time, you have a significant release of mercury."

There were 500,000 fluorescent lamps inside the Twin Towers on **September** 11, according to the Port Authority of New York, and unknown thousands more in the other buildings that were damaged or destroyed. Every one of those bulbs shattered when the buildings came down. Whenever a fluorescent bulb shatters the mercury breaks up into globules, most of it vaporizing within eight days, or sooner if there is heat present. The vapors, once they cool, easily attach themselves to other particulates. A Port Authority spokesman assured me in late February that the agency, which owned the World Trade Center until last year, had replaced many of its old lamps with newer models containing as little as 6 milligrams of mercury each. But even if you assume a mercury content lower than the 21-milligram national average, you are still facing a total release just from fluorescent bulbs of from 10 to 25 pounds of mercury that day. That does not include releases from other sources such as batteries, thermostats, and switches. All of that mercury was dispersed in minute amounts into the dust cloud on September 11. **This** is an enormous amount when you consider that on any given day the total nationwide average mercury

emission of the several hundred coal-burning electric power plants in the United States is only 200 pounds.

Mercury is so toxic at even minute quantities that exposure levels are tightly regulated by several agencies. The EPA has a limit of 2 parts per billion in drinking water and 3.1 parts per billion in air. The Food and Drug Administration has set a maximum permissible level of 1 part per million of methylmercury in seafood. And OSHA has set a limit of 0.05 milligrams per cubic meter of metallic mercury vapor for an eight-hour shift in a workplace.

The EPA says it took a handful of tests for mercury in the air around the trade center in the first two weeks after the collapse. None detected the presence of the metal, and in a few bulk dust samples taken around the same time only trace levels of the metal were found, according to EPA spokesperson Mary Helen Cervantes. When I asked Cervantes why, with so many fluorescent bulbs inside the trade center, so few tests were taken, she replied: "We still would not consider that [the bulbs] a huge source; nonetheless, we did sample in various media."

EPA officials were equally cursory concerning their measurements of mercury in the Hudson River in the days after September 11.

On September 14, the EPA conducted tests of water draining into the river from an overflow pipe near the trade

center. The test results, which were reported to the agency on September 20, showed extraordinarily high levels of mercury and other heavy metals as well as dioxins, furans, and PCBs in the water samples. For mercury, the tests showed levels of 8.8 parts per billion, four times the agency's Marine Acute Criteria, the level at which most fish are killed within an hour. In addition, tests the EPA performed the following day on Hudson River sediment opposite the trade center showed mercury levels as high as 2.8 parts per million—four times greater than the highest mercury levels measured in New York harbor back in 1993–94.

In other words, the EPA's own tests, taken within a week of the catastrophe, showed that mercury was making its way into the Hudson River from Ground Zero, even if the small number of tests the agency took for mercury showed none in the air or dust. Since then, clear evidence has emerged from other quarters of mercury contamination around Ground Zero. For instance, a private firm that was conducting the cleanup of an office building at 20 Church Street, just northeast of the World Trade Center, has confirmed that its tests show the presence of high levels of mercury as well as asbestos and dioxin. Mercury was even found in dust behind the building's plaster walls. Cleanup was expected to take many months as work crews stripped the building down to its concrete. Any material in the building that has a porous surface

face has been discarded. Because the city's Legal Aid Society was headquartered in the building, cleanup crews were forced to conduct a painstaking sheet-by-sheet decontamination of thousands of important legal files.

Meanwhile, fifteen Port Authority employees assigned to work at Ground Zero were found to have elevated mercury levels in their blood. The employees, eight policemen and seven civilian workers, were immediately removed from the site. The Port Authority urged them, at the same time, to remove all fish from their diets, since high mercury levels can also result from consumption of fish that are contaminated with the metal. All the employees were later found to have returned to normal mercury levels, according to an agency spokesman.

DIOXINS AND FURANS

Dioxins and furans are the more recognizable names for two families of chemicals that have chlorine atoms attached to them. The official chemical names for the two families are Chlorinated Dibenzo-p-dioxins (CDDs) and Chlorodibenzofurans (CDFs). There are a total of 75 chemically related dioxin compounds, or congeners, and 135 in the family of furans, many of which are highly toxic. One dioxin compound, 2,3,7,8 TCDD, was identified by the EPA as the

most potent carcinogen known to science. It became infamous during the 1970s as one of the components of Agent Orange, the herbicide used by the U.S. military in defoliation efforts during the Vietnam War. Dioxins are usually generated as by-products of the combustion of materials such as plastics and other chlorinated chemicals and bleached paper products, by the open burning of wood, or from the incineration of hospital and municipal waste.

The impact on humans from exposure to even low levels of dioxins and furans can be severe, since they accumulate in body fat and have a half-life of from seven to twenty years. Some dioxins not only cause cancer but can attack the liver and reproductive, immune, and gastrointestinal systems as well. In scientific tests, animals exposed to dioxins during pregnancy often have miscarriages or severe birth defects in their offspring.

Millions of pounds of plastics products were inside the World Trade Center before the collapse, including computers, telephones, plastic desks, chairs, and other furniture, and hundreds of miles of soft polyvinyl chloride cable.

"Hundreds, if not thousands, of discrete chemicals, organic compounds, heavy metals, and acids would have been produced and emitted by the collapse and uncontrolled burning of what amounted to an enormous crematorium," said Dr. Marjorie Clarke, an expert on emissions from incin-

erators who has testified at several legislative hearings about the trade center collapse.

Those fires, according to Clarke, were **the** equivalent of dozens if not hundreds of incinerators all burning at once." But in most incinerators dioxins are destroyed when temperatures reach more than 1,800 degrees Fahrenheit. At Ground Zero the fires did not occur in an enclosed space, and each time workers removed a piece of debris more oxygen fed the underground furnace. **Thus** temperatures for the Ground Zero fires were much cooler than in an incinerator. Some estimates put them at about 1,000 degrees.

"That's the perfect temperature for generating dioxins but not destroying them," Clarke said.

From the moment it began conducting the first tests for dioxins and furans in air on September 16, the EPA recorded unusually high levels. Four samples taken that day at different spots on the periphery of Ground Zero all showed the presence of several of the dioxin and **fur**an congeners. The normal method of measuring these compounds is by calculating a TEQ (**toxic** equivalency) ratio that is keyed to the most potent **2,3,7,8** dioxin. The measurement is **usually** expressed in nanograms (one billionth of a gram) per cubic meter of air, or ng/m³. Actual lab results on the September 16 tests, according to the EPA documents, did not come

back until September 22, and they were not reported in the agency's internal daily monitoring report until September 25.

That **may** have been because there was one big **problem** the EPA has no safety standards for many of the toxins that were found in the air at Ground Zero, including dioxin. **When** questioned about the dioxin standards in **early** March, the EPA confirmed that the New York regional headquarters had devised its own.

"Yes, we actually set benchmarks for a lot of substances where we didn't have a standard," said EPA spokesperson Mary Mears. "For many of them we didn't have standards that we can use. We did risk assessment based on what we have on these various substances." Mears said the agency's local experts in risk assessment consulted the **EPA's** office of research and **technology** in Washington and scientists at the Centers for Disease Control before they set about quickly devising "removal action guidelines" or "screening levels" based on already approved human-intake standards. In the case of dioxin, they determined thirty-year and one-year exposure guidelines. But they did so based on a cancer-risk potential of 1 in 10,000, not 1 in 1,000,000, which is the cancer-risk level that EPA **policy normally** seeks to achieve for a toxic substance. Under the **EPA's** Integrated Risk Man-

agement Information System, which was adopted in 1986, agency policy has been to reduce cancer risks to 1 in 1,000,000 wherever feasible. In some situations, the agency can allow a higher exposure risk to the public for a particular toxic substance, but it can do so only after the determination made by its staff has undergone extensive outside scientific review and after there has been a period of public comment.

Shortly after my October 26 Daily News article alerted the public to the elevated dioxin levels around Ground Zero, the EPA began publishing on its web page the overall TEQs for its dioxin tests. This is what the agency told the public about those standards:

Most of the air samples taken in areas surrounding the work zone and analyzed for dioxin have been below EPA's screening level, which is set to protect against significantly increased risks of cancer and other adverse health effects. The screening level is based on an assumption of continuous exposure for a year to an average concentration of .016 nanograms per cubic meter. Because the vast majority of individual as well the average measured dioxin levels have been lower than the screening level, EPA does not expect an increased risk of health problems as a result of dioxin being emitted from the World Trade Center site.

The EPA's official communications to the public never mentioned that its regional office had made its own ad hoc determination of a screening level, that this standard had never existed before September 11 and had not undergone any kind of scientific peer review, and that it was based on what many scientists consider a low cancer-risk threshold of 1 in 10,000. In their defense, EPA officials were dealing with an unprecedented situation that called for rapid decisions. When they reported these "removal action guidelines" or "screening levels" as if they were some long-standing federal policy, however, they directly misled the public.

Even with those ad hoc guidelines, all four tests taken on September 16 revealed dioxin levels above Region Two's freshly minted thirty-year exposure guidelines. According to EPA records, 43 percent (32 of 73) of all dioxin tests in air the agency took between September 16 and October 18 were above its proclaimed thirty-year benchmark, and 5 percent (4) were above its one-year benchmark. Given that the thirty-year exposure level had been so hastily established at such a questionably low cancer-risk level, and without the standard review process, the high number of tests that surpassed that level should have set off alarms.

Indeed, even as the agency told the public there was no dioxin problem to worry about, its own staff was expressing a far more cautious message internally. On September 25, for

instance, a **daily** monitoring report summarizing those first September 16 dioxin tests stated: "Levels do not pose a short-term health concern. However, elevated sufficiently to be of concern for long term [chronic exposures]. Action Item: Additional monitoring needed for dioxin beyond the debris pile perimeter."

That "action item" recommendation reflected a clear concern that dioxin was spreading beyond the "red zone" of Ground Zero into areas where civilians had been allowed to return.

Indeed, one of the few fixed monitoring stations the EPA set up beyond Ground Zero began to detect high dioxin levels from its first sample. That station, located at Broadway and Liberty Street, had been reopened to the public on September 17. But three of the first five tests at the station, taken between September 23 and October 8, found dioxin levels above the agency's **thirty-year** removal action guidelines.

By then, the agency had initiated more widespread and more sophisticated dioxin air sampling beyond Ground Zero, most of it conducted over a continuous twenty-four-or-seventy-two-hour period.

The first such extended sample was taken between October 1 and October 4, from a sixth-floor window at the EPA's own headquarters at 290 Broadway, half a mile north

of the World Trade Center. That sample "showed results above EPA's action level based on a **30-year** exposure," according to EPA documents. The agency had now confirmed elevated dioxin levels extending half a mile away from Ground Zero, in an area where thousands of **people** had already been sent back to work. That should have been troubling enough. What was more troubling was that the agency did not report those findings in any of its **daily** summaries throughout the months of October and November. Even after it released hundreds of pages of documents under Joel Kupferman's Freedom of Information Act request, the EPA did not include the data on the dioxin tests at its own headquarters. Agency officials did take one immediate action the week they completed the testing: they quietly made respirators available to all staff at the agency that wanted them.

The dioxin tests at agency headquarters were followed by a second round of eight twenty-four-hour tests from October 11 to October 15, four of them at Borough of Manhattan Community College and four from a monitoring station on **Park** Row, down the street from Beekman Hospital. Both locations are several blocks away from Ground Zero. Two of the eight samples, both from Park Row, showed dioxin presence above the EPA's action level based on the **thirty-year** exposure. A third round of seventy-two-hour samples taken at

the same two sites from October 23 to October 29 once again revealed that the two samples at Park Row had dioxin levels above the **thirty-year** removal action guideline. Not until a fourth round of tests in early November did the dioxin levels at Park Row finally recede. Thus it is safe to assume from the EPA's own testing that thousands **of people** who live or work in the Park Row area were exposed to high levels of dioxin at least from September 11 through the beginning of November, and that thousands of others who worked around the EPA building were also exposed for an unknown amount of time.

As with asbestos, the levels of dioxin in ambient air would last for only a finite time—in this case a few months. The long-term threat came from the potential for dioxin congeners to attach themselves to dust particles and penetrate inside of buildings, where they could permanently contaminate indoor spaces unless properly removed. At least three commercial office buildings near Ground Zero have since been found to be contaminated with high dioxin levels in indoor dust, while most have yet even to be tested for dioxin.

The EPA took two outdoor dust samples on October 8 from the rooftops of two buildings near Ground Zero. Both showed elevated dioxin levels, though not above the agency's removal standard in soil, which is one part per billion. (The agency chose to apply its soil standard for analyzing dust

from the trade center.) The highest total dioxin TEQ on the roof of one building was 77 picograms per gram, equivalent to 77 parts per trillion, and thus substantially below the federal removal level.

That does not mean such dioxin levels are safe, however, according to David Carpenter, one of the country's top dioxin experts and a former dean of the School of Public Health at the State University of New York in Albany, **who** reviewed the EPA data.

"When you have 13.3 picograms per gram of TCDD [the most dangerous dioxin], as you did at that building, that is extraordinarily high for dust," Carpenter said. "Background levels in most places are about one **picogram** per gram. That certainly is a level of concern. It is not above the EPA standard for having to remediate, but when you have that amount in the dust samples in the presence of these huge concentrations in the air, one has to assume that the levels will accumulate in the **body**."

Contrary to the EPA's **public** assurances, Carpenter insists, "there is real reason to worry. Dioxins cause cancer and chronic disease. There does need to be concern particularly about pregnant women, or **people** of reproductive age who might become pregnant."

Dioxin was not just showing up in dust and air, it was also showing up in drain water and Hudson River sediment at

alarming levels. In September, the agency conducted tests of runoff water draining into the Hudson and of river sediment near the trade center. "All analyzed dioxins and furans were detected," began a staff report on the September 14 sampling. The report went on to state:

The Toxic Equivalency (TEQ) for the sample was 122 pg/L which is high. Toxic PCBs congeners were also detected at very high concentrations, with a TEQ of 151 . . . Metals and Asbestos were detected at high concentrations. . . .

In previous harbor work performed by NYSDEC . . . the highest observed dioxin TEQ was 22 pg/L

In other words, EPA staff had detected dioxin levels in runoff water more than five times higher than had ever been measured in water flowing into the Hudson River. In addition, they found extremely high levels of heavy metals, asbestos, and PCBs.

On September 21, EPA administrator Whitman issued another press statement reassuring New Yorkers that their air and drinking water were safe.

"Results we have just received on drinking water quality show that not only is asbestos not detectable, but also we can not detect any bacterial contamination, PCBs or pesticides,"

Whitman reported. Technically she was telling the truth. No contaminants had made their way into the drinking water supply, but that would have been highly unlikely anyway, since the city's water comes from hundreds of miles away in upstate New York via huge underground water tunnels. Very high levels of some potent contaminants, however, had been found in drain water coming from the World Trade Center—a clear indication that those contaminants existed in large amounts at the site—and this was almost entirely absent from her statement. Her only allusion to it was in two sentences buried deep in the press release: "Following one rainstorm with particularly high runoff we did have one isolated detection of slightly elevated levels of PCBs. This is something we are continuing to monitor very closely."

The PCB levels were not "slightly elevated," as Whitman claimed. They were astonishingly high, according to a report her own staff had produced the previous day. This is what that September 20 report said about PCBs: "Numerous PCB congeners including co-planer [dioxin-like] PCBs were detected at high concentrations. The Toxic Equivalency (TEQ) . . . is 15 pg/L. In previous harbor work . . . the highest observed PCB TEQ was 0.002 pg/L."

As for asbestos levels, the EPA staff found they also were off the charts. The federal government's Maximum Contamination Level (MCL) for asbestos in drinking water is 7

million fibers per liter. The water draining from the trade center contained 9.6 billion fibers per liter, according to another EPA staff report of September 18 (see appendix). It is important to emphasize that this contaminated water was not about to get into the city's water supply. The significance of the data was as a snapshot reflecting the enormous quantity of asbestos on the ground in lower Manhattan. As with dioxins and PCBs, Whitman and other agency officials said nothing publicly about these worrisome levels. It is possible that Whitman herself had not seen the daily monitoring reports but depended on summaries from the agency's middle managers in New York City. Whether responsibility was at the top or at a lower level, however, makes no difference. The reality is that the public was not getting an accurate report of what the EPA had found.

DIESEL FUEL AND OILS

More than 130,000 gallons of oil and insulating fluid from transformers and high-power voltage lines were released at the World Trade Center on September 11 when two Con Edison substations that provided electrical power for much of lower Manhattan were destroyed by the collapse of Seven World Trade Center.

□

The building was erected over the substations and anchored to the ground by a series of crisscross steel beams that formed trusses over several multistory electrical transformers. Below ground level, underneath the building and the power stations, more than 40,000 gallons of diesel fuel were stored in several tanks. These tanks, which were connected by pipes to smaller tanks in upper floors of the building, provided emergency fuel to power computers for Mayor Giuliani's command center and the emergency needs of other tenants in the building. When debris from the Twin Towers set off fires at Seven World Trade, the tanks were breached. The diesel fuel inside caused such a huge blaze that the steel trusses on which the building rested weakened and gave way, thus leading to the collapse of the entire building. The collapse, in turn, ruptured the transformers and several major power lines that ran into the substations, spilling more than 100,000 gallons of oil in the transformers and 30,000 gallons of insulating fluid from the voltage lines.

In addition to the diesel fuel and oil lost at Seven World Trade Center, another 30,000 gallons of diesel were stored in separate tanks underneath other buildings in the trade center complex. While a few of the tanks were eventually recovered intact, in total 200,000 gallons of fuel and oil were lost as a result of the collapse. Since the planes the hijackers

crashed into the Twin Towers each contained about 10,000 gallons of fuel, that means another twenty planeloads' worth of fuel helped feed the fires after the towers collapsed.

At least one group of scientists has found convincing evidence that petroleum was burning at Ground Zero into October. Tom Cahill, head of the UC Davis team that performed continuous independent monitoring of air quality from a spot one mile north of Ground Zero, told me in an interview of an extraordinary plume of smoke from the trade center that blew over his monitoring station on October 3.

"The wind was pushing the particles across the ground in front of our station," Cahill recalled. When he and his team analyzed the air samples, Cahill said, they found "a stunning amount of vanadium and nickel in that plume. The vanadium was fifteen or twenty times higher than any levels previously recorded in the United States." Sulfur, vanadium, and nickel in ambient air, Cahill said, are clear signs that petroleum is burning.

New Yorkers did not learn about the enormous spills of diesel and transformer oil until November 29, when I reported the information in a column in the *Daily News*. Con Edison had notified the state Department of Environmental Conservation about the spills from its properties on September 11, but had not provided details of the amount involved. After I began asking about fuel spills in early November,

both Con Ed and state officials stonewalled me for several weeks. The burning of more than 100,000 gallons of transformer oils, as they no doubt understood, raised another big question—the possible release of PCBs polychlorinated biphenyls).

For decades, PCBs were used as coolants or lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily. But the manufacture of PCBs was banned in the United States in 1977 due to mounting evidence of their toxic effect. The EPA's own literature says the agency "has found clear evidence that PCBs have significant toxicity effects in animals, including effects on the immune system, the reproductive system, the nervous system and the endocrine system." By 1987 the agency had concluded that PCBs are a probable human carcinogen.

In late November, a Con Edison spokesman confirmed to me that the utility had lost 100,000 gallons of transformer oil at Seven World Trade Center. The oil, as best as the company could tell, was contaminated "with low levels of PCBs," less than 10 parts per million, according to the spokesman. New York State's definition of hazardous levels for PCBs is 50 parts per million or more. The Con Ed spokesman conceded that numerous smaller capacitors destroyed at the site could have had higher levels of PCBs. Until now, however, there have been no independent tests of oil or soil beneath

the trade center **by** either the state DEC or the EPA that can corroborate Con Edison's statements. One DEC spokesman told me his agency was depending on the utility for test **results**. This despite the fact that Con Edison was fined on several occasions **during** the 1990s **by** both the DEC and the courts for **falsely** reporting hazardous spill information.

What is not in dispute is that unusually high levels of dioxin and **furans** emissions were recorded throughout October by an EPA air-monitoring station at West Broadway and **Barclay** Street, **immediately** adjacent to the **destroyed** Con Edison substations. The presence of **furans** is often associated with the burning of PCBs, according to scientist David Carpenter of the State University of New York at Albany.

The **EPA's** preliminary grab **samples** of drain water flowing into the Hudson near Ground Zero on September 14, as mentioned previously, showed extremely high levels of PCBs—75,000 times higher than any previously reported. In the first few weeks, however, the EPA told the public that this "slightly elevated" PCB reading was a onetime problem. To buttress its contention, the agency reported that several tests of PCBs in dust near Ground Zero had detected none or only trace amounts.

That report turned out to be completely wrong.

The only way to discover that error was by a close scrutiny of thousands of pages of internal agency reports. According

to those documents, on the **day** of the trade center attack, EPA staff in lower Manhattan collected only four dust Samples near Ground Zero that were subsequently tested for a variety of toxic substances, including PCBs. One sample was taken south of the site and three north of it, the farthest away being at the corner of Reade and Hudson Streets, nearly a mile to the north. Not until November 1—six weeks after the attack—did the agency issue the results of those tests in its daily monitoring reports. All the samples had detected PCBs, the report stated, but none was **higher than** the **EPA's** standard of 1 part per million, which normally triggers cleanup efforts. Six weeks later, on December 14, the agency quietly posted a correction at the end of its full monitoring report for that **day** (see appendix). The correction stated:

*A **pesticide/PCB** scan previously conducted for those four samples and presented in the Nov. 1 Sampling Situation Report incorrectly identified all levels as being below 1 ppm. Two of the samples were actually estimated to be above 1 **ppm** for total PCBs. The highest total PCB **result** of these two samples was estimated at 1.54 ppm.*

This correction was astounding on two counts. First, the agency was admitting, more than three months after September 11, that high levels of PCBs had been found in the

only dust samples it took the day of the attack. Second, the highest levels had been found in a sample nearly a mile away. There is now no doubt that hazardous levels of PCBs were present in the dust on some streets on the day of the attack, and it is logical to assume that similar levels could be found on nearby rooftops and windowsills, and inside residential and commercial buildings wherever windows had been left open. But by the time the test results were released hundreds of thousands of people had returned to work in the area. They had been back for nearly three months. In all probability, few building or apartment owners had bothered to test for PCBs in dust before they moved back in, since the EPA had told them there was no PCB problem to worry about.

The December 14 PCB "correction" was never announced by the EPA in a press release. Nor was it highlighted in the daily summaries the agency posted on its web page. EPA administrator Whitman issued no retraction, nor did anyone else in the agency. No one wanted to draw attention, to the fact that the agency from the start had given the public erroneous information about PCB contamination.

By including the correction at the end of its December report, however, the agency was formally complying with its responsibility to inform the public. The report in which it appeared, while technically available to the public, was ac-

cessible only through a visit to the agency's regional library at 290 Broadway. With the EPA generating new environmental monitoring reports each day, some as lengthy as fifty pages, keeping up with the latest information was a daunting task. Most reporters simply accepted whatever the EPA told them or scanned the daily summaries the agency posted on its web page. Few bothered to examine the actual raw data.

To this day very few people are aware that, contrary to official government statements at the time, the dust in portions of lower Manhattan following the catastrophe of September 11 was contaminated with PCBs. This was true not just at Ground Zero but in spots as much as a mile away.

BENZENE AND OTHER VOLATILE ORGANIC COMPOUNDS

Benzene, a colorless, sweet-smelling liquid that evaporates very quickly, is one of the most widely used chemicals in the United States. It is found in plastics, resins, nylon, and many synthetic fibers, in gasoline, in some types of rubbers, in lubricants and dyes, in pesticides, even in some drugs, detergents, and cigarette smoke. It is extremely toxic. Breathing very high levels of benzene can cause tremors, confusion, inconsciousness even death. Long-term exposure can

cause leukemia and cancer of blood-forming organs. The chemical can also be released **by** volcanic eruptions or wild-fires.

For many months after the collapse of the trade center, hundreds of chemicals known as aromatic hydrocarbons and VOCs (volatile organic compounds), many of which are known carcinogens, were released into the **atmosphere** by the fires, and of those benzene was the toxin that appeared at extraordinarily high levels. The EPA did acknowledge from the first **days** of the disaster that it was finding high benzene levels at Ground Zero, and it repeatedly urged rescue workers on the site to use proper protection, as required by federal law. Unfortunately, as we shall see later, neither city officials in charge of the site nor OSHA monitored Ground Zero operations with sufficient vigor to implement that requirement.

The **EPA's** public announcements on benzene releases did not give any specific information or data for many weeks after the attack. Typical of its early reports was this one from the agency's Daily Environmental Summary of October 24, 2001: "Sampling for volatile organic compounds (VOCs) was conducted on October 23 in the direct area of the debris pile at ground zero. Benzene exceeded the OSHA **time-weighted average** permissible level at two locations."

OSHA's maximum **permissible** exposure limit (PEL) for benzene is 1,000 parts per billion in air for an eight-hour average, 5,000 **ppb** for short-term exposure. Anything greater than that requires the use of cartridge respirators or gas masks to filter out organic vapors. At two spots on the site that day, the Austin **Tobin** Plaza and the North Tower, the benzene **grab-sample** readings at the plume were 2,100 and 20,000 ppb. In fact, throughout all of September and October there were **only** six times when benzene readings at the North Tower plume were below OSHA's permissible exposure limit. On some days, they reached as high as 86,000 ppb (October 5) and 58,000 ppb (October **11**). Even during November, readings exceeded OSHA levels in half the tests conducted, yet on some days individual samples were higher than **they** had been in September and October. For example, on November 8, an **EPA grab** sample at the North Tower plume detected 180,000 ppb of benzene — **180** times above the OSHA limit! Even as late as January 7, benzene readings were as high as 5,300 ppb.

After I reported on some of these levels on October 26, furious EPA officials insisted that **they** were only samples taken at ground level in the debris pile and were not an accurate reflection of the benzene hazards to workers. Benzene dissipates quickly in air, they said, and all rescue workers had

been urged to wear proper respirators that would filter out such toxic gases. In an opinion piece for the **Daily News** on October 31, Christie Whitman wrote that the EPA had found "low levels of contaminants in the 'breathing zone'—5 to 7 feet away from the debris pile—and undetectable levels away from the work site." In short, the workers had sufficient protection and the public need not worry.

Once again, Whitman was wrong. Many of the rescue workers did not have proper protection. Emmanuel Gomez, for instance, was a probationary police officer at the New York Police Department Academy on September 11. He is also a veteran reserve army lieutenant assigned to U.S. intelligence. On September 11, Gomez and his entire academy class of 800 were deployed to the World Trade Center to secure the site and help with rescue and cleanup efforts.

Six months later, during a public hearing held by EPA hazardous waste ombudsman Robert Martin, Gomez and several other police officers and firefighters testified that they had worked for weeks at Ground Zero without being provided with anything more than paper masks that were not capable of filtering out asbestos fibers, let alone benzene or other toxic vapors. Gomez, who has had extensive training in chemical and biological warfare at Fort Bragg, said that from the first day he realized the toxic threat his fellow officers were facing. Below is part of the transcript of that hearing.

GOMEZ: It was not until the third day we were issued paper masks which were not effective in any way to protecting our lungs from the harsh odors, hazardous materials and particulates in the air emanating from the fire. . . .

I noticed with my fellow officers that the superior ranking officers had masks with filtration systems. So I was seeing captains and lieutenants walking around with masks, with actual gas masks on, and here we are cleaning up the rubble—securing the area and doing everything that should be done at that time and we don't have the proper equipment.

QUESTION: For that 25 days straight, starting from Sept. 11, did anyone try to provide you a respirator?

GOMEZ: No sir.

QUESTION: Only those paper masks?

GOMEZ: Only those paper masks . . . As a matter of fact, there were only three of us in my whole company out of 50 that were actually wearing proper masks that we purchased on our own.

Later in his testimony, Gomez described the working conditions at Ground Zero: "Every time they pulled up a new slab of concrete, the flames shot up, smoke came on and a new blast of smoke and particles came out right at you."

Whitman's assurance that benzene was not a danger **be** cause rescue workers had been advised to use protective masks was meaningless. Furthermore, her claim that **ben**zene and other pollutants did not travel beyond the actual smoke plumes on the site is contradicted by the agency's own tests. For example, on October 26, a few days before **Whit**man published her column in the *News*, a grab **sample** for benzene at Liberty and Trinity Streets, at the extreme southeast edge of Ground Zero, showed levels of 11,000 ppb—eleven times the OSHA permissible exposure limit.

CORROSIVE DUST LEVELS

An even more blatant example of how government health **of** ficials **kept** vital information on the dangers of the trade center's emissions to themselves is provided by events **sur**rounding the United States Geological Survey's discovery that dust in the air over lower Manhattan was highly corrosive to human lungs.

On September 16, five days after the attack, NASA's Jet Propulsion Laboratory flew one of its reconnaissance **planes** over the World Trade Center site equipped with AVIRIS **re** mote sensors. AVIRIS (Airborne Visible/Infrared **imaging** Spectrometer), one of the space agency's most advanced measuring devices, is designed to detect the presence of

even minute substances on the surface of a **planet**. It **identi**fies minerals and chemicals by **spectral analysis**. Data from the spectral mapping were immediately turned over to the Geological Survey for analysis. In addition, the USGS **dis**patched a team of scientists to the disaster site on the evenings of September 17 and September 18 to collect dust and debris samples from thirty-five spots within a **one**-kilometer radius of Ground Zero.

By September 18, the USGS had **provided** top officials in charge of the disaster with a **preliminary** report and map that identified the locations of more than a dozen thermal hot spots (fires burning **underground**) on the site. That was followed, on **September** 27, **by** a full report from the USGS **an**alyzing and mapping locations of asbestos and other minerals, as well as the results of chemical tests on the dust and debris, conducted both indoors and outdoors. Here, I will concentrate on what the USGS scientists discovered about the dust. Their asbestos findings will be discussed in the following chapter.

"Chemical leach tests of the dusts and **airfall** debris **sample**s indicate that the dusts can be quite alkaline," the report summarized, due to high levels of concrete, gypsum, and glass fiber particles.

Anyone who has ever carried out maintenance on a **swim**ming pool or a Jacuzzi knows that by testing for pH, you

determine the acidity or alkalinity of a material. On a 15 point scale, for instance, unpolluted water will register a neutral pH level of 7. The lower the level between 7 and 0, the more acidity there is. Rainwater is often measured at pH 5 to 5.6 because of the effect of some acid pollutants. The higher the reading between 7 and 14, the more alkaline the substance is. Extremes at either end can be harmful to animals and human beings.

Most of the samples collected by the USGS team were between 9.5 and 10.5, which is around the alkalinity level of ammonia. Some were as high as 12.1—equivalent to the corrosiveness of drain cleaner.

"Indoor dust samples generated the highest pH levels (11.8) in leach tests, indicating that dusts that have not been exposed to rainfall since September 11 are substantially more alkaline than those that have been leached by rainfall," the report found.

Thus by September 27, the EPA and other health agencies in New York City had been notified by the USGS that dust in the air in lower Manhattan—both indoor and outdoor—was extremely corrosive to human lungs. Yet neither the EPA nor any other local health agency reported the findings to the public. Not until late November, when the report was published on a USGS web page, did anyone outside the

government know about the findings, and even then the general public was still in the dark.

It took a February 9 investigative report by Andrew Schneider, a Pulitzer Prize-winning reporter at the *St. Louis Post-Dispatch*, to finally bring the startling alkalinity findings into the public spotlight.

"It is extremely distressing to learn that the EPA knew how caustic samples of the dust were and didn't publicize the information immediately," Joel Shufro, executive director of the New York Committee for Occupational Safety and Health, told Schneider.

EPA spokespeople repeatedly insisted to Schneider that they had warned the public about how caustic the dust was. Yet this is belied by the fact that not a single item of EPA, OSHA, or New York City Health Department literature since September 11 mentions the corrosive nature of the dust.

On February 12, the day after hundreds of people jammed a U.S. Senate subcommittee field hearing in New York to testify about the environmental problems in lower Manhattan, EPA administrator Whitman finally showed the first signs of recognizing some of the blunders her agency had committed. In a letter that day to Senator Hillary Clinton of New York, one of the conveners of the hearing, Whitman

wrote: "It has become clear in recent days that despite our best efforts, some results that were developed by other federal agencies and that would have been of interest to the public were not disseminated through our web site. Even though that data was consistent with our own, I still believe the public interest would have best been served **by** making it available promptly."

That day, five months after the disaster, Whitman also announced that she was forming an interagency panel to gather and analyze information about indoor air quality near Ground Zero. It was her agency's first admission that there were unresolved questions about environmental safety in lower Manhattan. But even as she formed the task force she continued to repeat the agency position that "data from air quality tests thus far have been, in general, reassuring. None of the testing done to date has shown results that would **indi-**cate long-term health impacts."

As we shall see in the following chapter about asbestos, Whitman's assurances were grotesquely misplaced.

Ignorance, Lies, and Cover-up: The Asbestos Fiasco

ASBESTOS IS ONE of the deadliest minerals ever used **by mod-**ern industry. Estimates suggest that more than 300,000 Americans died from breathing asbestos fibers during the twentieth century. The asbestos manufacturers knew their **product** caused lung cancer and asbestosis but suppressed the medical evidence for decades, and bitterly **fought** the eventual decision of the federal government to ban many uses of the mineral while sharply restricting others. **Thou-**sands of victims whose health was crippled **by** working with asbestos ended up suing the manufacturers, and several firms went **bankrupt** from the avalanche of court cases.

The EPA and other government agencies knew that the World Trade Center contained from 400 to 1,000 tons of asbestos, primarily used as fire insulation on steel girders in the lower floors of the main towers. And they did not dispute the

**U.S. Environmental Protection Agency (EPA)
Daily Summary
Tuesday, October 2, 2001**

<http://www.nyenvirolaw.org/nelj-p-EPA-WTCTestsResults.htm>
has most of the EPA DEC DOH docs see- under Menu Bar Gov.Agencies right arrow EPA WTC test results

Most Recent Results (as of 6:00 p.m. 10/2):

Air: Fixed Monitors in New York and New Jersey:

Asbestos - EPA analyzed 33 samples taken in and around the ground zero area from September 28 to September 29 (noon). Two samples around the World Trade Center showed levels above the 70 structures per millimeter squared, which is EPA's standard for allowing children to re-enter schools after asbestos removal activities. The locations for these two samples were Liberty Street and South End and West and Albany Streets.

EPA analyzed 34 samples taken in and around ground zero from September 29 to September 30. Two samples taken on September 29 showed levels above 70 structures per millimeter squared. The locations for these two samples were Liberty Street and South End and Rector and South End. Two samples taken on September 30 at Albany and Greenwich Streets and Albany and West Streets were also above the EPA school standard. All of the other samples were below the school re-entry standard.

Four air samples taken in New Jersey through September 30 were all less than the school re-entry standard.

This brings the total number of air samples collected and analyzed to 442. This figure is an adjusted and accurate number that reflects the total samples to date captured in our new database.

Staten Island Landfill (Asbestos)

Air - 49 air samples were taken from Sept. 29 to Oct. 1. All test results were below the AHERA standard used for allowing re-entry into schools.

Dust - Eight dust samples were taken on Oct. 1; all showed no detection of asbestos.

Ambient Air Sampling:

Metals - 10 samples were taken on September 27 within the vicinity of the emergency response operations. Of those, one sample at Barclay and West Broadway exceeded the National Ambient Air Quality Standard for lead, but did not exceed the National Institute of Occupational Safety and Health (NIOSH) standard. Chromium was found to be above the EPA action guideline at nine locations. However, when adjusted for a one year exposure, none of the levels exceed the most conservative NIOSH chromium standard or the EPA removal action guideline.

255

Volatile Organic Compounds - Eight samples were taken on September 30 from locations around the ground zero area. Two samples taken at ground level at Liberty and Greenwich Streets exceeded the OSHA level (0.5 ppm) for benzene. One sample taken at ground level at Liberty and Greenwich had a benzyl chloride reading that slightly exceeded the OSHA level (1.0 ppm).

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NIEHS WETP
National Clearinghouse
for Worker Safety and Health Training

For Immediate Release

NIEHS RELEASES ASSESSMENT REPORT ON WORKER SAFETY AND TRAINING NEEDS AT WTC SITE

Washington, DC, October 23, 2001—The National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP) released a preliminary assessment report yesterday on the potential safety and health hazards and training needs affecting on-site skilled support personnel and cleanup workers at the World Trade Center disaster site. The Report, which was discussed and released at the October 22 American Public Health Association annual meeting in Atlanta, contains information on significant risks that have been and continue to be faced by these on-site response and recovery workers.

“Absent a comprehensive WTC safety and health plan and given the lack of an organized safety and health presence on the site, we found it to be a very dangerous working environment where many workers lack the hazard-specific training required under current OSHA standards,” said Joseph T. “Chip” Hughes, Program Director of the WETP. A number of WETP grantees, including those training firefighters and construction workers, mobilized resource responses in an effort to begin training of on-site emergency search and rescue workers, technicians, and other specialists. It was estimated by local authorities that over 3,000 construction crafts/trades are working on the WTC Site daily.

“The WTC rescue and recovery efforts have occurred in an environment never before anticipated by current safety and health legislation and standards,” added John Moran, consultant to NIEHS and co-author of the report. “In light of today’s threats, we need to be prepared for any future bioterrorism or similar emergencies, by focusing primarily on the training needs of emergency first responders, skilled support personnel from the construction trades, and cleanup/demolition/removal workers.”

The WTC assessment report states that the loss of almost the entire emergency response command structure of the New York Fire Department, as well as most of the Department’s HAZMAT instructors, technicians, and specialists, resulted in a serious shortage of experienced HAZMAT personnel.

Conclusions of the assessment were made based upon observations made during a visit to the site from September 22-27, 2001, as well as analysis of the WTC Disaster Site Worker Injury and Illness Surveillance Update reports issued by the New York City Health Department. The full NIEHS WETP report can be downloaded on www.wetp.org, entitled ‘NIEHS WETP Response to the World Trade Center (WTC) Disaster: Initial WETP Grantee and Preliminary Assessment of Training Needs.’

About the NIEHS WETP

The NIEHS WETP was created in 1987 by Congress as part of the Superfund Program to support the development of a network of non-profit organizations that are committed to protecting workers and their communities by creating and delivering high-quality, peer-reviewed safety and health curricula to target populations of hazardous waste workers and emergency responders. Through NIH extramural grants, the WETP awards cooperative agreements to support the development of curricula and training programs throughout the country to help employers meet OSHA requirements under 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response.

**National Institute of Environmental Health Sciences (NIEHS)
Worker Education and Training Program (WETP)
Response to the World Trade Center (WTC) Disaster:
Initial WETP Grantee Response and Preliminary
Assessment of Training Needs**



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Contract # 273-FH-013264

October 6, 2001

EXECUTIVE SUMMARY:

The attack on the World Trade Center on September 11, 2001 and the subsequent magnitude of the destruction and loss of life at the World Trade Center Complex (WTC) created an emergency response, rescue, and recovery effort of enormous proportions. New York City, State, and many Federal disaster response organizations, in addition to thousands of volunteers and other support organizations, quickly responded, including the NIEHS-Worker Education and Training Program (WETP). Several of the WETP grantees were among those support organizations responding for the purpose of providing quick-response training to workers, many from organizations with which the grantees are affiliated. In order to provide a perspective at the WETP Administrator level, a short-term technical assistance and coordination task order was executed with the authors, one of whom was dispatched to the WTC disaster site over the period from September 22 through September 27, 2001.

The purpose of the short-term task order was four fold: 1) assist in coordination of NIEHS-WETP grantee activities at the WTC Site, 2) assess the current safety and health status of response personnel working at the WTC Site, 3) evaluate the current Site safety and health plans or programs and related aspects such as exposure monitoring with respect to worker protections, and 4) perform a preliminary training needs assessment specific to the WTC Site activities.

With respect to the coordination task, both the International Association of Fire Fighters and the Operating Engineers National HAZMAT Program had launched an immediate and comprehensive response. As events unfolded, the authors and several other grantee organizations mobilized response resources, including coordination with the New York City Building and Construction Trades Council and the Construction Employers Association, Bechtel Corporation, the contractor responsible for developing the over-all WTC Disaster Site Safety and Health Plan, and other parties with respect to the training programs that could be promptly provided by the grantee organizations.

Assessment of the current safety and health status at the Site was based upon on-site observations and analysis of the WTC Disaster Site Worker Injury and Illness Surveillance Update Reports issued by the City Health Department. Evaluation of the current Site safety and health plans and programs and related aspects was not possible, as none were apparently applicable to the construction workforce. The training needs assessment task, therefore, was conducted solely on the basis of safety and health status observations and analysis of the injury and illness surveillance reports. Training recommendations, in broad terms, are provided in this report. Training needs assessments keyed to specific construction crafts or trades, an important dimension to aid in better targeting of training response and capacity assessments by the grantees, was not possible as the prime clean-up, demolition, and removal contractor's safety and health plans and related documents have not yet been released.

It became very apparent early in the WTC Site visit that the WTC Site was operating in a search and rescue mode being undertaken by NYC Fire and Police personnel and Federal personnel such as the FEMA Urban Search and Rescue Teams in accordance with the Federal Response Plan (FRP). In addition, massive utilization of contractor-provided skilled construction support personnel to aid in the rescue and recovery effort was evident. As this phase continued past the second week, there was no clear termination of the rescue and recovery effort owing, no doubt, to several factors such as the NYC Fire Department bearing responsibility for collapsed buildings and the fact that fires continued to burn in the Site debris pile. This situation created a very complex safety and health setting in which there was confusion as to which occupational safety and health standards were applicable, whether enforcement agencies indeed had enforcement jurisdiction, and at what point in time the WTC Disaster Site Safety and Health Plan would become effective and operative. Examples of the approaches to worker safety and health protection during this period were the Operating Engineers National HAZMAT Program on-site support operation providing several thousand respirators and cartridges to operators (and Police, FEMA Team members, among others), the OSHA Technical Support operation providing over 4,000 respirators and conducting air monitoring as a technical support activity likely under provisions of the Occupational Safety and Health Support Annex to the NRP, and the Carpenters Union Training Academy providing respirators and fit testing. Of importance, it must be noted that the determination that respiratory protection is required, and providing of such devices when required, is the responsibility of the worker's employer.

What has emerged in this massive disaster and the protracted and complex response is the fact that rescue, recovery, and other activities have occurred in a scenario never anticipated by the safety and health legislation or the subsequent standards/regulations. The injury and illness reports for the initial weeks of the search and rescue activity were at unacceptable levels. Moreover, the exposure data, as well as the potential for serious exposure to toxic materials (including asbestos) among the construction response workers, raises significant concerns. Accordingly, how to respond to such situations demands serious attention in the context of worker protection and training needs.

TABLE OF CONTENTS:

Introduction:	5
The Incident Response Effort:	6
The NIEHS-WETP Assessment Task Assignment:	8
I. Coordination:	10
II. Safety and Health Status:	12
III. WTC Site Safety and Health Program/Plan:	16
IV. Preliminary Training Needs Assessment:	18
Conclusions:	20
Discussion:	23
References:	24

INTRODUCTION:

At 8:45 a.m. on September 11, 2001, hijacked American Airlines Flight 11 out of Boston was crashed into the north tower of the World Trade Center in New York City. At 9:03 a.m. a second hijacked airliner, United Airlines Flight 175, also out of Boston, was crashed into the south tower of the World Trade Center. At 10:05 a.m., the south tower collapsed. At 10:28 a.m., the north tower collapsed. At 4:10 p.m., Building 7 of the World Trade Center complex is reported on fire, and at 5:20 p.m. Building 7 collapses. At 7:45 p.m., the New York City Police Department reports that at least 78 of their officers are missing and the City reports that at least half of the first 400 firefighters who responded to the scene were killed.

While many thousands of those in the World Trade Center Complex were evacuated prior to the collapse of the two towers, thousands did not get out before the buildings failed. Further, the initial responding units of the New York City Fire Department (FDNY) included the emergency response command units and highly trained hazardous materials emergency response technicians, specialists, and instructors. In the collapse of the towers, essentially the whole emergency response command structure of the FDNY was lost as well as a majority of the Departments HAZMAT instructors, technicians, and specialists.

The New York City Mayor's Office of Emergency Management, Emergency Operations Center (EOC) was immediately activated. Fire Department and Police personnel were dispatched to the WTC site in a massive rescue operation. Concurrently, other emergency management actions were activated. State and Federal response, under provisions of the Federal Response Plan, were undertaken immediately as well by DHHS, FBI, FEMA, the dispatch of several FEMA Urban Search and Rescue Teams, the U.S. Army Corps of Engineers (in support of FEMA), EPA, OSHA, CDC, and others. (Additional information about the response activities of these organizations may be found at their web sites. See references.)

Requests for Assistance from NIEHS-WETP

Shortly after September 11th, the NIEHS-WETP received an urgent request for supplemental funding assistance from the International Association of Fire Fighters (IAFF), an NIEHS-WETP training grant awardee, to aid in immediate efforts to begin training of hazardous materials emergency response instructional staff, technicians, and specialists in order to immediately begin re-building the City's emergency response capability, a capability that was severely depleted very early in the WTC disaster. Several other NIEHS-WETP awardees initiated disaster response support efforts as well, as many of the organizations for which they provide HAZWOPER and related training were involved in the disaster response effort.

NIEHS-WETP initiated a coordinated response assistance effort. One aspect of that effort was a task order under the National Clearinghouse NIEHS-WETP contract to provide

coordination support, including on-site assessment and coordination activities. This document is a report on the four specific sub-tasks assigned to the Clearinghouse under that task order.

This Report is a snapshot in time. It reflects the observations during a period from September 22nd through September 27th and subsequent information obtained through October 5th. The entire WTC Site is a constantly changing entity. Activities and efforts of government agencies, contractors and support organizations subsequent to October 5th are not, unless specifically mentioned, reflected in this Report.

THE INCIDENT RESPONSE EFFORT:

The response to the WTC disaster has been enormous in both scope and complexity and has involved a wide range of resources from the City of New York, several State and Federal organizations, private contractors engaged by the City in various capacities, and many other support organizations such as the NIEHS-WETP grantees.

The magnitude of the destruction is difficult to perceive without visiting the site. The World Trade Center and related buildings are located on a 16-acre site bounded by Vesey, West, Church, and Liberty Streets. WTC Towers 1 and 2, Five WTC, Seven WTC, and the Marriott Hotel occupying this area collapsed or were destroyed. One Liberty Plaza, Four WTC, and Six WTC have partially collapsed. One, Two, and Three World Financial Center buildings adjacent to the WTC site suffered major damage, as did six other major structures adjacent to the WTC Site. Subway and PATH train tunnels, the Concourse level, the Mall, six levels of parking decks, and storage decks below and adjacent to the WTC site have partially or completely collapsed. The building materials and steel rubble at the WTC site alone is estimated to be in excess of 1.2 million tons.

Under the City of New York Emergency Response Plan, the Fire Department is responsible for managing responses to building collapse incidents. This Report is based on specific observations and information obtained through October 5, 2001. As of October 5, 2001, the activity at the site remained in an initial search and rescue management phase under the management of the Mayor's EOC Office and the Fire Department. The matter of control is very fluid and may well have changed substantially since October 5th. Each day brings another change in the management process. New contracts are being let for demolition and cleanup services. This is to be expected in a project of this magnitude.

The following response activities are of relevance to this Report:

1. Number of personnel working at the WTC Disaster Site:

The following estimated number of personnel are working daily at the WTC Disaster Site, by organization. Operations are being conducted on a 24-hours/day basis.

Fire Department	1200	10 and 12-hour tours.
Police Department	2000	12-hour tours.
FEMA Urban S. & R.	496	12-hour tours.
Construction	1350	8 and 12-hour tours.
Sanitation Department	85	-----
TOTAL:	5135	

These are estimates that may not include other organizations, such as Con-Edison crews. With the exception of the FEMA Search and Rescue Teams, Federal personnel from EPA, OSHA, USACE, and others are not included.

2. Prime construction contractors:

Four prime construction contracts have been awarded to support the rescue operations. These have been to: Tully, Bovis, Turner, and AMEC. Each has been assigned a “zone” of operation and responsibility within the WTC Disaster site, each representing approximately one-quarter of the area of the site. (Reference 1) AMEC and Bovis are operating three 8-hour shifts/day, while Tully and Turner are operating two 12-hour shifts/day. AMEC is reported to be employing 150 workers per shift, 450/day; Bovis 100 per shift, 300/day; Tully 150 per shift, 300/day; and Turner 150 per shift, 300/day. Total daily construction hours worked is 158,400 based upon these estimates. (Reference 9)

3. Environmental, Safety and Health Oversight Contract:

Bechtel has been awarded a 90-day contract to develop the WTC Disaster Project Environmental, Safety and Health Plan. The Bechtel organizational structure responding to this contract is shown in Reference 2. Bechtel has developed at least two Draft World Trade Center Emergency Project ES&H Plans. The latest available to the authors as of October 5, 2001 is Revision A, dated 30 September 2001, which was received on October 3, 2001 after significant difficulties arose in obtaining copies by non-Agency organizations. (See below for more discussion on this issue.) That Draft indicates that the Site Logistic Plan, Site Demolition Plan, Site Asbestos Removal Plan, Spill Prevention and Response Plan, and Storm Water Pollution Prevention Plan were “under development.”

It is unclear, at this writing, as to when the final WTC Disaster Site ES&H Plan will be issued and implemented.

4. Air Monitoring:

EPA, OSHA, and the Operating Engineers National HAZMAT Program (OENHP) have been conducting bulk, area, and personal monitoring data. Other organizations are reported to be doing so as well, although their data is not available to us at this point. Bruce Lippy, with the OENHP, provided a summary of the EPA, OSHA, and OENHP data in a presentation to Dr. Kenneth Olden, Director of NIEHS, on October 4, 2001. His Power Point presentation “Air Monitoring Overview” is provided as Reference 3. The

OSHA Web Site (www.osha.gov) provides monitoring data obtained at the WTC Site. The October 3, 2001 report provided the results of 67 personal air-monitoring samples and concluded that “None of these samples exceeded OSHA’s permissible exposure limit of 0.1 f/cc (of asbestos) as an 8-hour time-weighted average.” However, it is important to note that some 18% of the samples evidenced asbestos fiber counts in excess of 0.1 f/cc, although full shift duration samples were not taken.

5. WTC Site Hazardous Materials Identification:

Table 2 in Revision A of the Site ES&H Plan dated 30 September 2001 lists the following materials as being present at the WTC Site as well as materials present in the several WTC structures. No quantities are provided. Reports indicate that asbestos was present in pipe insulation in both WTC towers, up to the 40th floor in one tower and the 20th floor in the other tower.

Chemicals existing at WTC Site: Diesel fuel, Asbestos, PCB, Crystalline Silica, Carbon Monoxide, Formaldehyde, PaH’s, Zinc Oxide, Mercury Compounds, Arsenic, Nickel, Lead, Cadmium Fume, Chromates, Benzene, HCL, HF, Hydrogen Sulfide, Gasoline, Freon (R-22), and spray paints and thinners.

THE NIEHS-WETP WTC ASSESSMENT TASK ASSIGNMENT:

The National Clearinghouse for Worker Safety and Health Training, pursuant to Contract # 273-FH-013264, was tasked by the NIEHS-WETP to undertake specific activities associated with the WTC disaster. The specific sub-tasks were:

1. Assist with coordination of NIEHS-initiated WTC Site activities by WETP grantee organizations with the existing Incident Command structure and federal, state and local emergency response agencies and other organizations as needs become apparent.
2. Assess the current safety and health status of site response and rescue workers with respect to compliance with OSHA 29 CFR 1910.120 (HAZWOPER) requirements and other applicable state and federal safety and health requirements for worker protection for purposes of identifying potential training needs.
3. Evaluate the current WTC Site safety plans, site environmental and worker monitoring data, inventories of hazardous materials and substances present in the collapsed structures, and levels of personal protection requirements for rescue and recovery workers, with respect to current and near-term operations at the Site for purposes of estimating training needs.
4. Perform a WTC Site training needs assessment for both immediate and short-term occupational safety and health and appropriate craft skills requirements for the recovery and potential demolition workforce in line with current requirements for EPA, OSHA and Army Corps of Engineers hazardous waste site protocols based upon available information.

John Moran was dispatched to the WTC as the safety and health liaison to provide an on-site perspective in responding to the tasking assignment. He was on-site from September 22 through September 27, 2001. Donald Elisburg served as the off-site coordination point, which proved to be of substantial value due to communication difficulties in the WTC area.

Responding to the specific sub-tasking elements reviewed above presented significant challenges and difficulties.

While the New York City Fire Department was “in-charge” of the WTC Disaster Site, the Incident Commander was, as a practical matter, the Mayor through the New York City Mayor’s Emergency Management structure. The enormous magnitude of the disaster and the impact on the City, the huge loss of life including over 400 fire fighters and police, the loss of essentially the whole emergency response command structure in the Fire Department, and the massive federal response to the disaster/crime scene created what is likely the most complex emergency response and management challenge ever faced in the Nation. As a consequence, close communication and coordination was occurring at only the highest levels. This began to expand and extend as disaster response management took hold, although effective communications and participation of affected parties with respect to worker safety and health matters remains a serious challenge, especially with regard to workers and their representatives.

Assessment of safety and health status of site response workers with respect to compliance with 29 CFR 1910.120 was not, in terms as stated in the sub-task element, possible at the time of the site visit, because the disaster site was still in the rescue phase of the emergency response. With respect to 1910.120, the response and rescue phase is governed by 29 CFR 1910.120(q) until such time as the Incident Commander terminates the rescue phase and turns the site over to clean-up operations.

At the time of the site visit, and to at least October 5, 2001, the WTC Disaster Site would appear to be under the emergency response provisions of 1910.120 and the four prime contractor entities would be considered as providing “skilled support personnel” to aid in the response and rescue operations. Skilled support personnel are not required under the 1910.120(q) provisions to be specifically trained as emergency responders in accordance with the requirements of 120(q) or the “clean-up” requirements of that standard under 1910.120(b)-(o). They must, however, be provided sufficient instruction on site-specific hazards, the wearing of appropriate personal protective equipment, and other appropriate safety and health considerations. (See OSHA Interpretation Shermann 920327.)

The writers were advised that when the WTC Disaster Site transfers from emergency response and rescue to clean-up and removal that compliance with the HAZWOPER standard at 29 CFR 1910.120 will not be required.

Evaluation of the then current WTC Site safety plans and monitoring data with respect to hazardous waste site response and remediation requirements was simply not possible. As of October 5, 2001, no WTC disaster site safety and health plan apparently existed.

Monitoring is being conducted by some organizations, largely federal (EPA and OSHA). EPA monitoring efforts began early with specific regard to concerns about public exposures to asbestos and other potential contaminants in the dust and smoke being released from the site. OSHA began air monitoring somewhat later with emphasis on personal exposure monitoring, as did the OENHP Industrial Hygiene staff. (See summary in Reference 3.) A preliminary inventory of hazardous materials and substances in the WTC structures was presented in the WTC Disaster ES&H Plan draft of 30 September 2001. Many such materials are present, including asbestos, lead, silica, arsenic, and freon.

Evaluation of the levels of personal protection in-use at the Site at the time of our visits with respect to hazardous waste site response and remediation was a simple task within the context of the tasking element in that PPE was simply not utilized by most of the workforce.

Only a very preliminary training needs assessment based upon evaluation of Site injury and illness incidents for the period 9/14 through 9/25 and Site observations could be conducted because the site has not transitioned to the clean-up and removal phase nor has either the Site Safety and Health Plan or prime contractors' Safety and Health Plans been issued or implemented. Absent these Plans, which should contain specific training requirements and regulatory standards under which operations will be governed, it is simply not possible to provide a rigorous training needs assessment.

The following sections address the four sub-tasking elements:

I. Coordination:

Upon arrival and tour of the WTC Disaster Site it became apparent that coordination aspects needed to be undertaken with a different approach than initially conceived. The Site was still in a serious rescue phase; the support contractors evidenced little if any attention to safety and health, let alone training, and communications and coordination among the various organizations with respect to safety and health particularly was isolated and difficult at best.

NIEHS-WETP Awardee Activity

The IAFF immediately responded to the disaster that had stricken their members in NYC. IAFF dispatched over 100 seasoned IAFF members to work with the NYC locals, they coordinated their response plan with FEMA and the FDNY, arranged to provide critical stress management services, established an IAFF headquarters office in NYC to assist the local unions with administrative and family services issues, and brought in administrative staff from IAFF headquarters in Washington. The WETP-funded program at IAFF immediately undertook efforts to begin training FDNY personnel to replace the HAZMAT instructional staff, technicians, and specialists that were lost in the collapse.

A major and comprehensive effort was undertaken by the Operating Engineers National HAZMAT Program that involved moving their mobile training facility to the Site from

West Virginia, with a stop at MSA in Pittsburgh to procure respirators and cartridges. Industrial Hygiene staff were deployed to the Site. The OENHP began air monitoring; developed informal guidance booklets on the site hazards; provided respirators, cartridges, hard hats, tyvek coveralls, and other PPE; and worked with the individual IUOE member heavy equipment operators to get them into respirators. They also worked with OSHA technical support personnel to facilitate personal air monitoring of their operators. Despite this level of effort and commitment, they were able to obtain only fragmented information about the safety and health program activities on the site at the time of John Moran's arrival on the site on September 22, 2001. (Reference 6)

Other WETP grantee organizations including L-AGC/IBT, CPWR, and UMDNJ (UBC) were also beginning to mobilize their responses to the disaster. See Reference 7 for the WETP WTC Updates issued by the WETP or the Clearinghouse web site at www.wetp.org.

A summary of the coordination activities related to the worker safety and health training issues undertaken, or observed, by the authors includes:

1. Site Safety and Health meetings began to be conducted at 8:00 a.m. every day starting on or about September 20, 2001. These meetings were apparently convened by Bechtel. WETP and labor organizations were not aware of these meetings. An EPA official brought it to the attention of the WETP Director and the Site liaison. WETP and labor representative organizations on site were informed. Conversations with the OSHA Regional Director indicated that these meetings, which OSHA personnel attended, had been largely focused on public health matters with little attention to worker safety and health. She expressed the desire to have labor and WETP grantee safety and health personnel involved and participating so that worker safety and health issues might be more fully considered. Labor representatives and WETP grantees on-site began to attend these meetings on September 25, 2001.
2. Pete Stafford, Director of Safety and Health for the BCTD and Director of the Center to Protect Workers Rights (CPWR), a WETP grantee, arranged for a joint meeting of the NYC Building Trades Council and the Construction Employers Association on matters associated with support that the CPWR could offer specific to the WTC Disaster. Arrangements were made for Pete Stafford to provide summary information on the courses available through the WETP grantees to support the training program needs of the contractors during the WTC clean-up effort. (Reference 4)
3. The summary information (Reference 4) depicting the courses available and WETP grantees available to deliver them was also provided to Bechtel and OSHA in order to facilitate wide dissemination of this information.
4. Peg Seminario, Director of the AFL-CIO Department of Occupational Safety and Health, organized an AFL-CIO WTC Cleanup Work Group, which held a meeting with OSHA and NIOSH to discuss the safety and health situation at the WTC Site. On September 20, 2001 that Department issued comprehensive information and fact sheets to Unions involved in the WTC Rescue and

Cleanup efforts. Bill Kojola, in the AFL-CIO S&H Department, was designated as the WTC Coordination point for the AFL-CIO and Pete Stafford for the BCTD. (Reference 8 contains this information package.) Communications with Messr's Kojola and Stafford were established and continued.

5. Additional communications and coordination links were established with Bechtel, EPA, OSHA, FEMA, several other WETP grantee organizations, and the Department of Occupational Medicine at Mt. Sinai Hospital in New York City, the New York Committee on Occupational Safety & Health (NY COSH), Hunter College and Johns Hopkins University. The Director of NIEHS, Dr. Kenneth Olden, was accompanied by the WETP Director to NYC on October 4th and convened a meeting of the WETP Awardees conducting Site related activities in order to review the various activities and begin planning for the next phase of the WTC cleanup operation.
6. A conference call among members of the EPA-Labor Superfund Task Force was held on October 3, 2001. Primary topic was discussion of safety and health issues pertained to the WTC and Pentagon Disaster Sites. After an hour and half of information exchange and discussion, there was agreement that many lessons could be learned from these two tragic incidents, which could aid future disaster response activities with specific reference to worker safety and health. Reports, such as this one, and others could serve as the basis to begin to focus on the lessons learned dimensions. The next meeting of the Task Force is in November. There is a desire for definitive recommendations at that point with respect to advancing the lessons learned approach. These recommendations will be presented and discussed with the new AA for OSWER at EPA during the upcoming annual meeting of the Task Force with the OSWER Assistant Administrator.

With respect to conveying information about the response assistance capabilities of the WETP and the WETP grantees, it became evident that the prime contact points must be the contractors engaged in the subsequent cleanup effort. The information provided by the CPWR at the meeting of the NYC Building Trades Council and the Employers Associated was critical to that dissemination effort. Getting the information to other key participants has been of value as well. Of course, the grantee organizations supporting the NYC trades have their traditional labor-management channels through which to convey the information.

II. Safety and Health Status:

The following worker safety and health protection practices were observed by John Moran during his initial tour of the WTC Disaster Site on the afternoon of September 22, 2001:

1. Site overview:

The collapsed towers and immediately adjacent structures are piles of debris and twisted steel beams 2-4 stories high in places and within pits in others. The debris pile continues to burn in several places. Perimeter buildings are burned, severely damaged, partially collapsed, and/or have most or all of the windows blown out on the sides facing the WTC Site. Steel beams two inches thick, three feet deep, and a foot wide are torn as if a piece of paper. Street-level stores a block or more from the WTC Site have the windows blown out and the interiors are covered in thick layers of a grayish dust. Dust is everywhere, most of it wetted on walking and working surfaces, reducing re-entrainment significantly. There are large numbers of heavy construction equipment, trucks, fire department equipment, police vehicles, military vehicles, and ambulances on and near the site. There are large numbers of workers at the site and in the supporting areas including construction workers, fire fighters, police, federal personnel, military, FBI, and others. Tents line the perimeter streets providing drinks, food, first aid, counseling, washing facilities, and personal protective equipment such as goggles, ear plugs, and respirators. These are primarily volunteer organizations such as the Salvation Army.

Work to this point appears to have been devoted primarily to search and rescue efforts for survivors and to clearing access routes on the streets bordering the WTC complex, all of which were initially covered with debris from the initial structure collapses. Access to the site is controlled and requires appropriate badging. Several check points manned by police and military personnel must be passed in order to gain entry. Truck routes to and from the site have been established for purposes of moving debris from the site. There are, according to a Bechtel individual, some 27 entry points to the “hot zone” (the WTC Complex collapse site).

2. Personal Protection Observations:

The following observations are generally focused on the construction activities, and construction workers, on the site and not on the Fire Department rescue teams or Federal disaster assistance personnel.

As a general statement, no uniform level of personal protective equipment usage is evident. Most workers, but not all, are wearing hard hats. It is estimated that perhaps 50% are wearing eye protection, whether safety eyewear was not determinable. Most workers appear to be wearing work boots, whether safety boots was not determinable. Clothing varies from long work pants and shirts to short pants and tee shirts. Respiratory protection is rare. The exception is the heavy equipment operators (IUOE), nearly all of whom are wearing half mask air purifying respirators with HEPA/OVAG combination cartridges. A small percentage of truck drivers are wearing respiratory protection of the type worn by the Operators. Perhaps 5-10% of the workers are wearing disposable dust masks. Workers were observed at or near the top of the debris pile in the smoke plume emanating from the pile in tee shirts without hard hats, eye wear, or respirators. Torch cutters were not wearing respiratory protection nor protective goggles or face shields.

Police and military personnel on the site were not equipped with personal protective equipment.

3. Safety and Health Observations:

The WTC Disaster Site is a very dangerous work site. Heavy equipment and trucks are always on the move and routes are not always obvious, the swing arc perimeters of cranes are not marked or barricaded, spotters are generally not present when large equipment is being moved or when heavy trucks are backing up, and there are numerous construction vehicles moving equipment and supplies all over the site. The debris pile is unstable and treacherous to work upon. The area of immediate destruction is also surrounded by numerous damaged building structures, some of which will likely have to be demolished.

Vehicles leaving the site with debris, either dumps or lowboys with large sections of steel beams, are not deconned 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. Workers do not decon upon leaving the site. There are a couple of hand/face and boot wash stations set up on the perimeter by volunteer organizations, but these do not appear to be utilized by most of the workers.

Compressed gas cylinders, cans of gasoline, and similar such potentially hazardous materials are utilized on the site. Many are not labeled, most are not stored properly (gasoline cans on the edge of vehicle transit routes, for example), and compressed gas cylinders are not properly stored nor moved. (Cylinders were observed being rolled down slopes without cylinder caps, for example.)

Noise levels, with the exception of areas in immediate proximity to heavy equipment operations, does not appear to present a hazard on the site.

This site also has permanent odors from the fires and collapse, including very obvious odors from decomposing bodies still entombed in the rubble. We have been advised by those undertaking air sampling that the odor while very bad is not harmful. Even though not toxic, the constant smell of death brings with it a degree of psychological stress.

4. Safety and Health Program/Personnel:

The presence of contractor safety and health personnel was not obvious. Safety and health personnel from a few support organizations, such as the OENHP, were visible however. A number of OSHA compliance officers and IH personnel were present on the site in their capacity to provide technical assistance and support. There was no evidence or even suggestion that any safety and health program was operative at the site, indeed the very opposite seemed to be the case. The lack of an operating safety and health program was confirmed by various support personnel, workers and various government officials.

5. The Site Workers:

Discussions with many workers from several crafts indicated that most had been on-site since the disaster response effort began. They have been working seven days a week since that time, most 12 hours on-12 hours off shifts. They were tired, very fatigued, and simply worn out.

6. The Public:

Tours are frequently conducted at the site. Those observed were utilizing no protective measures, walking through the muddy debris and dust in business attire including dress shoes, for example. Many members of the public line the outer control perimeters of the area. They are clearly supportive of the response workers' efforts and offer bottled water and cold drinks to those leaving the site that may want such. These groups have mostly dispersed in recent days.

7. Atmosphere:

The clear impression is that this is a major disaster site engaged in a massive rescue operation. This is a heroic endeavor by fire, police, federal disaster teams, and support workers. Considering the catastrophic circumstances of the initial event, as well as the enormous problems of the search and rescue phase, the various entities engaged in these activities, including OSHA, EPA and the construction crews, clearly performed with extraordinary professional competence. There were no 'textbook' solutions. The realities are that in such a setting there is little attention to or concern devoted to worker safety and health issues among the support operations. Specific entities such as the IUOE through the OENHP, conducted air monitoring and literally talked with each individual heavy equipment operator to convince the operators to wear respiratory protection based upon the air monitoring results, and subsequently provided the necessary equipment and replacement cartridges. The OENHP also prepared pocket-sized guidance pamphlets specific to the WTC Disaster Site addressing general site hazards and respiratory protection. (Reference 6) The United Brotherhood of Carpenters (UBC), through their training academy located near the site, conducted fit testing and provided respirators to their members. The Laborers' International Union of North America (LIUNA) responded with respirators and protective clothing through its various locals. Such efforts as these are, in any normal construction project, conducted by and the equipment provided by the workers' employers. That normality was not the case in this situation.

8. Changes observed during 22-26 September period:

Observations at the WTC Disaster Site over this period evidenced an increasing utilization of personal protective equipment by construction workers, notably respiratory protection. Vehicles leaving the site began to be hosed-down by fire fighters. This decontamination effort slowly transitioned to power washing of the whole vehicle, although the personnel conducting this activity were not equipped with protective gear.

OSHA technical support personnel, who had been conducting personal air monitoring by having individual OSHA staff walk increasingly closing circuits around the WTC Site, transitioned to placement of personal air monitors on individual workers facilitated by labor representatives of the various construction crafts, commencing with the heavy equipment operators.

At the September 25, 2001 site safety and health meeting at 8:00 a.m., Bechtel announced that efforts were being undertaken to designate the WTC Disaster site rubble pile as a restricted zone (hot zone) with a greatly decreased number of personnel and vehicle entry/exit points, requirements for new badging of personnel authorized entry, and minimum levels of personal gear that all entrants must have for entry. That minimum level of gear included hard hats, safety glasses with side shields/face shields/or goggles, half mask APR with combo P100/OVGA cartridges, leather gloves with latex inner gloves, coveralls or long sleeved work shirts, and steel-toed boots. An outer perimeter support zone was also established. Work to implement these changes was to begin on September 25, 2001, although these requirements had not yet been implemented as of the date of this Report.

III. WTC Site Safety and Health Program/Plan:

As noted previously, no WTC disaster project safety and health plan apparently exists as of October 5, 2001. Draft ES&H Plans have been developed and are in review and development. These require that the individual prime contractors develop ES&H Plans that incorporate the requirements of the Site Program. Contractor ES&H Plans are being developed concurrently with the Site Plan. It remains unclear at this writing as to when the Site ES&H Plan will become effective.

Based upon review of Draft Revision A of the Site ES&H Plan, there are, however, many serious potential deficiencies. The primary deficiencies relate to a complete lack of overall S&H site coordination on this multi-employer site, lack of a clear S&H organizational structure to facilitate attention to concerns that workers or their representatives might have, and a complete lack of participation by workers or their representatives. There are many other issues with the Draft that require attention as well.

The development of the Site ES&H Plan has been a frustrating process for labor representatives. The “next chapter of the safety and health program” was launched at the 8 a.m. site safety and health meeting on September 25, 2001 by announcing the effort lead by Bechtel to develop the Site Program. Bechtel announced that several agencies were participating in the process and that other volunteers wishing to participate in the process would be welcome. Labor representatives hopes that they would now begin to have an opportunity to participate in this critical activity were quickly dashed when the New York City Department of Engineering and Construction subsequently refused to allow these representatives to have copies of the Draft Plan, stating that it was restricted to Agencies participating in the process. This refusal to provide copies of the Draft Plan was not a single incident but several such incidents among different organizations.

Subsequently, arrangements were made with the CPWR to act as liaison with Bechtel in providing comments to the Draft Plan. The CPWR has provided its concerns regarding the Draft Plans to Bechtel. (Reference 11) It is not clear as of this writing how the various contractors are handling worker involvement in developing their respective safety and health plans.

IV. Preliminary Training Needs Assessment:

In order to develop a training needs assessment specific to the support that the NIEHS-WETP grantees could provide for the clean-up phase of the WTC Disaster Site operation, several inputs are required. These include, at a minimum:

1. Training required by the Site S&H Plan and by the contractor S&H Plan.
2. Whether the WTC Disaster Site will require compliance with the OSHA Hazardous Waste Operations and Emergency response standard at 29 CFR 1910.120?
3. The hazards present on the site for which specific OSHA standards apply and which require specific training, such as asbestos and lead.
4. The number of workers, by craft or trade, that will be employed and the crafts or trades that will require hazard-specific training.
5. The time frame within which training can be provided.
6. The capability of the NIEHS-WETP grantees to provide the training identified.
7. The capacity of the NIEHS-WETP grantees to provide the training identified.

At this writing, the situation specific to each of the above requirements is as follows:

1. The Draft Revision B to the WTC Disaster Site ES&H Plan only requires that all site workers have site orientation training. All other specific training is to be identified by and included in the individual contractor S&H Plans. These plans were not available at this writing and are not likely to be available until the final Site ES&H Plan is issued, as integration of the individual contractor S&H Plans with the Site Plan is required. Contractors will be responsible for determining whether asbestos training, for example, is required.
2. We have been informed that the Site will not be operated under provisions of 29 CFR 1910.120. Therefore, specific HAZWOPER training does not appear to be a requirement at this time.

3. Hazard-specific training requirements will be determined by each contractor. Hazards known to be present at the Site suggest that hazard-specific training specific to asbestos and lead will be required. In addition, HAZCOM training should be required for all workers, although the Draft Revision A of the Site ES&H Plan qualifies this requirement.
5. The number of workers by craft or trade requiring hazard-specific training or the time frame within such training needs to be provided cannot be estimated until such time as the contractor Project Plans and S&H Plans are issued.
6. The capability of the grantees to provide the identified training cannot be determined until such time as the training requirements become known. The capability aspect specifically refers to whether individual grantees have the required training programs and instructional staff already on-line and available for delivery in the needed time frame.
7. The capacity of the grantees to provide additional training to workers at the WTC Disaster Site is an assessment of the capacity of the grantee to provide additional training beyond their current training plan schedule and, in some cases, to deliver such at sites remote from their fixed training centers. An initial assessment of core capacity in the NY/NJ area based upon HAZWOPER and related training, delivered by grantee organizations during the September 1, 2000-August 31, 2001 period, has been developed by WETP Staff. It is included as Reference 5.

Based upon a request from the NIEHS-WETP Director, WETP grantee organizations have been developing preliminary estimates of the training needs envisioned as needed by the organizations that they support which are engaged in or are anticipated to be engaged in the WTC clean-up effort. These estimates will provide a solid basis upon which to advance the WTC-specific training needs assessment once the matters identified above have been addressed and specified.

Analysis of Injury and Illness Incidents

In order to attempt to identify potential training needs, we performed an analysis of the injury and illness incidents reported by the NYC Department of Health for the period 9/14 through 9/25, 2001. In that analysis, we sought to estimate training needs based upon the adverse outcomes represented by the injury and illness summary report. We combined our Site hazard and operations observations with the results of the injury and illness outcome analysis to develop a preliminary list of training needs by training subject.

The injury and illness incidence report analysis was approached in the following manner:

Sources: References 9 and 10.

Notes:

1. Activity at time of injury, while in the data collected, is not reported in the Updates.
2. Eye and lung injuries have several sub-categories, which are not reported in the Updates. Only total eye and lung injuries are reported.
3. Updates do not permit determination of OSHA “reportable” injuries or illnesses.
4. Analysis considered only the construction workers.
5. Total construction hours worker per day are derived from Reference 9 and are assumed to be representative of the Surveillance Update period covered: 9/14 through 9/25. (158,400 hours/day)
6. Incidence rate is calculated on the basis of the BLS definition of occupational injury/illness incidence rate in terms of injuries/illness per 100 workers per year. The BLS reported total injury/illness incident rate for construction in the US for 1999 was 8.6. By way of a specific large construction project reference, at the point where the Boston Harbor Project had completed 5.8 million contractor hours, the lost time incidence rate was 6.9 and the medical only incidence rate was 11.0.
7. The Updates contain two categories of adverse outcomes, “unknown” and “other.” While the incidences within “other” are listed by number of injuries/illness with more than 5 occurrences, this is presented for the whole workforce and “unknown” is simply the number of occurrences for each worker category for which the nature of the occurrence is not known. “Unknown” represents some 14% of the construction worker group.

Injury and illness occurrences in construction at the WTC Site from 9/14-9/25

Injury or Illness	Number reported	% of total injuries/illnesses
Abrasion	19	2
Blister	116	12
Burn	35	4
Contusion	7	1
Crush	3	-
Dehydration	5	1
Eye Injury, combined	101	10
Fracture	7	1
Headache	83	8
Laceration	67	7
Lung injury, combined	40	4
Nausea/vomit/diarrhea	23	2
Skin irritation/rash	46	5
Sprain/strain	77	8
TOTAL*	995	100

*Not all categories are included in the table.

Incidence rates (per BLS definition):	Eye injuries, combined	128
	Lung injuries, combined	50
	Strain/Sprain	97
	Combination A.	424
	Combination B.	192
TOTAL Incidence rate		1,256

Combination A (Trauma): Abrasion, Blister, Burn, Contusion, Crush, Dehydration, Fracture, Laceration, Sprain/Strain.

Combination B: Headache, Nausea/vomit/diarrhea, Skin irritation/Rash.

Training implications:

1. Eye injury incidence rate suggest that **PPE training** (and required use of protective eyewear including side-shields) is critical and it is likely that Cutting/Burning training is needed as well, based upon Site observations.
2. Lung injury incidence rate suggests that **Respirator training** and **Confined Spaces** training are critical. Respirator medical certifications are required as well, of course. Confined Spaces issue arose in discussions with FEMA US&R Team Physician and is included in the Lung Injury, combined category as “Asthma exacerbation” and, perhaps “SOB/Wheezing.” Exposures in Confined Spaces could also contribute to several other injury/illness categories such as Headache, Nausea/vomit, and Skin irritation/Rash.
3. Strain/Sprain incidence rate suggest that attention to ergonomics could be beneficial. **Ergonomic** training is available.
4. Combination A incidence rates suggest that **General Construction Safety/OSHA-10 and PPE training** is merited.
5. Combination B incidence rates suggest that **HAZCOM training** is essential.
6. Hazard specific training may also be required associated with the hazardous materials and substances known to be in the debris pile based upon WTC Complex inventories and work activities that may result in exposures in excess of the PELs. (See The Incident Response Effort, 5.)

CONCLUSIONS:

The following are conclusions drawn by the authors specific to the tasking assignment from the WETP and to occupational safety and health matters observed at the WTC Disaster Site.

1. WETP supported grantees provided significant and important immediate responses in support of the WTC Disaster response effort.

- A. The immediate response effort undertaken by the IAFF was massive and dedicated. With respect to the WETP supported grant program at IAFF, that organization promptly undertook efforts to provide training support to rebuild the FDNY HAZMAT instructional staff, technicians, and specialists; most of the existing such resources within the FDNY having been lost during the collapse of the WTC Towers. That effort will take time, of course, but the dedicated efforts of the IAFF will make a significant contribution to aiding the FDNY in rebuilding their emergency response capacity.
 - B. The significant response support actions undertaken by the Operating Engineers National HAZMAT Program proved to be of great value to IUOE members working the WTC Site, other organizations such as the FEMA Response Teams with regard to provision of much needed protective equipment, and to workers on the site in general by actions undertaken in support of OSHA efforts to obtain personal air monitoring data and through the conduct and sharing of data obtained in extensive media and air sampling conducted by the OENHP Industrial Hygiene professionals on site. This team made a major contribution and should be commended for having the foresight to launch this support effort.
 - C. The Carpenters Union Training Academy, located near the WTC, undertook specific efforts to conduct respirator fit testing and provide respiratory protection to their members currently working at the Site.
 - D. The CPWR organized a key meeting and briefing of the NYC Building Trades Council and the Construction Employers Association during which the training support resources of the WETP grantees, which can be brought to bear on the WTC cleanup operation, was presented and discussed.
 - E. Other grantee organizations and those affiliated with them provided response support as well, including the Laborers-AGC Education and Training Fund (L-AGC), which sent its mobile training unit to New York City and provided respirators to Site workers, and the University of Medicine and Dentistry of New Jersey (UMDNJ).
2. As of October 5, 2001 activities at WTC Site remain in rescue phase. Despite the fact that four major construction contracts have been awarded, the construction activities remain in what could be described as the “skilled support personal” category as defined at 29 CFR 1910.120(q)(4). A significant number of these workers started as heroic volunteers and now have continued with contractors working at the site since the tragic collapse of the WTC structures. They are tired, weary, and extremely fatigued and they are operating in an environment essentially devoid of any organized safety and health protection programs. Were it

not for the initiatives of a few organizations, such as the OENHP, UBC, OSHA's compliance assistance staff and others, these workers would likely still be largely without important protective gear. There is a critical need for a definitive closure of the rescue phase and transfer to cleanup, demolition, and removal phase.

The WTC Disaster Site cleanup will not, we are informed, be conducted under provisions of the OSHA Hazardous Waste Operations and Emergency Response standard at 29 CFR 1910.120. This decision, in our view, may be inappropriate in that the Site is in clear need of that worker protection pro-active standard based upon the nature of the activities to be conducted, the inventory of hazardous materials known to be present on the site, the fact that the nature of the collapse and resulting debris pile makes it nearly impossible to determine when increased exposures to these hazardous materials (particularly asbestos) will occur as clean-up and removal activities progress, and the presence of many of these materials in the bulk/area/personal monitoring data already obtained. 29 CFR 1910.120 provides a comprehensive basis for training of workers, medical surveillance, exposure monitoring, and worker protection levels that are downgraded based upon work site monitoring data rather than the typical health standards compliance approach in construction which upgrades worker protection after the fact of increased exposures. It seems likely that the authorities have some confusion over the differences between a site protected under 1910.120 and an EPA declared Superfund site. It is not necessary to declare this site a Superfund site in order for 1910.120 to apply. For simple example, all leaking underground fuel storage tank removals required by EPA regulations have been and are conducted in accordance with 1910.120.

3. We are not able, nor are others such as the WETP grantees, to provide a definitive estimate of the training needs required to support the cleanup phase of the WTC Disaster Site as the Draft Site ES&H Plan which we have reviewed establishes no definitive training requirement, leaving such a determination to the four prime contractors. The ES&H Plans from the prime contractors have not yet been made available for review. However, based upon an analysis of injury and illness adverse outcomes reported and Site observations, we suggest that the following training would be appropriate, and perhaps required by the subsequent Prime Contractor S&H Plans:

- Asbestos
- Lead
- Confined Spaces
- General Construction Safety/OSHA-10
- Personal Protective Equipment
- Respiratory Protection (and remaining requirements of 1910.134)
- Fall Protection
- HAZCOM

4. OSHA has served as a significant technical support resource through participating in the development of the WTC Disaster Site ES&H Plan, in conducting air monitoring, and participating in walk-around safety and health observations of the Site with Bechtel personnel. OSHA has not, up to October 5, 2001, been operating in an enforcement mode, although OSHA has made it known that they will begin enforcement activities in the near future. The technical support role undertaken by OSHA is likely governed by the Occupational Safety and Health Support Annex to the Federal Response Plan.
5. There is a need to carefully review this emergency response activity from a worker safety and health perspective and glean lessons learned from the tragic incident that may be of value in future similar incidents. While the sheer magnitude of this particular disaster will likely never be experienced again in this country, that very aspect has stretched all involved, including response plans and efforts, to extreme limits. Valuable lessons can be learned and should be shared to the appropriate organizations.
6. There are many other organizations that played a role in helping aid and advance worker safety and health at the Site during these first few weeks since the incident. We apologize for not having mentioned those that we have some awareness of and those about which we not aware at this point in time. However, the urgency associated with completing this initial effort dictates that this Report be timely and not exhaustively detailed.

DISCUSSION:

The enormity of and the consequences of the terrorist attacks on the WTC Complex can never be overstated. The enormous impact on the City of New York and its response resources, the huge loss of life of both civilians and public servants, and the heroic dedicated massive rescue and recovery efforts have been unparalleled.

The complexity of this rescue, recovery, demolition and construction project cannot be overstated. Two recent NY Times Articles (References 12 and 13, October 9, 2001) are representative of the difficulties the workers are facing on this project. The safety and health issues are only one part of the enormous problems confronting everyone on the project. The Federal Response Plan was activated at the WTC Site shortly after the collapse. That Plan (www.fema.gov/r-n-r/frp/frposh.htm) addresses, through the Occupational Safety and Health Support Annex, the matter of safety and health of “federally deployed personnel” including “employees and volunteers with recognized voluntary organizations.” While the FRP operates under the Incident Command System (ICS) based upon the fire and rescue community model (1910.120(q) actually), it does not specifically address “skilled support personnel” as identified in 1910.120(q)(4). It may be appropriate to evaluate the clarity of the FRP and OS&H Support Annex with specific regard to applicability to skilled support personnel and such personnel as

volunteers in light of the protracted and extremely hazardous search and rescue phase of the WTC disaster operations.

This effort has not, however, been without an impact on the workers involved in it. The intensity of the effort, long hours, continual work seven days a week for over three and half weeks has resulted in severe stress and fatigue, and a high rate of injury and illness among those workers. Based upon the “World Trade Center Worker Injury and Illness Surveillance Update” (Reference 10), published daily by the NYC Department of Health, dated September 26, 2001 “Construction” workers suffered 995 injuries/illnesses over the twelve day period from September 14 through September 25, 2001. The data released in the “Surveillance Update” does not, however, have the detail necessary to determine what of the adverse outcomes are “reportable” under the OSHA standards. However, if only 10% are “reportable,” it is evident that the injury and illness rate for work at the Site over this period is far above the national average for construction reported by the BLS for 1999 (8.6) or, for that matter, typical large and complex construction projects. There may be longer term value to a detailed examination of the records supporting the Surveillance Report as a basis for developing recommendations for future reporting by public health agencies so as to aid rescue, cleanup, and removal construction S&H professionals in improved targeting of interventions based upon emerging adverse outcomes.

Once the WTC Disaster Site ES&H Plan and the prime cleanup contractors ES&H Plans are released, the worker training requirements can be identified. The grantee organizations will face significant challenges in providing the required training, as it is highly unlikely that the cleanup work will stop in order to accommodate the training delivery needs. As an example, the recently imposed requirements for specific levels of protection for workers in the rubble zone requires the use of half mask APR's. Of the 1350 or so construction workers on the Site, it is probable that fewer than 20 % have been medically certified to wear respiratory protection or have had respirator training. The training delivery efforts by the grantee organizations involved must be as dedicated as have the workers engaged in the rescue and recovery effort. The workers involved need that dedication and clearly, based upon the injury/illness statistics, need that training.

REFERENCES: (Reference links to 1-13 are located on www.wetp.org)

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2. WTC Disaster Project, ES&H Oversight Team, Rev. Date 9/24/2001.
3. Air Monitoring Overview. Bruce Lippy, OENHP.
4. WETP listing of relevant training courses available to support the WTC response and the NIEHS supported organizations available to provide those resources. September 25, 2001.
5. WETP compilation of WTC disaster relevant training courses delivered and workers trained in NY and NJ from September 1, 2000 to August 31, 2001.
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7. WETP WTC Updates issued periodically since the WTC disaster. See www.wetp.org for copies.

8. Information materials on the WTC cleanup issued by the AFL-CIO Department of Occupational Safety and Health.
9. "Estimated Number of Personnel Working Daily at the World Trade Center Disaster Site" NYC Department of Design and Construction. Undated. Obtained on October 3, 2001.
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**Testimony before the Environment Committee of the New York City Council
on the Public Health Concerns Resulting from Exposures
in the Wake of the Collapse of the World Trade Center Towers**

Submitted by

**Barbara J. Olshansky
Assistant Legal Director**

and

**Nicole Pollier
Legal Intern, Equality Concentration Program, CUNY Law School**

**Center for Constitutional Rights
666 Broadway, Seventh Floor
New York, New York 10012**

November 1, 2001

Testimony

Good Morning. My name is Nicole Pollier. I am a third-year law student at CUNY Law School. I work with Barbara Olshansky, the Assistant Legal Director of the Center for Constitutional Rights and Adjunct Law Professor at CUNY Law School, and am here today to submit testimony on behalf of the Center. The Center for Constitutional Rights would like to thank the Environment Committee for convening this important hearing and for providing us with this opportunity to testify on the public health conditions created by the collapse of the World Trade Center Towers and surrounding buildings.

The Center for Constitutional Rights (the "Center") is a non-profit legal, education, and advocacy organization dedicated to advancing and protecting the rights guaranteed by the United States Constitution and the Universal Declaration of Human Rights. The Center was founded in 1966 by attorneys whose legal work on behalf of the leaders of the Southern civil rights movement convinced them of the need for a permanent, privately-funded legal center to work in support of popular movements for social justice. Since its beginnings, the Center has practiced a unique kind of civil and human rights law. The Center works in partnership with community-based labor, environmental, religious, immigration, and other civil rights organizations, both here in the United States and abroad, to protect and advance civil and human rights. To

that end, the Center uses litigation strategically to empower poor communities and communities of color, to guarantee the rights of those with the fewest protections and the least access to legal and other resources, and to strengthen the civil rights and human rights advocacy movements.

The Center appears before the Committee today to express its **serious** concern over the health and well-being of the workers and law enforcement officers involved in the clean-up and criminal investigation processes, the owners of businesses in the downtown area, and those people that live in Battery Park City, Chinatown, Little Italy, Tribeca and other neighborhoods below Canal Street. Today we hope to provide the Committee with as clear a picture as possible of the conditions faced by the people who are working very long days trying to uncover lost family members and friends, and to make some specific recommendations intended to lessen the risks faced by them.

Factual Background to the Current Environmental and Public Health Crisis

According to the report issued by the National Institute of Environmental Health Sciences (“NIEHS”) on October 22, 2001, the operations at the World Trade Center (“WTC”) disaster site continue to be conducted on a 24-hour basis.¹ Rotating through this continual operation on a daily basis are more 5000 City and private sector workers, including employees of the New York City Police Department, the Fire Department, the Sanitation Department, the construction industry, and FEMA Urban Search and Rescue Teams.² These numbers do not include employees from other companies such as Con Edison, Verizon, and others, nor do they include federal personnel from the Environmental Protection Agency (“EPA”), the Occupational Safety and Health Administration (“OSHA”), or other federal agencies dispatched to the site. Estimates of the total number of individuals working at the site on a daily basis thus range from 6000 to 8000.

Control over the site has been vested in the Fire Department. Under the City of New York Emergency Response Plan, the Fire Department is responsible for managing responses to building collapse incidents. Presumably, the responsibility was given to the Fire Department because of the Department’s expertise in search and rescue operations. Responsibility for developing an environmental safety and health plan for the WTC disaster site was subcontracted out to a private company, Bechtel. Bechtel was awarded a 90-day contract to develop a comprehensive safety and health plan. As part of this contract, Bechtel circulated two draft World Trade Center Emergency Project Environmental Safety and Health Plans, however, neither of these drafts contained plans for logistics, demolition, asbestos removal, spill prevention, storm water pollution prevention.³ No final ES&H Plan was ever issued by Bechtel.

We learned yesterday that Bechtel has bowed out of its role, and that a new company will shortly be replacing it. In the meantime, there is still no environmental safety and health plan in effect at

¹NIEHS Report at 6. A copy of the NIEHS Report is attached hereto as Exhibit 1.

²*Id.* at 7.

³*Id.* at 8.

the World Trade Center disaster site. According to the NIEHS report, “there was no evidence or even suggestion that any safety and health program was operative at the site, indeed the very opposite seemed to be the case.”⁴ The lack of an operating safety and health program has been confirmed by the workers we have spoken to and various government officials.

Although neither of the draft ES&H plans included information on quantities, they did list the following materials as present in several WTC structures. **Crysotile asbestos** was used as pipe insulation in both WTC towers, up to the 40th floor in one tower, and up to the 20th floor in the other tower. In addition, present at the site are the following chemicals: **PCBs, Crystalline Silica, Carbon Monoxide, Diesel fuel, Formaldehyde**, Zinc Oxide, **Mercury, Arsenic**, Nickel, **Lead, Cadmium fumes, Chromates, Benzene**, HCL, Hydrogen Sulfide, Gasoline, Freon, and spray paints and thinners.

Despite the **known presence of these toxic chemicals**, all agencies involved with the search, rescue and recovery efforts have acknowledged that **virtually none of the people working at the WTC disaster site are or have been wearing any personal protective equipment.**⁵ While respirators, cartridges, hard hats, tyvek overalls, and other equipment are available at the site, no organized training has been undertaken. The NIEHS study included the following observations about compliance with health and safety measures:

As a general statement, **no uniform level of personal protective equipment usage is evident.** Most workers, but not all, are wearing hard hats. It is estimated that perhaps 50% are wearing eye protection, whether safety eyewear was not determinable. Most workers appear to be wearing work boots, whether safety boots was not determinable. Clothing varies from long work pants and shirts to short pants and tee shirts. **Respiratory protection is rare....** Perhaps 5-10% of the workers are wearing disposable dust masks. Workers were observed at or near the top of the debris pile in the smoke plume **emanating from the pile in tee shirts, without hard hats, eye wear or respirators....** Police and military personnel on the site were not equipped with personal protective equipment.⁶

In addition, **workers leaving the site are not decontaminated,** nor do they use the washing stations that have been set up at the perimeter of the site by volunteer organizations.⁷ Workers continue to work under these conditions on 12-hour shifts despite exhaustion. According to the **NIEHS Study, the intensity of the effort and long work hours has resulted in a very high rate of injury and illness among the workers.**⁸

⁴*Id.* at 14.

⁵*Id.* at 10; *see* telephone conversation between Barbara Olshansky and Laura Kenny, Labor Liaison for OSHA’s New York Regional Office.

⁶NIEHS Study at 13.

⁷*Id.* at 14.

⁸*Id.* at 24.

This utter lack of compliance with health and safety measures is due – at least in part – to the absence of contractor safety and health personnel, and the fact that OSHA compliance officers present have been limited by that agency to providing only technical assistance and support at the site.

All involved have agreed that the WTC disaster site is a very dangerous site. The debris pile remains several stories high and is very unstable; many areas continue to burn.⁹ The immediate WTC area is surrounded by other buildings which are burned, severely damaged, and partially collapsed. Many volatile and hazardous materials are utilized on the site, including gasoline and compressed gas, and are not stored or moved properly.¹⁰ A thick layer of dust is everywhere, and vehicles leaving the site with debris are not decontaminated and do not have covers.

What the Lack of an Environmental Health and Safety Site Plan Means

Environmental Health and Safety plans contain specific regulatory standards under which operations must take place, assess the level of risks being faced by those involved in the operations, and contain specific training and protection requirements. In this case, **the absence of a plan prevented NIEHS officials from evaluating safety and health issues and assessing monitoring and exposure data.**¹¹

More importantly, without the direct oversight and enforcement by experienced federal agencies such as NIEHS and OSHA, even the draft plans – which have not been implemented – contained serious deficiencies, including among others: the complete lack of overall safety and health site coordination by all employers and agencies, the lack of an organizational structure to ensure attention to workers' concerns, and the lack of any avenue for participation by workers or their representatives in safety and health planning.¹² Both of the Draft Plans previously circulated contemplated that the four individual prime contractors for the site would develop their own environmental health and safety plans incorporating elements from the overall Site Program. To date, no one has seen any draft of the contractor plans.

Even more troubling is the fact that the Draft Plans only required that site workers be given site orientation training. **The issue of whether any safety and health training would be provided was left to the individual contractors.**¹³ This is so despite the fact that **there are hazards present on the site, such as asbestos, benzene, and lead, for which specific OSHA standards apply and require specific training.**

⁹*Id.* at 13.

¹⁰*Id.* at 14.

¹¹NIEHS Study at 9-10.

¹²*Id.* at 16.

¹³*Id.* at 17.

And perhaps most troubling of all is the fact that a determination has apparently been made that the WTC disaster site will **not** be operated under the provisions of 29 C.F.R. 1910.120. This is the OSHA Hazardous Waste Operations and Emergency Response Standard which provides a comprehensive basis for worker training, medical surveillance, exposure monitoring, and worker protection levels that are set based upon actual worksite monitoring data.¹⁴ Occupational Safety and Health experts contacted by the Center all agree that the decision not to conduct the clean-up under this OSHA standard is entirely inappropriate given the nature of the activities to be conducted at the site, the inventory of hazardous materials on the site, the fact that the debris pile is unstable and makes it impossible to determine when exposures to these materials will occur, and the presence of many hazardous materials in the personal monitoring data already obtained by NIEHS.¹⁵

Finally, all of these deficiencies have been exacerbated by **deliberate decisions by the New York City Department of Engineering and Construction to refuse to supply labor representatives with copies of the Draft Plan and to refuse to permit them to participate in the safety and health program development process.**¹⁶

The Utter Lack of Enforcement of Occupational Safety and Health Laws, Regulations, and Procedures

While the designation of the Fire Department was appropriate at the beginning of this crisis, once a determination was made that no one could have survived beyond a certain date, on that date, the activity at the site should **have been re-designated as a recovery operation.** However, as far as the Center has been able to ascertain, as of today, the activity at the site remains an initial search and rescue management operation under the control of the Mayor's Emergency Operations Center.

This designation has serious ramifications for the issue of compliance with Occupational Safety and Health laws. **The Occupations Safety and Health Administration has taken the official position that it does not have authority to enforce the OSH Act or any the agency's regulations or standards. This means that while OSHA has been playing a consultative role as a technical advisor, there have been no mandated training sessions, and no enforcement of personal protective equipment requirements or exposure monitoring requirements.**

The Center has researched this issue and discussed the matter with OSHA officials and has concluded that there is no legal basis whatsoever for the agency's failure to assert jurisdiction and "suspend" its enforcement authority. **There is simply nothing in the OSH Act, the Code of Federal**

¹⁴By comparison, the typical health standards compliance approach in the construction industry increases worker protections only after there has been a demonstration of increased exposures to toxic materials.

¹⁵NIEHS Study at 22.

¹⁶*Id.* at 17.

Regulations, or any directives issued by the agency which permit it to evade its Congressionally mandated responsibilities.

The authorities relied upon by OSHA¹⁷ for its refusal to begin enforcement more than six weeks after the disaster are statements from the Field Inspection Reference Manual stating that “OSHA does not have authority to direct rescue operations—this is the responsibility of the employer and/or of local political subdivisions or State agencies.”¹⁸

OSHA’s reliance on this language is entirely mistaken. First, language in a reference manual does not – and indeed cannot – create an authorization for a federal agency to ignore its federal jurisdictional mandate. Second, the workers at the site are no longer involved in any direct rescue operations. Third, the single additional authority cited by OSHA officials, a 1991 directive entitled “OSHA Response to Significant Events of Potentially Catastrophic Consequences,” completely undermines their position. Paragraph F of that directive states: “The OSH Act *requires* that OSHA respond to catastrophic events, whether or not subject to the NCP. *OSHA must be an active and forceful protector of employee safety and health during the clean-up, removal, storage and investigation phases of these incidents, while maintaining a visible but limited role during the initial response phase.*” (Emphasis supplied). This provision further states that “[c]ommunication and coordination among federal and local agencies during their response to catastrophic events becomes crucial for operational as well as political considerations.” **This language unquestionably demonstrates that the agency and the federal government contemplated that OSHA would play a significant role in handling catastrophic events.** There is no excuse whatsoever for the agency’s refusal to assume its statutorily-mandated duties.

Why The City Needs to Act Now To Help Its Heroes, Workers, and Residents

Asbestos has been definitively determined by EPA, the United States Department of Health and Human Services, and the World Health Organization to be a human carcinogen. There are two types of cancer caused by exposure to asbestos: lung cancer and mesothelioma, a cancer of the thin lining surrounding the lung or abdominal cavity. Because of these risks, in 1989, EPA banned all new uses of asbestos, and established regulations regarding the release of asbestos from factories and during building demolition or renovation in order to prevent it from getting into the environment.¹⁹

Chrysotile Asbestos, the form of asbestos used for pipe insulation in the World Trade Center towers, is probably one of the most dangerous forms of the mineral with regard to the potential for

¹⁷Information provided in a memorandum from OSHA provided to Barbara Olshansky on October 11, 2001, on file with the author.

¹⁸See OSHA Field Inspection Reference Manual, CPL 2.103, Chapter II, Section B.2.e.

¹⁹See “Asbestos ToxFAQs,” Agency for Toxic Substances and Disease Registry, Division of Toxicology, CAS # 1332-21-4 (September 2001). A copy of the Asbestos ToxFAQs is attached hereto as Exhibit 2.

causing exposure-related disease. It takes only one fiber of Chrysotile Asbestos to cause mesothelioma. Given the long days (ranging from 8 - 20 working hours) put in by workers at the disaster site, the amount of asbestos found in bulk samples and in the air analyzed by EPA and others,²⁰ and the type of asbestos the workers have been and are being exposed to, the probability is very high that many of the workers will contract cancer within the next 10 to 20 years. For example, EPA Asbestos Air Monitoring Data plainly show numerous instances of in which its standard of 70 structures per square millimeter was significantly exceeded.²¹

Furthermore, Chrysotile Asbestos is only one of many toxic agents (including other known carcinogens) present at the site. Workers' exposure to this toxic combination of particulate matter and gases is by now well-documented. Many, many of those who have been working so hard to put the City back together are already feeling ill. Yet we do not know – because there are no studies yet on these toxic combinations – what other health effects in addition to lung cancers are likely from the cumulative and multiple exposures workers have suffered to date. According to industrial health specialists who have examined the dust from the site, the pulverization of material from the explosions and collapse have created a finer asbestos dust than has been assessed in industrial health studies to date.

There is no reason to make the risk any greater for those serving our City by continuing these levels of exposure. We are morally obligated to provide the training, equipment, counseling and enforcement necessary to ensure that the workers at the disaster site are protected from all future exposures. We have the technology to protect people, we have the equipment available; there is simply no excuse for permitting these conditions to continue.

Specific Recommendations

The Center strongly urges the Committee to take a public stand on the need to move officially out of the rescue phase and the need for OSHA to exercise its enforcement powers. Training is needed for workers in many areas, including training for asbestos, lead, confined spaces, general construction safety, personal protective equipment, respiratory protection, fall protection, and hazard communication. Personal exposure monitoring must be put into place, and provisions for medical surveillance need to be established and implements. In addition, any environmental health and safety site plan must be fashioned in compliance with the HAZWOPER standard discussed above. Finally, the City must take responsibility for providing accurate information and equipment to the general public that is at risk for exposures to the hazardous materials present at the site, and in the dust and air that is circulating in the downtown area.

²⁰Data posted by EPA indicating the results from its asbestos in bulk tests at the WTC disaster site indicate that the dust at various times contained as much as 4% Chrysotile Asbestos. See EPA Asbestos in Bulk Monitoring Results attached hereto as Exhibit 3. If a substance contains more than 1% asbestos, it is designated an “asbestos-containing material” and must be handled as a hazardous material.

²¹See EPA Asbestos Air Monitoring Results, attached hereto as Exhibit 4.

Thank you very much for your attention and your critical work in bringing these issues to light.

**EMILCOTT
ASSOCIATES, INC.**

ENVIRONMENTAL, SAFETY & INDUSTRIAL HYGIENE

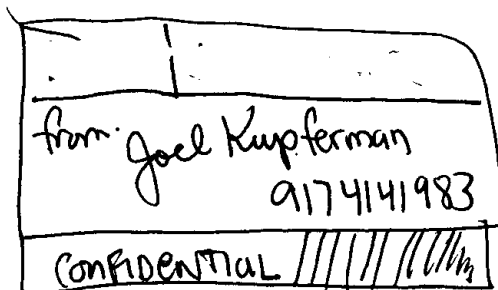
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466 SOUTHERN BOULEVARD
CHATHAM, NJ 07928-1462PHONE: (973) 765-0991
FAX: (973) 765-0994

September 28, 2001

Mr. Tom Scotto, President
NYC Detectives Endowment Association, Inc.
26 Thomas Street
New York, NY 10007



**Re: Preliminary Report on the H&S Evaluation of the Fresh Kills Landfill Project
Supporting the WTC Disaster Recovery**

Dear Mr. Scotto:

On 27 September, 2001, representatives of Emilcott Associates, Inc. (Dale Wilson, CIH, Doug Ogden and Bruce Groves, CIH) conducted a walkthrough survey of the Fresh Kill Landfill operation supporting the WTC disaster. Emilcott was asked by the NYPD Detectives Endowment Association (DEA) to conduct a third party evaluation of the operation to identify issues that may impact the health and safety of the NYPD detectives working at the landfill.

Emilcott recognizes that this is an emergency operation responding to a horrific disaster where many lives have been lost. Overall, we were highly impressed and humbled by the energy and willingness of all personnel involved in this operation to get the job done and to do the right thing. The cooperation displayed by Inspector Luongo and the rest of the NYPD staff at the Fresh Kills Landfill was extraordinary.

The comments and recommendations summarized below and presented in the attached report and photos, focus on items that need immediate attention in order to make the greatest improvements to the health and safety program of NYPD personnel working at this operation.

The summary of our findings is as follows:

- There is evidence and data showing that the WTC debris contains asbestos and as such creates an inhalation exposure potential to NYPD personnel working on this site.
- Health and safety on this site is continually evolving. Additional program elements are required to provide the generally accepted standard of care.
- No organization is coordinating the overall H&S activities, strategy and information for this site. As such, information that may be useful for one group is not being shared.

Emilcott Associates, Inc.
Health and Safety Evaluation
NYPD - Fresh Kills Landfill
September 2001

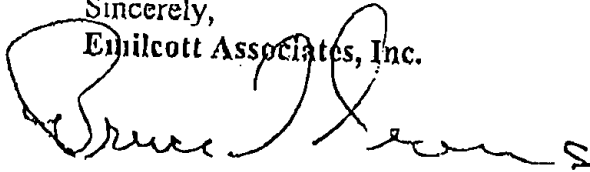
The summary of our recommendations is as follows:

1. Develop a site-specific H&S plan or program that covers the many changing operations and duties of the NYPD personnel on this project. This plan must address the following:
 - Task Hazards and Controls
 - Decontamination and Clean-up
 - Site Control
 - Emergency and Contingency Procedures
 - Air monitoring and Exposure Assessments
 - Respirator and Personal Protective Equipment Usage
 - Hazard Communication
2. Designate an individual or group who is responsible for implementing the Site Specific H&S plan for the NYPD personnel onsite. This person(s) must be competent to run the safety and industrial hygiene aspects of the project while being the liaison between other H&S personnel representing the EPA, FBI and others.
3. Commence an air sampling program to document that support areas are safe and that NYPD personnel are being adequately protected while performing the many tasks in this project. Results of the asbestos air sampling should be made available within 24 hours of collecting the samples. Other contaminants should be included to ensure that there are no other exposure concerns not currently being addressed.
4. Implement a quality respirator protection program. At minimum bring medical personnel onsite to certify that NYPD personnel can wear the respirators, adequately train everyone on respirator use, provide onsite fit-testing as required and require everyone to be clean shaven before each shift.
5. Develop a strategy and means to communicate to all NYPD personnel what hazards exist at this site and how NYPD is taking measures to control these hazards.
6. Develop a strategy to coordinate site H&S activities and information so that information gathered by other agencies and contractors is shared with the NYPD.
7. Continue to improve the area where the NYPD can decontaminate, wash their hands and face, stage and put-on their respirators and PPE. ?

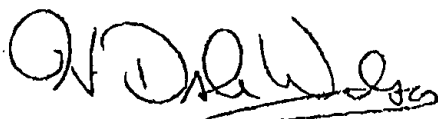
Emilcott Associates, Inc.
Health and Safety Evaluation
NYPD - Fresh Kills Landfill
September 2001

We appreciate the opportunity to enhance the health and safety of the NYPD officers involved in this monumental project. Please contact us at 973-765-0991 with any questions or concerns.

Sincerely,
Emilcott Associates, Inc.



Bruce D. Groves, CIH
President



H. Dale Wilson, CIH
Senior Project Manager

Emilcott Associates, Inc.

ENVIRONMENTAL SAFETY & INDUSTRIAL HYGIENE



Preliminary Report on the H&S Evaluation of the Fresh Kills Landfill Project Supporting the WTC Disaster Recover

Prepared for:

New York City Detectives Endowment Association, Inc.
26 Thomas Street
New York, NY 10007

Prepared by:

Emilcott Associates, Inc.
466 Southern Blvd.
Chatham, NJ 07928

28 September, 2001

**Preliminary Report on the H&S Evaluation of the Fresh Kills Landfill Project
Supporting the WTC Disaster Recovery**

INTRODUCTION:

On 27 September, 2001, representatives of Emilcott Associates, Inc. (Dale Wilson, CIH, Doug Ogden and Bruce Groves, CIH) conducted a walkthrough survey of the Fresh Kill Landfill operation supporting the WTC disaster. Emilcott was asked by the NYPD Detectives Endowment Association (DEA) to conduct a 3rd party evaluation of the operation to identify areas that may impact the health and safety of the NYPD detectives working at the landfill.

Emilcott recognizes that this is an emergency operation responding to a horrific disaster where many lives have been lost. Overall, we were highly impressed and humbled by the energy and willingness of all personnel involved in this operation to get the job done and to do the right thing. Everyone also showed their commitment to make continual improvements in the health and safety procedures of the operation to: improve the quality of life for the people onsite; follow good health and safety practices; and meet basic compliance to health and safety regulations and requirements. The cooperation displayed by all members of the NYPD and other agencies we spoke with was extraordinary.

The comments and recommendations presented below focus on items that need immediate attention and are designed to make the greatest improvements to the health and safety program of NYPD personnel working at this operation.

FINDINGS:

1. Personal air sampling of FBI agents performing similar tasks to NYPD personnel (raking debris) showed asbestos levels greater than the OSHA Permissible Exposure Level - PEL (0.1 fibers/cc - for an 8-hour period or 0.067 fibers/cc for a 12-hour period). Twenty-one (21) personnel air samples for asbestos were taken by Public Health Service (PHS) industrial hygienists. Twelve (57%) of these samples had results greater than the OSHA 12-hour PEL (permissible exposure limit) for asbestos. The samples were taken on 18 and 19 September and the results were reported to the FBI on 25 September, but not given to the NYPD until Emilcott's review on 27 September 2001.

This data underscores the fact that this debris has the potential to produce significant asbestos exposures.

2. There has been no exposure assessment (air sampling) data that can determine the expected exposures to asbestos, dust, and other contaminants to the NYPD detectives performing the various tasks in this operation. Emilcott conducted six four-hour air samples (NYPD personnel and area samples) for asbestos on 27 September. The results ranged from non-detected to 33% of the 12-hour OSHA PEL.

Emilcott Associates, Inc.
Preliminary Report - H&S Evaluation
NYPD - Fresh Kills Landfill
Page 3

3. We were told by many that personnel working in the raking and sieving operations were required to wear respirators for dust. We could not determine who made this directive, nor could we find a plan or report that detailed these requirements. Regardless of who made the call or the rationale behind it, the NYPD has accepted it and mandated for NYPD personnel that respirators and personal protective equipment (PPE - disposable coveralls, gloves, hardhats) are required for those jobs associated with raking, sorting and handling debris.
4. Respirators are being handed out by Federal OSHA personnel to whoever walks in the tent and requests one. It appears that many different manufacture types and sizes of respirators are available reflecting probable donations or supply actualities. The OSHA personnel provide basic instruction on how to assemble and put-on (don) the respirator and instruct individuals on performing a positive and negative fit check. They did however, give respirators to individuals who were obviously unqualified to wear respirators and who would not pass even the most rudimentary respirator fit check. Many of these individuals had full or partial beards that would make the respirator useless for asbestos or respirable dust. Upon further evaluation, it was determined that few individuals were fit-tested, had been given adequate training, had medical clearance to wear a respirator, nor met many of the basic good practice or requirements for using respiratory protection.
5. Handwritten results from an EPA logbook taken on 22 and 23 September showed LEL (lower explosive limit) readings in supply tents ranging up to 14%. These results were made available to the NYPD during the evaluation on 27 September. This indicates that there may be a potential for the collection of landfill gas in confined areas causing a potential for a flash fire if the concentration is sufficient and there is a source of ignition.
6. Direct reading instrument results, taken by Emilcott on 27 September for vapors and gases associated with the landfill did not show that these gases were a health exposure concern to the workers onsite at the time of our visit. Further qualitative testing would substantiate this finding. There is no current qualitative sampling being conducted by the EPA or PHS for vapors and gases associated with the landfill.
7. The EPA has developed a Fresh Kill Landfill Site Safety Plan dated 20 Sept, 01 which covers *ESF-101, EPA and USCG Personnel only*. The EPA did tell Emilcott that they had a written air-sampling program that addresses our questions on exposure assessment. They did not have a copy of this plan on site and told us they would email it to us ASAP. We have not received this plan to date. Neither of these plans cover NYPD personnel.

Emilcott Associates, Inc.
Preliminary Report - H&S Evaluation
NYPD - Fresh Kills Landfill
Page 4

8. The FBI has an Incident Safety Plan dated 25 September 2001 that covers *ERTU* personnel. When asked if this covered NYPD personnel, the answer by the FBI safety representative was "No". The plan covers only FBI and personnel working for the FBI on this project.
9. There was no other site-specific health and safety plan that we found that would cover the health and safety issues and procedures for the NYPD personnel working at this operation.
10. NYPD field personnel have been receiving inconsistent information on the health and safety hazards associated with this project. No one, from our evaluation, has taken any ownership of the decision to have mandatory respirator use in some areas, while not requiring respirator usage in others. There is no consistent, quality information being provided to the workers in the field that explains to them what the health and safety hazards might be and what controls are being implemented to reduce these hazards.
11. NYPD personnel, as well as many other personnel on site, are wearing their normal work clothes underneath the disposable coveralls (Tyvek). These Tyvek or similar type disposable coveralls are not generally effective in protecting street clothes from getting contaminated. This is especially true if the coveralls are torn and/or improperly worn. Personnel decontamination and cleanup was inconsistent and totally voluntary.
12. It was noted by Emilcott that many work practices performed by contractors and other non-NYPD personnel were in direct violation to basic safety good practices, such as the site respirator and PPE requirements and/or OSHA rules and regulations. The inconsistent and poor safety practice of these personnel directly impacts the health and safety environment of NYPD personnel and does little to aid in improving the overall health and safety conditions of the whole operation.

RECOMMENDATIONS -

These recommendations are made based on our assessment on what is reasonable in a long-term disaster recovery operation such as this, what is considered to be best safety and health management practice (BMP) and what OSHA regulations would require for similar operations.

- 1) Develop a site specific Health and Safety Plan (HASP) to address how the NYPD is managing health and safety issues at this location. Preparation of a written NYPD HASP would be a BMP that is in line with what other agencies (i.e. FBI, EPA) have done on this site. A written HASP would assist in managing and communicating to

frequently changing personnel the current site conditions and the work and hygiene procedures that are necessary to protect their health and safety.

- 2) The written HASP should include how the following issues are being managed. These items are based on required elements of the OSHA Asbestos and Respiratory Protection Standards.
 - a) **Exposure Monitoring** - Currently only area monitoring around the perimeter of the NYPD work area is conducted by EPA. FBI is conducting personal monitoring weekly. Procedures for personal exposure monitoring of NYPD personnel should be implemented as part of an Exposure Assessment Plan to document actual NYPD exposures and verify that appropriate work procedures are being employed. It is anticipated that individual exposures will vary according to factors which include the job being performed, weather conditions (wind and rain), the source of the debris (lower floors of the WTC are noted to contain more asbestos than the higher floors), etc. In addition to asbestos, provision for monitoring of other potential site contaminants should be evaluated during HASP preparation.
 - b) **Task Hazard Assessment** - Comprehensive evaluation of all the tasks being conducted by the NYPD and a detailed listing of potential hazards and means and methods to control those hazards.
 - c) **Site Control** - Access to the debris fields where raking is taking place should be limited to personnel wearing the proper protective equipment and respirators. Warning signs should be posted at entrances to each area.
 - d) **Use of Respiratory Protection** - The following elements are necessary in order to ensure the effectiveness of the respirators that are being used:
 - i) **Selection** - Respirators used in the debris fields should be limited to tight-fitting half-face or full-face respirators. The use of filtering-facepieces (dust masks) of any type should be prohibited unless it is shown that asbestos levels to that person in that job are consistently below the OSHA PEL.
 - ii) **Training** - The training which was observed included instructions on how to put on the respirator and how to perform a positive and negative pressure "fit-check". Typical respirator training also includes why a respirator is necessary; how improper fit, use, or maintenance can compromise the protective effect; capabilities and limitations; maintenance and storage procedures; and how to inspect the respirator. Additional training is necessary.
 - iii) **Fit-Testing** - Instruction was provided on how to perform a positive/negative pressure "Fit-Check". Fit-testing, procedures which evaluate if a person has an effective seal between the respirator and their face, was not conducted. Qualitative fit-testing tests an individual's ability to smell, taste, or otherwise

respond to a challenge agent such as saccharin, Bitrex, isoamyl acetate (banana oil), or irritant smoke. Quantitative fit-testing uses an analytical instrument to evaluate the respirator seal. A fit-test is specific to each individual brand, make, model and size respirator. Wearing more than one brand respirator would require more than one fit-test. Qualitative or quantitative fit-testing is necessary.

- iv) **Facial Hair** - Any facial hair which comes between the sealing surface of the respirator and a persons face prohibits the effect seal of a respirator. A personnel assigned to this area must be clean shaven before every shift.
- v) **Medical Evaluation** - OSHA states, "Using a respirator may place a physiological burden on individuals that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee". Accordingly a medical evaluation by a physician or other licensed health care professional is required before wearing a respirator for the first time. Medical evaluations are also required for anyone with potential exposure to asbestos at levels greater than the OSHA PEL.
- vi) **Maintenance and Care** - To ensure continued effectiveness of a respirator's ability to function, maintenance and inspection procedures should be developed and communicated to each individual.
- e) **Personal Protective Equipment** - Tyveks, gloves, over-boots are being provided. The consistent use of the over-boots should be enforced to ensure individuals do not track debris into their cars. The wearing of personal clothing under Tyveks should be evaluated. Standard practice in projects with asbestos exposure potential is to not permit personal clothing to be worn under Tyveks
- f) **Engineering Controls and Work Practices** - Light misting of the debris with water should be considered if the evidence value of the material will not be compromised. Misting and other wet methods are recognized as ways to reduce airborne asbestos levels.
- g) **Decontamination / Hygiene Facilities and Practices** - Showers and change areas are expected to be installed by October 5th. Showers should be mandatory for all personnel before leaving the site.
- h) **Hazard Communication** - Effective communication of site conditions, air monitoring results, and other information through safety briefings, signs and other postings may alleviate concerns expressed by some individuals working in the debris field.
- i) **Emergency/Contingency Planning** - Addressing common emergencies such as weather (eg: lightning, excessive wind and rain), accidents and injuries, fire, and other emergencies anticipated on this project.

Emilcott Associates, Inc.
 Preliminary Report - H&S Evaluation
 NYPD - Fresh Kills Landfill
 Page 7

- 3) Designate one individual as the NYPD's site Health and Safety Officer (HSO). Having a HSO would be a BMP that is in line with what other agencies (i.e. FBI, EPA) have done on this site. The duties of the HSO would be to ensure implementation of all aspects of the site specific HASP and to provide consistent level of information to personnel working at the site.

Health and Safety Evaluation of the Fresh Kills Landfill Disaster Recovery Operation

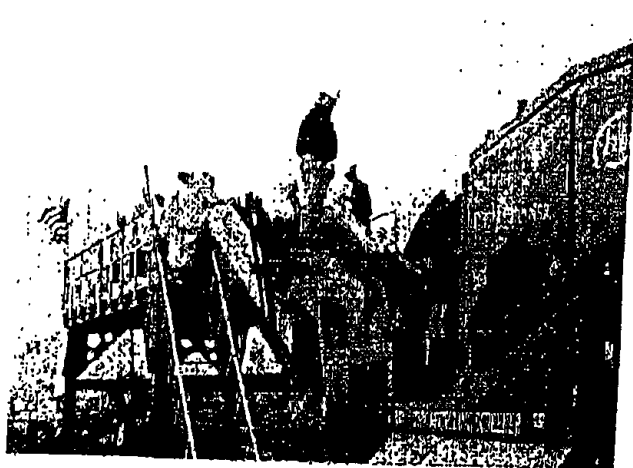


1. Respirator tent where NYPD personnel pick up respirators. Cursory training is given on assembly, when to change filters (2 days) and positive and negative fit checks. OSHA personnel provide respirators to whomever wants one, even if fully bearded. No documentation kept.



2. NYPD person who is going to wear a sampling pump. The individual was issued a respirator but has a substantial beard. The result of sampling was below OSHA PEL.

Health and Safety Evaluation of the Fresh Kills Landfill Disaster Recovery Operation



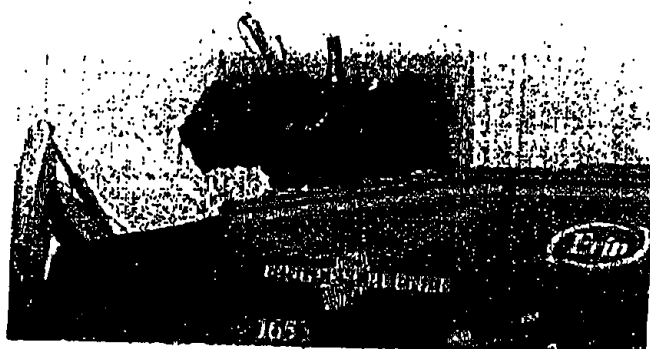
3. Metal Recycling Screening machine. WTC debris is dumped into the hopper and the large materials go up the conveyor belt to awaiting NYPD personnel on platform. Contractor standing on side, unprotected (10 feet vertical); Army COE person on platform without respirator or PPE. Dust is visible during shaking and noise levels are significant.



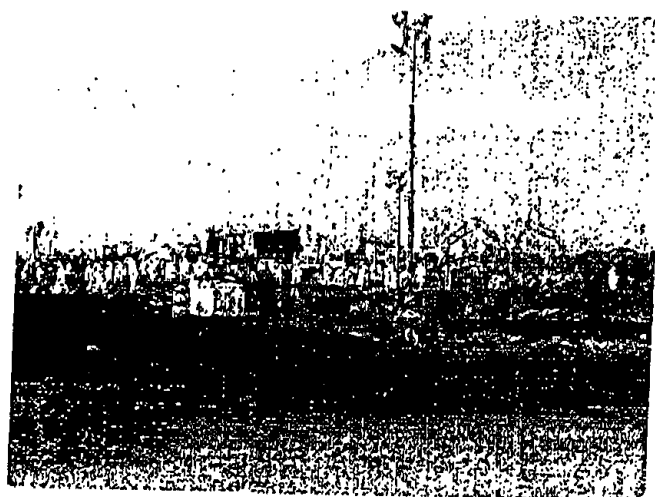
4. Metal Recycling Screening machine. Two individuals "balancing" on conveyor housing (Emilcott asked owner to consider building a platform for these individuals - he said he would). NYPD personnel trailer support area begins 50 yards from this machine. NYPD personnel also located to the right of picture.

Health and Safety Evaluation of the Fresh Kills Landfill Disaster Recovery Operation

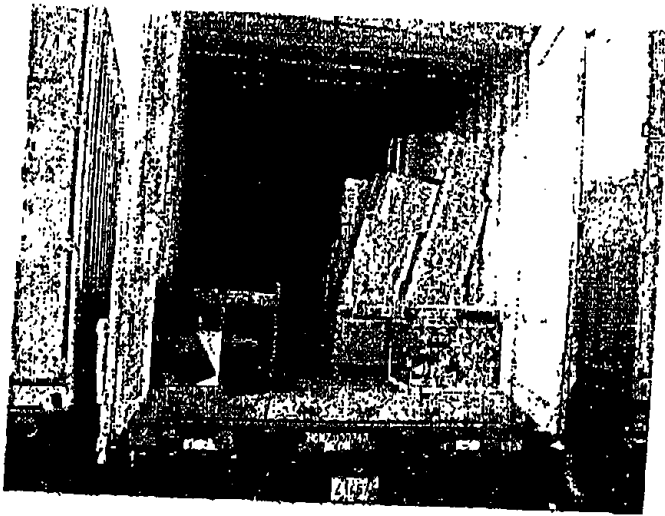
5. WTC debris being dumped in metal screener. Contractor operating equipment not wearing PPE or respirator.



6. NYPD and others raking the WTC debris. Picture taken from the adjacent vehicle roadway. No obvious site control or barriers prohibiting personnel from access to the area.



Health and Safety Evaluation of the Fresh Kills Landfill Disaster Recovery Operation



7. Trailers being used for storage of various materials. Generators stored onsite. Reported that some fuel (gasoline) and other flammable and combustible materials are being stored in these trailers and other unapproved locations.



8. NYPD personnel standing by waiting for another load to be dumped for raking. Dust levels are significant (visible dust) when the load is dumped.

BULK SAMPLE ANALYSIS REPORT

RIVERPOINT, INC.
7 HILLSIDE AVENUE
NEW ROCHELLE, NY 10801
PHONE: (914) 632-1552; FAX: (914) 632-1558

NICHE FILE: 01-0606-0

Page 1 of 1

JOB NO.:	101,169	INSPECTOR	Mark Pawlik
FACILITY NAME AND ADDRESS	333 Rector Place New York NY	ANALYST	Bing Liang
		DATE SAMPLES TAKEN	09-27-01
		DATE ANALYZED	09-28-01

Sample No.	Type Of Material Condition / Appearance	Sample Location	Asbestos Content And Percent	Non-ACM Content And Percent
1	Dust/ Gray	Apt 2J/ Living room/ Window sash	2.3% Chrysotile	25% FB, 2% CL
2	Dust/ Gray	Apt 2J/ Living room/ Trapped on AC filter	ND	95% FB, 2% CL
3	Dust/ Gray	Apt 2J/ Bedroom/ Trapped on AC filter	ND	90% FB, 5% CL
4	Dust/ Gray	Apt 2J/ Living room/ Window sills	1.8% Chrysotile	30% FB, 30% CL
5	Dust/ Gray	Apt 2J/ Debris from exterior window frame	ND	6% FB, <1% CL
6	Dust/ Gray	Apt 2J/ Living room/ Dirt sample from floor	2.1% Chrysotile	45% FB, 10% CL
7	Debris/ Gray	Roof/ North edge of roof	Trace Chrysotile	45% FB, 10% CL
8	Debris/ Gray	Roof/ Play area (on end of rubber squares)	4.3% Chrysotile	40% FB, 30% CL
9	Dust-Debris/ Gray	Roof/ South side of roof	3.2% Chrysotile	40% FB, 15% CL
10	Debris/ Gray	Roof/ Perimeter north side	0.6% Chrysotile	50% FB, 10% CL
11	Debris/ Gray	Roof/ Middle section	2.2% Chrysotile	40% FB, 15% CL

Note: The balance of each sample is non-fibrous particulates. Please contact us promptly if you have any questions about the results. Analysis was performed by using "Point Count Technique" as required and recommended by the New York State Department of Health and USEPA Interim Method for "Identification of Asbestos in Bulk Samples". This report must not be used by the client to claim product endorsement by NPLAP or any of the US government. This report relates only to the items listed. Detection limit is 1% for asbestos. NICHE's liability not to exceed the invoice amount. Sample location was provided by the client. Polarized light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if the material can be considered or treated as non-asbestos-containing.

ND = None Detected
ELAP#: 11236

CL = CELLULOSE

FB = FIBERGLASS

Thomas Pauckel, Ph. D.
Laboratory Director

Approved Signatory

From: Employee Communication on 04/30/2002 11:24 AM
To: EC -- New York Area Distribution List
cc:
Subject: On the Move -- Environmental Quality

On The Move

News and Information About Our New York Moves

In advance of our first moves back to the Tower on May 6, extensive environmental testing has shown that the Tower is in excellent condition and is ready for us to return. Here is some additional information about the extent of the testing conducted.

Who has conducted the testing?

American Express hired leading environmental firms to perform testing, manage the clean-up process, and to ensure that the indoor environment meets or exceeds established safety standards. The consultants -- EMG Consulting, Langan Engineering and Environmental Services, and their sub-consultants -- have expertise in environmental science, industrial hygiene, chemistry and biology.

How much testing has been done?

The consultants have conducted extensive testing both inside the Tower and at the building's external air intakes. In total, many thousands of samplings have been systematically analyzed over the course of the past six months. The company wanted to be aggressive in both the extent of the testing and the standards applied for re-occupancy.

Where does the environmental testing stand now?

Each floor inside the Tower has undergone multiple rounds of testing for asbestos, metals, volatile organics, mold and other compounds. This includes a final round of testing with external air circulating in the building. All floors have now passed the final round of testing and have been assessed as safe for occupancy. Test results for each floor had to meet or exceed established safety standards set by governmental agencies, or if no governmental guidelines were available, then recommended guidelines set by leading scientific institutions.

Additionally, our consultants have continued to test the outside air in the area surrounding the Tower by taking samples through the external air intakes on the 52nd and 3rd floors. The results of these tests have been well within established safety ranges.

What did they test for?

The testing covered a wide range of compounds including:

Asbestos

Metals – Aluminum, Antimony, Arsenic, Barium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Thallium, Tin, Vanadium, Zinc.

Volatile Organic Compounds – Testing for 60 separate compounds.

Polyaromatic Hydrocarbons – Testing for 18 separate compounds.

Polychlorinated Biphenyls – Testing for 7 separate compounds.

Dioxins/Furans – Testing for 17 separate compounds.

Microbials

Q: What standards were used in judging the test results?

For asbestos, the consultants applied the standard of 0.01 fibers per cubic centimeter. This standard is ten times more stringent than the Occupational Safety and Health Administration's permissible exposure limit of 0.1 fibers per cubic centimeter, which is the level of asbestos exposure considered as safe. The test results were well within the more conservative standard.

For all the other elements listed above, results were well within OSHA safety standards as well as criteria established by the American Conference of Governmental Industrial Hygienists.

How does this compare with air in other parts of the city?

According to leading governmental and academic experts, as well as our environmental consulting firms, the air quality in lower Manhattan is safe and is consistent with overall air quality elsewhere in the city.

What about the microbial testing inside the Tower?

As noted in an earlier update, mold was found on the 3rd, 44th and 52nd floors where there was damage from water leaks. Wherever mold was identified, the area was contained and the materials were removed and cleaned. Final testing for mold showed no unusual microbial conditions.

* * * *

Information Sessions

Those employees who want additional information about how the environmental testing and analysis was conducted can attend information sessions to be held in each of the company's temporary locations over the next few weeks. Representatives from the environmental consulting firms who performed the work will be on hand to provide information and answer questions. The first session, for employees based in Parsippany, will be held on Thursday, May 2, from 10:00 to 11:00 am. Due to space limitations, only Parsippany employees should attend this session. Please look for future announcements for sessions in Stamford, Short Hills, Weehawken and Jersey City.

Please keep visiting the *On the Move* web site at <http://www.express.aexp.com/onthemove>.

American Express Tower
3 World Financial Center

Air/Water Quality Q's & A's as published in A nex intranet "On The Move"

Both questions/answers provided by American Express, see dates after ea. question

AIR/WATER QUALITY

Q: Who is doing the cleaning in the Tower? What are their credentials?

The clean-up is being done by Environmental Technology Systems (ETS), a leading environmental cleaning company that is fully certified and insured to remove asbestos, metals, microbial and other contaminants. Their personnel are trained in accordance with Environmental Protection Agency, Occupational Safety and Health Administration and New York State regulations and are licensed professionals. ETS' clients include the City of New York, other municipalities and governmental agencies and leading multinational companies. ETS is being supervised by the contractor responsible for the overall restoration of the Tower, and the cleaning methodology is approved by the American Express Medical, Health and Safety departments and monitored by Real Estate. (posted 2/26/02) [\[top\]](#)

note: personnel are
trained

Q: How is the environment inside the Tower being cleaned?

This work is being done by independent professionals who are trained and experienced in the removal of asbestos and other contaminants. On floors where these materials are present, the areas are sealed off and secured to create zones from which they cannot spread. Then, the contaminants are removed through various cleaning processes that involve specially equipped vacuums, filters, ventilation devices and disposal containers. Above the ceiling, the heating, ventilation and air conditioning systems (HVAC) are cleaned by removing ceiling tiles, cleaning external surfaces and mechanical components, and flushing the internal duct work. (posted 2/26/02) [\[top\]](#)

Q: Are the carpets, walls and windows in the Tower being specially cleaned?

In the impacted areas -- floors 4 through 16 and southeast corner of floors 17 through 26 -- computers, carpeting, drapes, blinds, cloth wall coverings, fluorescent lamps, upholstered furniture, cubicles and floor panels will be cleaned and removed for disposal. All interior walls, glass windows, sills, hard-surface furniture, file cabinets and workstations are being wiped down and specially cleaned with HEPA filtered-vacuums. Telecommunication and data cables from above the ceilings and below the floors are being disposed. (posted 2/26/02) [\[top\]](#)

Q: How will we know that the air quality is safe for employees to return to the Tower?

We are intensely focused on this issue because nothing is more important than the well-being of our employees. According to the analysis and judgment of air quality experts and public health officials, conditions will be safe for us to return to the Tower. We will only proceed with moving back to the Tower if we are completely satisfied that employees' safety is not at risk.

Daily testing by a variety of experts, including the Environmental Protection Agency, indicates that air quality in the area surrounding the World Financial Center is well within the most stringent safety guidelines established by the government, and has progressively improved as time has passed since September 11th. In addition, American Express has hired a leading

environmental testing firm -- EMG -- to conduct independent tests of the air in and around the Tower. EMG's testing indicates that the air outside of our building in the area around the World Financial Center is well within established safety ranges. This is consistent with the findings of the EPA tests.

EMG has also conducted tests of air quality inside the Tower. Some of these tests have shown the presence of contaminants, principally asbestos, on some floors -- primarily on floors 26 and below. Our environmental experts have told us that this material came into the building when the Trade Center collapsed, entering through sections of the Tower's facade that were broken by falling debris. They assure us that the contaminants are detectable and can be removed from the building. We are in the process of thoroughly cleaning the areas where this material is present and eliminating it from the building. This work is being done by firms that are leaders in asbestos removal and environmental sanitation.

We will continue to have the air inside the building tested. We will only move back in after the clean-up is completed and we are confident -- based on extensive testing -- that the air inside the building is completely safe for occupancy.

This is an important subject that we will discuss in more depth. Starting next month, there will be a series of information sessions to discuss this and other topics related to the move back to the Tower. (posted 2/7/02) [[top](#)]

Q: Will the air filtration system in the Tower be enhanced?

Yes. The building's engineering staff are performing more frequent filter changes to the air intake systems. We will also be installing higher-efficiency filters that will be able to capture smaller airborne particles more effectively than in the past. All filter modifications are similar to what other building owners located in the World Financial Center are following. (posted 3/22/02) [[top](#)]

Q: Earlier this year, some employees returned to the Tower to retrieve files from the floors where they worked. How do you know that it was safe for them to be there given the air quality situation inside the building?

We would not place any employee in a situation that we have reason to think could be harmful. A small number of employees were given access to the building on a controlled basis to retrieve common files. We only allowed these individuals to go to floors that had been certified as safe for re-entry, based upon extensive testing that was conducted by independent experts and reviewed by the company's medical, health and safety expert. The tests showed no presence of asbestos or other contaminants that pose health risks on these floors.

Besides only granting access to floors that were certified as safe, we also put controls in place to prevent the spread of any potentially harmful materials from other floors in the building where asbestos or other contaminants had been detected -- primarily on the 26th floor and below. These steps include the following:

- The Tower's air intake system was closed by building engineers before the first World Trade Center Tower collapsed and has remained shut down since then.
- The Tower's ventilation system, which circulates air between floors, was also closed by building engineers and has remained shut down since September 11th.
- Passenger elevators to floors 26 and below are restricted, preventing employees from entering these floors. The elevator doors have been sealed.

- All elevator shafts were tested. While the tests showed no asbestos was present, the shafts were cleaned as an extra precaution.
- Barriers were placed on the southeast areas of the building that were exposed to the outside air due to damage to prevent the possible circulation of contaminants.

We are taking every precaution with these and other measures. Ongoing tests have shown that asbestos and other contaminants inside the building have been contained to the areas in which they were originally found. We are in the process of removing these materials so that the building is safe for re-occupancy.

A very small number of employees have visited restricted areas in the building upon request for important business purposes. These visits were controlled and all necessary safety precautions were taken, including the use of respirators and protective clothing where necessary. Construction and environmental workers who have been working on restricted floors have also used respirators and worn protective clothing where necessary.

We continue to have air quality and environmental tests conducted throughout the building on an ongoing basis. We will only move back into the Tower after the clean-up is completed and we are confident -- based on extensive testing -- that the air inside the building is completely safe for occupancy. (posted 2/19/02) [\[top\]](#)

Q: What kind of confidence should we have with regard to entering other buildings in the area such as restaurants and stores?

It's impossible for us to know, with certainty, the steps that every merchant in the downtown area has taken to test and clean their facilities. However, we do know that Brookfield properties, which manages and/or owns most office space in the World Financial Center, has undertaken testing, cleaning and monitoring of the World Financial Center properties which they manage. We have had a number of meetings with Brookfield Properties staff to review the scope of testing and cleaning undertaken by their environmental consultants in Brookfield spaces in the World Financial Center. In the course of our discussions, Brookfield has assured us that the level of testing and cleaning in these spaces was within safety standards stipulated by government agencies.

In terms of other lower Manhattan establishments and businesses, we know that the New York City Department of Environmental Protection allowed owners to reoccupy their establishments in early December, following analysis of samples of outdoor air and dust in the lower Manhattan area. In addition, following public hearings on air quality in lower Manhattan that were held in early February, Senator Clinton has called for an indoor air program that would include the creation of a Task Force on Indoor Air in Lower Manhattan by the EPA with the participation of local, state and federal entities. Senator Clinton has asked the Task Force to take a number of steps to help monitor existing indoor air quality in lower Manhattan as well as speed up remediation efforts, including:

- Going door-to-door in lower Manhattan establishments and residences to perform air quality tests
- Ensuring that all information on indoor air in Lower Manhattan is made readily available to the public

As the Task Force comes together and begins its work in coming weeks, we expect to hear news and updates on the progress of the Task Force's activities. (posted 3/22/02) [\[top\]](#)

Q: Why were there conflicting reports in the news about EPA and government testing and results?

The EPA has been using proven methods and technologies as well as published and established standards to conduct their testing and evaluate the results. There have been some individuals cited in the media and news that have questioned the extent of testing or suggested other methods of testing. Many of the methods that these individuals have suggested do not meet the established and proven standards. (posted 3/22/02) [\[top\]](#)

Q: How can I be confident that the boxes I've received of files and office possessions are not contaminated?

We have only shipped personal materials and possessions from floors that were certified as safe, based upon extensive testing. In addition, workers who packed these boxes wore personal monitors that tested the air around them. These monitors would have detected particle matter that became airborne as a result of possessions being packed. No harmful materials were detected. (posted 2/19/02) [\[top\]](#)

Q: With the excavation work still underway, isn't there a risk of contaminants being released into the air and causing health problems?

Based on extensive testing and analysis by public health authorities and leading experts, the air quality in lower Manhattan is well within established safety guidelines. In addition, testing by the EPA and other experts has shown that the air quality has improved significantly since the aftermath of the Trade Center collapse and as the clean up work has advanced.

While there have been occasional increases in pollutant levels at the work zone itself as certain debris is disturbed, these exposures have been short term in nature, localized to the work zone site, and have not caused air quality in the surrounding area to pose health risks. This has been confirmed by results of daily air quality testing in and around the area of the World Trade Center pit. (posted 3/22/02) [\[top\]](#)

Q: What air quality testing was done within the 40 Wall Street building?

Extensive testing conducted at 40 Wall Street after September 11th showed that the air quality was within the most stringent safety guidelines set by the government. It's important to note that, unlike the Tower, the 40 Wall Street building was never breached. Nevertheless, tests were conducted to ensure that the building was safe to occupy.

Trump Management, the manager of the 40 Wall Street property, conducted testing for asbestos immediately following September 11. These tests show no presence of asbestos.

In addition to the tests performed by the building's management, American Express arranged testing by environmental safety experts from Travelers Insurance. Five tests were conducted in the building at ten day intervals from September through November. These tests included air samplings for particulate dust and fibers, carbon dioxide, carbon monoxide, humidity and air temperature. Results from these tests also showed that the air quality within the 40 Wall Street facility was safe.

We did not reoccupy our space in 40 Wall Street until the building management's testing and our own first round of tests were completed. We continued to conduct tests thereafter to ensure that conditions remained safe. We will also conduct another round of testing using the exact same processes and protocols as we are using in the Tower so that testing across both locations is completely consistent. (posted 3/13/02) [\[top\]](#)

Q: If the level of air quality is acceptable, why were there so many cases being reported of people with respiratory problems?

There have been cases of rescue and construction workers reporting respiratory symptoms. These individuals were exposed to high levels of a variety of compounds and chemicals on September 11 and during the days immediately following the collapse of the World Trade Center towers. Many of these workers did not wear respirators or other protection during this time. It is also important to note that these individuals were working in or around the World Trade Center site

From: Employee Communication on 07/31/2002 11:19 AM
To: Employee Communication@AMEX
cc:
Subject: Upcoming Cleaning of Tower Facade

MEMORANDUM

Subject: UPCOMING CLEANING OF TOWER FACADE
Date: July 31, 2002
To: American Express Tower Residents
From: Peter Kane, Vice President, Corporate Real Estate

During the next week, employees who are based in the Tower will see cleaning crews begin work on a 10-week effort to wash the entire stone facade of the American Express Tower. This work is being done for cosmetic purposes to improve the external appearance of the Tower.

The Tower's facade has not been washed in its entirety since we first moved into the building about sixteen years ago. As a result, the color of the original stone panels has become dulled over time. Washing the facade will not only improve the overall look of the building, but will also make the color of the original stone panels more consistent with the replacement panels that have been installed over the past few months as part of the building's restoration.

It is important to note that washing the building's facade presents no environmental safety issues, nor is it being done to clean debris resulting from the collapse of the World Trade Center on September 11. Debris from the Trade Center collapse was removed as part of extensive clean-up efforts done prior to our re-occupying the building.

The American Express Real Estate Department has arranged for Aztec Service Group to perform this work under our supervision. The work will start on the north and west sides of the upper tower (the 51st floor to 26th floors) and proceed counterclockwise until the upper tower is completed. Aztec will then clean the lower tower (15th floor to ground), starting on the north and west sides and proceeding in a counterclockwise direction until completed.

Please feel free to contact me if you have any questions about this effort.



MAY
April 11, 2002

Department of
Environmental
Protection

100 West
Broadway
New York
City 10007

John Miele Sr., P.E.
Commissioner

C. Avaltroni
Deputy Commissioner
Office of
Environmental Compliance
(8) 595-4418
(8) 595-4422

Building Owner Name: Bldg owner

Address: 315 BROADWAY
N.Y., N.Y.

Subject: 315 BROADWAY

EXHIBIT H

Dear Sir/ Madam:

In September 2001, the New York City Department and Environmental Protection (NYC DEP) and the Department of Health (NYC DOH) advised building owners regarding building maintenance and re-occupancy issues following the collapse of the World Trade Center. The steps included the professional assessment of building contamination for possible hazardous components, including asbestos, and a retrospective filing, as required, if applicable.

The NYC DEP is hereby requesting copies of the environmental hazard assessments including bulk sample results and air monitoring results and a summary of clean-up activities at the above referenced site. Please forward the requested documents to our offices within FIVE BUSINESS DAYS. They may be faxed to (718) 595-3744 or sent to the NYC DEP Asbestos Control Program at 59-17 Junction Boulevard, 8th floor, Corona, New York 11373-5108.

Please be advised building owners are responsible for the cleaning of building exteriors, grounds, and common areas. Adherence to proper cleaning methods is important for the protection of public health and the environment. DEP inspectors will be following up on this matter.

If you have any questions, you may reach the Department at (718) 595-3682 during office hours or the 24-hour Help Center at (718) DEP-HELP. DEP staff is available to provide guidance and technical assistance.

Sincerely,

R. Radhakrishnan

R. Radhakrishnan
R. Radhakrishnan, P.E.
Director
Asbestos Control Program



www.nyc.gov/dep

(718) DEP-HELP

Lee/Dalland
Owner/ Occupant
27 Oliver St.
NYC 10038

May 06, 2002

FAX TO:
NYC DEP Asbestos Control Program
59-17 Junction Blvd. 8th flr
Corona, NY 11373-5108
Fax: 718 595 3744

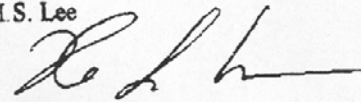
Dear Sir/Madam:

We received a DEP notice dated May 1, 2002 regarding the assessment of environmental conditions after the events of Sept. 11, 2001. This is the first and only request for assessment we have received.

Residents in our area did not relocate and took no debris or ash on or after 9/11. As a result, we have taken no action.

I have spoken with an associate of Mr. Radhakrishnan, who requested we report the above.

Sincerely, H.S. Lee



ASBESTOS INSPECTION REPORT

PAGE 1 OF 2

PREMISE NO. 22 JOHN STREET / 18 JOHN STREET / 15 MAIDEN LANE		STREET		INSPECTION DATE 09-18-02	
FLOOR ROOF AND FACADE	ZIP 10038	BORO CODE 1	BLOCK 65	LOT 0T	SQUAD # N/A
INSPECTOR D. ANTZOULATOS		BLDG TYPE A	BASIS OF INSPECT. WTC 91802		PHOTOS TAKEN <input checked="" type="checkbox"/> YES / NO
CONTRACTORS NAME MALOY RESTORATION CORP			SAMPLE NO. 20918A078001 TO 20918A078024		
ADDRESS 56 MASPETH AVENUE			CITY BROOKLYN		
STATE NY			ZIP 11211		
PHONE (718) 963-3366			SAMPLE NO.		
LABORATORY NAME NONE			OWNERS NAME RELIDE REALTY COMPANY		
ADDRESS			CITY NEW YORK		
STATE			ZIP 10038		
PHONE			PHONE (212) 964-3180		
CONTACT PERSON:			TIME OF INSPECTION FROM: 9:30 am/pm TO: 10:30 am/pm		
INSPECTION DISCLOSED:					

AT APPROXIMATELY 9:30 AM I REVISITED THE PREMISE AND OBSERVED WORKERS, FROM MALOY RESTORATION CORP, CUTTING INTO THE MASONRY OF THE SOUTH FACADE OF THE PREMISE (15 MAIDEN LANE PORTION). THIS FACADE HAD VISIBLE WTC DEBRIS ON IT. ALREADY AT THE SCENE WAS CARL LUTCHMEDIAL, DIRECTOR OF ENFORCEMENT - ASBESTOS CONTROL PROGRAM AND INSPECTOR RAM RAMMOHAN. THEY PROCEEDED TO THE BUILDING OWNERS OFFICE ON THE 13TH FLOOR TO SEE MR. LAURENCE ANG IN ORDER TO HAVE THE ONGOING WORK CEASE. I PROCEEDED TO THE ROOF OF THE ADJACENT PREMISE TO ORDER THE WORKERS TO STOP WORK. WHILE ON THE ROOF I OBSERVED A WORKER WHO WAS NOT WEARING ANY PERSONAL PROTECTIVE EQUIPMENT. SO MUCH DUST WAS BEING GENERATED BY THE CUTTING OPERATION THAT THE WORKER WAS DISAPPEARING IN A CLOUD OF DUST. I CALLED OUT TO THE WORKER, IDENTIFIED MYSELF AS A CITY INSPECTOR AND ORDERED HIM TO STOP WORK. HE IMMEDIATELY COMPLIED. I ASSISTED INSPECTOR RAMMOHAN WITH THE COLLECTION OF BULK SAMPLES FROM THE FACADES OF THE PREMISE (15 MAIDEN LANE PORTION - WHERE CUTTING INTO MASONRY OCCURRED 22 JOHN STREET PORTION - WHERE POWERWASHING ACTIVITIES OCCURRED YESTERDAY; AND THE 18 JOHN STREET PORTION). SAMPLES WERE ALSO COLLECTED FROM ROOF

ASBESTOS INSPECTION REPORT

PAGE 2 OF 2

PREMISE NO. 22 JOHN STREET / 18 JOHN STREET / 15 MAIDEN LANE		STREET					INSPECTION DATE 09-18-02
FLOOR ROOF AND FACADES	ZIP 10038	BORO CODE 1	BLOCK 65	LOT 07	SQUAD # N/A	BADGE # A020	

MR. LAWRENCE ANG, THE BUILDING OWNER'S REPRESENTATIVE, AND NOTIFIED HIM OF THE RESULTS OF THE LABORATORY ANALYSIS. AT THIS TIME, MR. ANG ASKED IF THE SAMPLES, COLLECTED AT THE PREMISE EARLIER, COULD BE RE-ANALYZED BY HIS OWN LABORATORY. I ASKED HIM TO CONTACT THE DEPARTMENT'S LABORATORY DIRECTOR DIRECTLY REGARDING THIS MATTER. I THEN NOTIFIED THE DEPUTY DIRECTOR OF THE ASBESTOS CONTROL PROGRAM, PENNY THEODORAKIS, THE DIRECTOR OF THE ENFORCEMENT UNIT, CARL LUTCHMEDAL, AND THE INSPECTOR, RAM RAMMOHAN ABOUT THE RESULTS OF THE SAMPLE ANALYSIS.

THURSDAY SEPTEMBER 19 2002

A FORMAL WRITTEN STOP WORK ORDER IS ISSUED AND IS HAND DELIVERED BY DEPUTY DIRECTOR PENNY THEODORAKIS. MR. LAWRENCE ANG SIGNS OFF AS THE RECIPIENT OF THE STOP WORK ORDER

ASBESTOS INSPECTION REPORT

PAGE 1 OF 3

PREMISE NO.		STREET				INSPECTION DATE	
22 JOHN STREET / 18 JOHN STREET / 15 MAIDEN LANE						09-17-02	
FLOOR ROOF AND FACADE	ZIP	BORO CODE	BLOCK	LOT	SQUAD #	BADGE #	
	10038	1	65	07	N/A	A020	
INSPECTOR D. ANTZOULATOS		BLDG TYPE A	BASIS OF INSPECT. WTC 91802			PHOTOS TAKEN <input checked="" type="checkbox"/> YES / <input type="checkbox"/> NO	
CONTRACTORS NAME MALOY RESTORATION CORP				SAMPLE NO. 20918A078001 TO 20918A078024			
ADDRESS 56 MASPETH AVENUE			CITY BROOKLYN		SAMPLE NO.		
STATE NY	ZIP 11211	PHONE (718) 963-3366		SAMPLE NO.			
LABORATORY NAME NONE				OWNERS NAME RELIDE REALTY COMPANY			
ADDRESS			CITY		ADDRESS 15 MAIDEN LANE		
					CITY NEW YORK		
STATE	ZIP	PHONE		STATE NY	ZIP 10038	PHONE (212) 964-3180	
CONTACT PERSON:				TIME OF INSPECTION FROM: 8:30 am TO: 9:30 am			
INSPECTION DISCLOSED:							

ON SEPTEMBER 17 2002 AT 8:30 PM I OBSERVED MALOY RESTORATION CORP WORKERS POWERWASHING THE NORTH FACADE OF THE PREMISE. A PLASTIC SHEET DRAPED OVER THE STORE FRONT WINDOWS AND COVERED APPROXIMATELY ONE HALF THE WIDTH OF THE SIDEWALK (SEE PHOTOS). MINOR ACCUMULATIONS OF WTC DEBRIS AND WATER WERE PRESENT. WORK ACTIVITIES HAD APPARENTLY STARTED JUST PRIOR TO MY ARRIVAL. I IDENTIFIED MYSELF AS A DEP INSPECTOR AND ASKED TO SPEAK WITH THE CREW SUPERVISOR. AT THIS TIME I MET AND SPOKE WITH MR. JACEK POMIANEK THE SITE SUPERVISOR. I ASKED TO SEE A COPY OF THE ASBESTOS PROJECT NOTIFICATION (ACP-T) FORM, A COPY OF HIS COMPANY'S ASBESTOS ABATEMENT CERTIFICATE AND THE DEPARTMENT OF TRANSPORTATION (DOT) PERMITS FOR THE SIDEWALK CLOSURE. NONE OF THESE DOCUMENTS COULD BE PRODUCED. MALOY RESTORATION WAS NOT A LICENSED ASBESTOS CONTRACTOR, NO ASBESTOS PROJECT NOTIFICATION (ACP-T) FORM HAD BEEN FILED PRIOR TO THE START OF WORK, THIS IS IN DIRECT VIOLATION OF SECTION 1-25(C) OF TITLE 15, CHAPTER 1 OF RCNY, AND NO DOT PERMITS HAD BEEN APPLIED FOR. I INFORMED MR. POMIANEK THAT THE DEBRIS MATERIAL HIS WORKERS WERE POWERWASHING OFF THE BUILDING FACADE HAD TESTED POSITIVE FOR ASBESTOS AND WAS ASBESTOS CONTAINING MATERIAL (ACM) [THE BUILDING OWNER SUBMITTED SAMPLE RESULTS TO THE DEPARTMENT]. I ASKED MR. POMIANEK TO CEASE WORK. MR. POMIANEK IMMEDIATELY ORDERED HIS WORKERS TO CEASE WORK AND THEN CALLED THE BUILDING OWNER'S REPRESENTATIVE, MR. LAWRENCE ANG, TO INFORM HIM ABOUT THE SITE CONDITIONS. HE

ASBESTOS INSPECTION REPORT

PAGE 2 OF 3

EMISE NO.		STREET				INSPECTION DATE	
22 JOHN STREET / 18 JOHN STREET / 15 MAIDEN LANE						09-17-02	
FLOOR	ZIP	BORO CODE	BLOCK	LOT	SQUAD #	BADGE #	
ROOF AND FACADE	10038	1	65	07	N/A	A020	

BUILDING, THERE WERE NO POSITIVE ASBESTOS SAMPLE RESULTS FOR THE NORTH FACADE OF THE BUILDING. MR. DOMIANEK TOLD MR. ANG THAT AT THIS POINT HE DID NOT KNOW WHAT TO BELIEVE AND THAT HE WAS GOING TO COMPLY WITH THE DEP INSPECTOR'S REQUEST TO CEASE WORK ACTIVITIES. MR. ANG ASKED TO SPEAK WITH ME VIA TELEPHONE. I TOLD MR. ANG THAT I COULD NOT BELIEVE THAT AFTER MY NUMEROUS VISITS TO HIS OFFICE, AND MY MANY CONVERSATIONS WITH HIM AND FRAN OF HIS OFFICE, THAT HIS ORGANIZATION WOULD CHOOSE TO AN IMPROPER COURSE OF ACTION. I TOLD HIM THAT ONLY DAYS BEFORE (SEPTEMBER 13 2002) I HAD A LONG CONVERSATION WITH FRAN AT HIS OFFICE AS TO THE PROPER METHOD OF ADDRESSING THE REMOVAL OF WTC DEBRIS FROM THE FACADES OF THE BUILDINGS. I EXPLAINED AT THAT TIME THAT THERE WERE ONLY TWO ACCEPTABLE OPTIONS GIVEN THAT POSITIVE ASBESTOS SAMPLES OF THE DEBRIS HAD BEEN COLLECTED BY THEIR OWN ASBESTOS INVESTIGATOR. THE BUILDING OWNER COULD EITHER SIGN THE LICENSING AGREEMENT GIVEN TO THEM BY THE DEPARTMENT (I HAD DROPPED OFF TWO COPIES PERSONALLY) AT WHICH POINT THE DEPARTMENT'S LICENSED ASBESTOS CONTRACTOR WOULD SCHEDULE THE CLEAN UP ACTIVITIES AS SOON AS POSSIBLE OR THE BUILDING OWNER COULD HIRE THEIR OWN LICENSED ASBESTOS CONTRACTOR TO PERFORM THE CLEAN UP ACTIVITIES. I EXPLAINED THAT IF THE BUILDING OWNER CHOSE HIS/HER OWN CONTRACTOR THAT AN ASBESTOS PROJECT NOTIFICATION (ACR-7) FORM MUST BE FILED WITH THE DEPARTMENT, THAT A SCOPE OF WORK MUST BE SUBMITTED FOR APPROVAL BY THE DEPARTMENT, THAT A THIRD PARTY AIR MONITOR MUST BE HIRED BY THE OWNER TO PERFORM AIR MONITORING DURING THE CLEAN UP ACTIVITIES AND THAT ANY DOT PERMITS REQUIRED (FOR STREET/SIDEWALK CLOSURES) WOULD BE OBTAINED PRIOR TO THE START OF WORK. I TOLD MR. ANG THAT NEITHER OF THE TWO PROPER OPTIONS HAD BEEN TAKEN AND THAT HIS ORGANIZATION HAD CHOSEN TO DO THE WRONG THING BY HIRING AN UNLICENSED ASBESTOS CONTRACTOR TO PERFORM THE CLEAN UP IN THE MIDDLE OF THE NIGHT. I TOLD MR. ANG THAT ALL WORK TO BE CONDUCTED BY MAJOY RESTORATION CORP SHOULD CEASE UNTIL SUCH TIME THAT THE EXTERIOR FACADE SURFACES WERE PROPERLY CLEANED. MR. DOMIANEK'S CREW REMOVED ALL THE PLASTIC SHEETING THAT COVERED THE STORE FRONT WINDOWS AND SIDEWALK AS WELL AS THE DISPOSABLE SUITS WORN AND PLACED THESE MATERIALS INTO LARGE BLACK

ASBESTOS INSPECTION REPORT

PAGE 3 OF 3

PREMISE NO. 22 JOHN STREET / 18 JOHN STREET / 15 MAIDEN LANE		STREET				INSPECTION DATE 09-17-02
FLOOR ROOF AND FACADE	ZIP 10038	BORO CODE 1	BLOCK 65	LOT 0T	SQUAD # N/A	BADGE # A020

SECTION 1-36(a) OF TITLE 15, CHAPTER 1 OF RCNY. NO WORKER DECONTAMINATION SYSTEM WAS PROVIDED. THIS PRACTICE IS IN DIRECT VIOLATION OF SECTION 1-82(a) OF TITLE 15, CHAPTER 1 OF RCNY. THE ASBESTOS CONTAINING DEBRIS WAS NOT BEING BAGGED DIRECTLY UPON DETACHMENT FROM THE FACADE SURFACES NOR WAS IT CAUGHT IN A CATCH BASIN AND IT WAS BEING DROPPED GREATER THAN A HEIGHT OF TEN FEET (WORK BEGAN ON THE 6TH STORY OF THE BUILDING). THESE PRACTICES ARE IN DIRECT VIOLATION OF SECTION 1-102(d) OF TITLE 15, CHAPTER 1 OF RCNY. PRIOR TO LEAVING THE PREMISE, I NOTIFIED DEPUTY DIRECTOR P. THEODORELLYS AS TO WHAT EVENTS HAD TRANSPIRED AT THE PREMISE. THE PREMISE WILL BE REVISITED. SEE FOLLOW UP REPORT



Please Reply To:

SCIENTIFIC LABORATORIES, INC.

13635 GENITO ROAD
MIDLOTHIAN, VA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

FACSIMILE TELECOPY TRANSMISSION

To: Joel Kupferman From: C. Samuel Manooch
New York Environmental Law & Justice Project SCILAB Job#: 102071900
Fax #: (212)202-6388 Subject: PLM Results
Client Project: FD25-07-27

Date: Wednesday, July 31, 2002Time: 08:32:21

Comments:

Number of Pages: 03
(including cover sheet)

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LABORATORIES, INC.**

117 EAST 30TH STREET
NEW YORK, NY 10016
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FAX: (212) 679-9392

**SCILAB
CALIFORNIA, INC.**

24416 SOUTH MAIN ST.
CARSON, CA 90745
TEL: (310) 834-4868
FAX: (310) 834-4772

**SCILAB
BOSTON, INC.**

6 SCHOOL STREET
WEYMOUTH, MA 02189
TEL: (781) 337-9334
FAX: (781) 337-7642

**SCIENTIFIC
LABORATORIES, INC.**

13635 GENITO ROAD
MIDLOTHIAN, VA 23112
TEL: (804) 763-1200
FAX: (804) 763-1800

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**SCIENTIFIC LABORATORIES, INC.**13635 GENITO ROAD
MIDLOTHIAN, VA 23112

TEL: (804) 763-1200 • FAX: (804) 763-1800

PLM Bulk Asbestos ReportNew York Environmental Law &
Justice Project
Attn: Joel Kupferman
315 Broadway
Suite # 200
New York, NY 10007-1121**Date Received** 07/29/2002 **SciLab Job No.** 102071900
Date Examined 07/31/2002 **P.O. #** FD25-07-27
Page 1 of 1
RE: FD25-07-27

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
150	102071900-01	Yes	3 %

Location: Ladder 25**Description:** White/Grey, Heterogeneous, Bulk Material
Asbestos Types: Chrysotile 3. %
Other Material: Fibrous glass 40. %, Non-Asbestos 57. %

100	102071900-02.1	No	NAD
-----	----------------	----	-----

Location: Ladder 25**Description:** White/Grey, Heterogeneous, Paper Material
Asbestos Types:
Other Material: Cellulose 100. %

100	102071900-02.2	Yes	2 %
-----	----------------	-----	-----

Location: Ladder 25**Description:** White/Grey, Heterogeneous, Debris Material
Asbestos Types: Chrysotile 2. %
Other Material: Fibrous glass 40. %, Non-Asbestos 58. %**Reporting Notes:**

Analyzed by: C. Samuel Manooch

Date

07/31/02

*NAD/NSD = no asbestos detected; Detection Limit <1%; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab #101904-0) and ELAP PLM Analysis Protocol 198.1 for New York samples (NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

102071900

Tom McKee
SciLabs
13635 Gerito Road
Midlothian VA 23112
FEDEX #:1222-2625-5

Chain of Custody Form

Collection

Sent by: Joel R Kupferman
New York Environmental Law & Justice Project
351 Broadway 4th Fl NY NY 10013 212-334-5551 nyeljp@justice.com

ID Number: FD25-07-27 Notes: _____

Collected By: Uday Singh & Joel R Kupferman

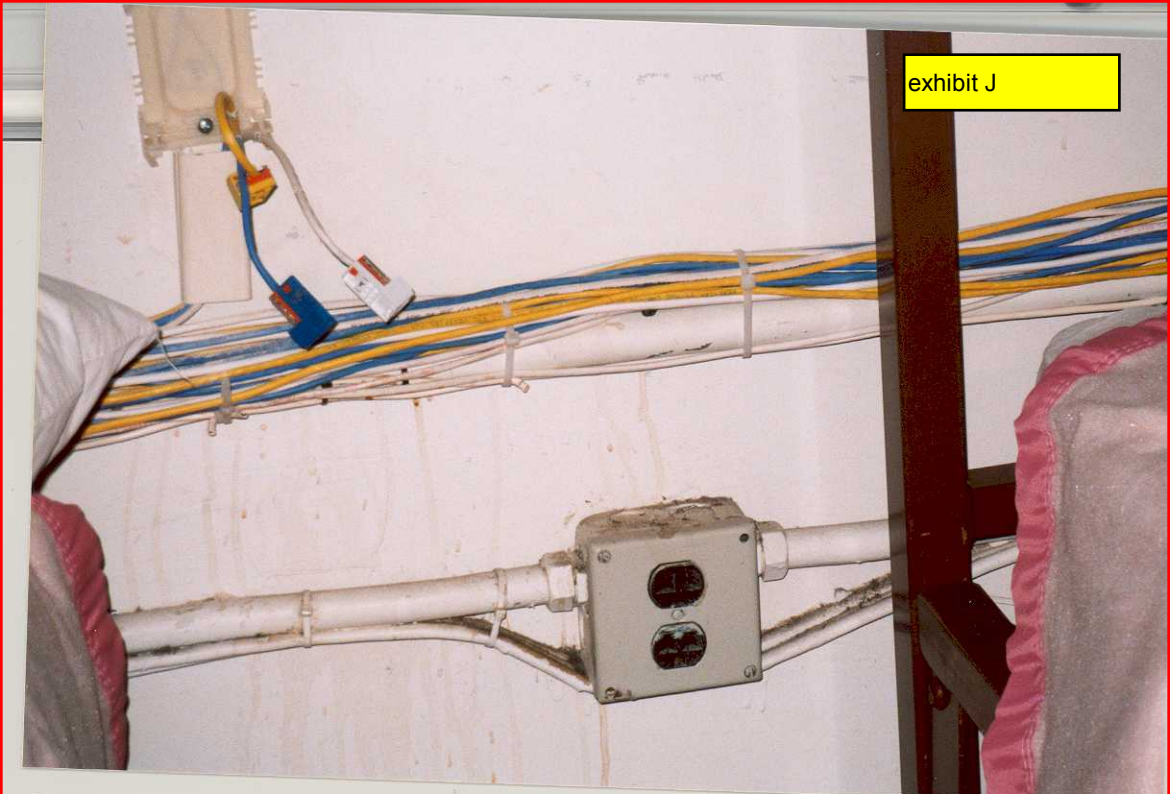
Date and Time Collected: _____

Number/ _____ Type of Samples - visual inspection asbestos & fiberglass
Do not use ELAP 198.1

150	Ladder 25		collected 6-26-02		
100	Ladder 25	← in your possession →	collected 6-26-02		



exhibit J



FDNY Ladder 25

P.A. Letterhead Enmeshed In Ladder



This envelope was found on 6/25/02 "post-cleaning of this firetruck. Outstanding proof that this asbestos laden dust came from the WTC. The contracted "decontaminator" was allowed to bid on the cleanup cleanup of downtown "

Ladder served at Ground Zero. The Firehouse is located at 205 West 77th Street Manhattan. (over 5 miles from the

**SCIENTIFIC LABORATORIES, INC.**13635 GENITO ROAD
MIDLOTHIAN, VA 23112

TEL: (804) 763-1200 • FAX: (804) 763-1800

PLM Bulk Asbestos ReportNew York Environmental Law &
Justice Project
Attn: Joel Kupferman
315 Broadway
Suite # 200
New York, NY 10007-1121Date Received 07/29/2002 SciLab Job No. 102071900
Date Examined 07/31/2002 P.O. # FD25-07-27
Page 1 of 1
RE: FD25-07-27

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
150	102071900-01	Yes	3 %

Location: Ladder 25

Description: White/Grey, Heterogeneous, Bulk Material
Asbestos Types: Chrysotile 3. %
Other Material: Fibrous glass 40. %, Non-Asbestos 57. %

100	102071900-02.1	No	NAD
-----	----------------	----	-----

Location: Ladder 25

Description: White/Grey, Heterogeneous, Paper Material
Asbestos Types:
Other Material: Cellulose 100. %

100	102071900-02.2	Yes	2 %
-----	----------------	-----	-----

Location: Ladder 25

Description: White/Grey, Heterogeneous, Debris Material
Asbestos Types: Chrysotile 2. %
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Analyzed by: C. Samuel Manooch

Date

07/31/02

*NAD/NSD = no asbestos detected; Detection Limit <1%; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab #101904-0) and ELAP PLM Analysis Protocol 198.1 for New York samples (NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

FDNY Engine 4 Locker Room





Resource

The Asbestos Nightmare



Plagued by complacency, the quality of abatement work and enforcement of regulations is suffering.

Though it's still booming, the asbestos business is quite different from the one that we knew in the 1980s. You would think that after more than 20 years of asbestos abatement activity, we would have this industry under control. However, it's far from it, and certainly nowhere near where it was more than a decade ago—and it's getting worse. Perhaps the largest single change in the abatement business is that building owners and managers no longer have the fear of asbestos that existed in the 1980s. This is both good and bad for the abatement business. Good, because building owners and managers now can make rational, fact-induced decisions regarding asbestos presence in their buildings. But it's also bad, because complacency has set in regarding the selection and hiring of both asbestos abatement contractors and asbestos abatement consultants.

Overall, complacency regarding asbestos, asbestos contamination and asbestos abatement hazards outweigh the good that may have been created by better information and a subsiding of fears surrounding asbestos. Complacency is producing poorer quality work by a certain segment of asbestos abatement contractors, and this problem is further fueled by a lack of enforcement. It's leading the industry toward an inevitable disaster that will surely tip the scales back again in favor of more enforcement, more oversight and, of course, more cost.

Complacency of Government Officials

Not only does complacency exist among building owners and managers, it also exists with regulatory and enforcement officials regarding asbestos in buildings. One need only look at the Environmental Protection Agency's (EPA) handling of the asbestos contamination associated with the collapse of the World Trade Center to understand how complacency has affected our regulators' ability to make logical, informed decisions. The EPA misreported the asbestos hazards that existed in the aftermath of the World Trade Center collapse by stating that there were very low levels of airborne asbestos detected. What they failed to do was to check the inside of nearby buildings that might have had asbestos-laden dust tracked into them.

In the wake of the collapse of the World Trade Center on Sept. 11, 2001, the EPA was quick to begin monitoring the outdoor air, using the schools clearance criteria of 70 structures per mm² as the benchmark

for safe air. In a school, a contractor's work isn't complete and people aren't allowed back into the abatement area until the asbestos fiber concentration is less than 70 structures/mm². Thus, it was prudent for the EPA to use this as a benchmark for safe air. However, as soon as a number of samples came up above this level, EPA was quick to explain that "levels above 70 structures per square millimeter do NOT imply an immediate health threat. Asbestos exposure becomes a health concern when high concentrations of asbestos fibers are inhaled over a long period. Illness is very unlikely to result from a single, high-level exposure, or from a short period of exposure to lower levels."

Most importantly, the EPA collected all of these samples from stationary locations sampling outdoor air. It failed to collect indoor air samples from buildings that were impacted by asbestos-laden dust generated from the WTC collapse. Sampling performed inside buildings by a private firm, HP Environmental of Reston, Va., showed that there were very significant levels of both airborne asbestos and asbestos-laden dust, with fibers that were extremely small. (These fibers were so small that they likely weren't even detected by the EPA's testing.)

After HP Environmental's testing became public, the EPA quietly began testing in buildings. The EPA's work was so quiet, in fact, that the results are still not publicly available on its Web site. However, on May 8, the agency announced a comprehensive clean-up plan for all residences south of Canal Street in Manhattan. The EPA's response to the Sept. 11 disaster points out that even officials charged with creating and maintaining regulations have become complacent about asbestos hazards.

Complacency Among Building Owners

The complacency among building owners and managers has caused many of these firms to begin hiring asbestos abatement contractors without abatement specifications and without independent oversight in both air monitoring and final clearance sampling. This has led to a steep decline in the quality of work being done by some asbestos abatement contractors. Without independent oversight and final clearance monitoring, some asbestos abatement contractors are cutting corners on negative pressure enclosures, decontamination systems and fine cleaning. The quality of asbestos abatement work is difficult for an owner or manager to measure, so it's going largely unchecked. There's widespread agreement from contractors and consultants in the industry regarding this trend.

During the recent annual conference of the Environmental Information Association, a meeting called "The Asbestos Roundtable" generated significant discussion about the degradation of the quality of asbestos abatement work being done today. Many attendees complained that there was little or no enforcement of existing regulations and that owners just want to get the job done cheaply. For the most part, the contractors and consultants gathered in that room are trying to provide high quality work to their clients, but they're being hurt by lower-priced contractors who are cutting corners and charging less money. Owners are hiring firms that can give them a turnkey job, by providing asbestos abatement, demolition and air monitoring all under one contract.

The EPA says that enforcement activity related to asbestos abatement is up. At the same time, an informal survey of several contractors from around the nation indicates that they're experiencing fewer or the same number of visits from enforcement officials on their projects. If the words from the EPA and the results of the informal survey can be believed, the EPA is having greater success catching the "bad guys" and, therefore, are making fewer visits to the projects of the "good guys." In my opinion, this isn't true.

What does the survey show? It says that even though the EPA says enforcement activity is up, the visits aren't being made to the job sites of the contractors that we interviewed. There were some exceptions to this trend, specifically in New York state, where the interviewed contractor said it had a visit on 100 percent of the projects by a New York State Department of Labor official. The problem is that "these officials do not deliver any teeth ...and they only visit the job sites between 8 a.m. and 4 p.m. Monday through Friday."

The other interesting trend pointed out in this survey is that the entity hiring the asbestos contractor, has, in most cases, decided to let the contractor hire its own monitoring firm. This means that the contractor has control over the monitoring firm, and can determine their schedule and the number of samples to be collected. Most contractors are using monitoring firms only to provide short term exposure limit monitoring and final sampling. Thus, there's no control over the work practices of the contractor by an independent

firm, which is how most asbestos exposures outside of the work site can occur. There is a regulatory requirement (with the exception of a few states) for independent daily monitoring, but the EPA makes strong recommendations for the hiring of an independent monitoring firm to oversee and inspect the project, to develop specifications for the project and, finally, to conduct final visual inspections and final air clearance sampling for the project.

Even more disturbing is the realization that the regulations are clearly being disregarded by some building owners in not providing a thorough survey of asbestos-containing materials to the contractor before a project has begun. More than half of the contractors interviewed said that there's no survey on the majority of their projects. This is a direct violation of the existing regulations, and contractors aren't bringing this to the attention of their clients ...they're just "'doin' the job." Enforcement officials also are reluctant to cite an owner for an asbestos violation, thus the trend continues. This means that other service industries could be sending employees into buildings that have asbestos hazards, with no idea that the asbestos exists.

The reality of the asbestos abatement industry in 2002 is that the quality of work has diminished significantly over the last 10 years. What will it take to improve the quality of the work? A return of strict enforcement of existing asbestos regulations is one method. Another would be a major litigation related to poor quality of asbestos abatement activities. Another incentive for better work would occur if the citations given to building owners for asbestos notification violations increases significantly.

The Legislation Exists

In the United States, federal regulatory authorities have enacted legislation and regulations that, on paper, create an "airtight" containment for the identification and correction of any asbestos hazards that may exist in the country's buildings. However, the reality is that lack of enforcement and blatant disregard of these regulations by regulatory and enforcement authorities means that the "containment" is far from airtight. Such attitudes from government officials exacerbates the complacency that exists among building owners and managers, and is leading to an unraveling of the asbestos abatement industry.

The National Emissions Standards for Hazardous Air Pollutants (NESHAP) Regulation (40CFR, Part 61), promulgated by the EPA, requires that, before any demolition or renovation activity occurs in a building, the building or part of the building that will be affected must be inspected for the presence of friable and nonfriable asbestos containing material before the renovation or demolition activity begins.

Likewise, the Occupational Safety and Health Administration (OSHA), in the asbestos in construction standard (29 CFR 1926.1101), requires that building and facility owners shall determine the presence, location, and quantity of asbestos containing material at a work site before any construction, demolition, alteration, repair or maintenance begins. Further, the building or facility owners must notify persons or companies that will be performing work in a building of the presence, location, and quantity of asbestos containing material that might be affected by their activities.

Additionally, both the NESHAP and OSHA regulations contain specific criteria for the proper abatement of asbestos hazards, protection of workers performing the abatement and others in adjacent spaces, and for proper disposal of asbestos containing materials once they're removed. Along with the federal regulations, specific state and local regulations often go into greater detail regarding the requirements for identifying and remediating unique asbestos hazards.

Federal regulations don't require a specific clearance criteria for public and commercial buildings. However, a clearance criteria is established by federal regulations for asbestos abatement activities performed in schools. This criteria is an airborne level of asbestos fibers that's less than 70 structures per mm², when air samples are collected in accordance with the standard and analyzed by Transmission Electron Microscopy (TEM). This criteria has become a de facto standard for all abatement activities, whether performed in schools or other buildings.

Thus, on paper the regulations look relatively good in protecting workers and the public from asbestos exposure. However, enforcement of these regulations by both the EPA and OSHA is deplorable. OSHA hasn't issued a single citation to an owner for failure to comply with the communication of hazards portion of the asbestos in construction standard.

The Nightmare

Some areas around the country have already begun to experience the nightmare being caused by this complacency. For example, in upstate New York, a number of contractors have been sentenced to jail terms for improper asbestos removals and for falsifying air monitoring records. Worse yet, the work that led to these convictions was being performed in a government building on a weekend with no supervision or oversight. What does the owner expect?

Shoddy work like this in New York state led to the formation of a group called the Professional Abatement Contractors of New York (PACNY). PACNY provides support and a united voice for those interested in a powerful, intelligent force in the industry. This group has realized that they're in the middle of the nightmare, so the contractors that want to "do the job right" have banded together to try to rid their state of the "bad guy" contractors. The "bad guys" are cutting corners and endangering the livelihood of the good firms and unsuspecting persons that are being exposed to asbestos.

The unfortunate reality of asbestos work is that the quality can't be measured at the completion of the project. The work must be monitored and checked during the course of the abatement activity to assure that it's being done properly, and in accordance with existing regulations and any governing specifications. The EPA points this out repeatedly in all of its guidance material on asbestos abatement.

Without specifications, without oversight, without independent air monitoring and without enforcement, some projects will continue to be poorly executed and the risk exposure to persons working in adjacent spaces and those returning after an abatement activity will continue to rise. The unfortunate reality of asbestos abatement work is that exposures don't result in immediate injury or symptoms. This means that poor work will continue unchecked, because no one is getting sick immediately. Unfortunately, it will take a "train wreck" of sorts before quality is brought back in line with the expectations proclaimed in the regulations. The nightmare is underway, and those of us in the industry are allowing it to go unchecked. We risk our own businesses and the health and safety of those around us by not calling out the problems that exist. From the survey, asbestos still makes up the biggest portion of business for all of the firms interviewed. Yet, we're letting shoddy work practices by others drive the quality of our work down. The industry has the tools to assure safe and effective work ...all that has to be done is to follow the regulations and the guidance of the EPA. Is that so difficult?

[Contractor Survey Gauges Asbestos Abatement Landscape](#)

[References and Source Materials](#)

This article originally appeared in the June 2002 issue of *Insulation Outlook*.

Author

J. Brent Kynoch

J. Brent Kynoch is president of Kynoch Environmental Management (KEM), Inc. in Bethesda, Md. KEM is an environmental engineering firm specializing in asbestos, lead, mold, indoor air quality and other environmental contaminants. Find out more about KEM at www.kynoch.com. Kynoch is also managing director of the Environmental Information Association (EIA), a multi-disciplinary association of contractors, consultants, laboratories, government officials, training providers and building owners. Visit EIA at www.eia-usa.org.

[back to top](#) | [home](#)

Wind-Borne Pollutants May Travel Thousands Of MilesCOLLEGE STATION, - Air pollution is not just a local problem. In fact, research by geoscientists at Texas A&M University find that pollutants can travel thousands of miles, so the air you breathe may contain pollutants brought by the wind.

A team of geoscientists -- June-Soo Park, Steve Sweet, and Terry Wade -- at Texas A&M's Geochemical and Environmental Research Group (GERG) came to these conclusions while studying how pollutants such as polynuclear aromatic hydrocarbons (PAHs), pesticides, and polychlorinated biphenyls (PCBs) are transported in the atmosphere to Galveston and Corpus Christi bays and removed by rain and dust. The scientists also studied how gaseous pollutants are exchanged between the air and water.

They found that air pollutants could be transported over long distances instead of being trapped in the ocean or the soil, and that gaseous water pollutants could evaporate into the atmosphere instead of staying in the ocean. In both cases, the airborne pollutants could lead to deposition of pollutants long distances from where they were produced or used.

"Most scientists used to think that organic pollutants were not present as gas in the air," Wade says. "To our surprise, we have learned over the last 30 years that organic pollutants can be in the vapor phase, which means that they can be transported over long distances."

For example, high levels of pesticides such as DDT, chlordane and toxaphene are present in beluga whales from the Arctic, where they were not used.

"What we do here in Texas can affect what is happening in the Arctic," Wade says. "We have added these contaminants to the environment, and now we can see that they are showing up in areas where we would not have expected them to be."

To assess the whereabouts of the pollutants, Wade and his collaborators used rain and air samplers that they installed close to Galveston and Corpus Christi bays.

A rain sampler that opens only when it is raining was used. The sampling site was also equipped with sensors that look at wind speed and direction, relative humidity, and barometric pressure.

"The general principle of the experiments," Wade says, "is that you take a sample of air or rain and you measure how much contaminant is present in the rain or in the air. Then using models, you try to estimate the amount of contaminants that are coming down into the bay."

In the rain sampler, the rain goes first through a filter that holds back the particles present in the rain and then through an absorbent that soaks up the dissolved pollutants. The volume of rain going through the sampler is measured

The air sampler contains a filter to collect particles in the air (dust) and polyurethane foam plugs that trap gaseous air pollutants.

Wade and his collaborators recently collected pollutants in about 3,000 cubic meters of air and up to 120 liters of rain. Knowing the amount of pollutant deposited in the samplers, the scientists estimated the corresponding amounts that would enter the entire bay area.

"To determine how much of some pollutants deposited in Corpus Christi Bay during rain

events," Wade says, "we analyzed the rainfall events over more than a year's period and determined the yearly amount of deposition in our sampler, then we estimated the corresponding amount to the entire surface area of Corpus Christi Bay."

The estimation of pollutant inputs from the atmosphere is good for rain, but more uncertain for particle (dust) deposition and gas exchange. It is more difficult to measure the ground deposition of air pollutants than rain pollutants.

One of the most interesting results of the scientists' work is related to the gas exchange between air and water. "Our most surprising result is that there is a flux of contaminants currently coming out of Corpus Christi Bay to the atmosphere," Wade says, "while we previously assumed that all the flux of contaminants would be into the water." Wade suggests that PAH might come from the evaporation from small petroleum spills.

"In an area where we produce petroleum, there is natural seepage and accidental releases," he says, "so if you spill PAH in the ocean, a lot of it evaporates and then can be transported long distances."

Their research also indicates that DDT and PCB evaporate into the atmosphere and are transported over long distances.

"Scientists assumed that when you spray DDT on crops, the insecticides stay in the soil. They might be washed into rivers when it rains and be transported down rivers to coastal areas," Wade says. "To our surprise, we discovered that the pesticide can volatilize into the gaseous state and be transported in the air over long distances fairly rapidly."

Wade adds that scientists are now trying to design pesticides that break down faster and can be biodegraded more rapidly to prevent them from being transported to remote locations by the atmosphere.

"We may alter our environment as long as we keep it sustainable," Wade says. "If we can put something in the environment that degrades at a rate that prevents it from building up, then there should be no harm caused to the environment."

This story has been adapted from a news release issued by Texas A&M University.

<http://www.sciencedaily.com/releases/2001/09/010920070914.htm>

EMSL Analytical, Inc.

307 West 38th Street, New York, NY 10018

Phone: 212-290-0051 Fax: 2122900058 Email: manhattanlab@emsl.com

EMSL

Attn: U. S. EPA
HQ Financial Services Division
1200 Pennsylvania Ave. NW Maildrop 2734R
Washington, DC 20460

Fax: Phone:
Project: 150 FRANKLIN STREET, NEW YORK, N.Y. 10015

Customer ID: USEPA30
Customer PO: 2W-1104-NNLX
Received: 04/17/02 3:12 PM

EXHIBIT M

EMSL Order: 030204992
EMSL Project ID:
Analysis Date 4/18/02

**Asbestos Analysis of Non-Friable Organically Bound materials by Transmission
Electron Microscopy via NYS ELAP Method 198.4**

SAMPLE ID	DESCRIPTION	APPEARANCE	MATRIX MATERIAL	NON-ASBESTOS FIBERS	ASBESTOS TYPES	TOTAL ASBESTOS
150F-1 030204992-0001	DEBRIS ON ROOF	Various Other Heterogeneous	97.7	None	2.3 <1 Chrysotile Anthophyllite	2.3
150F-3 030204992-0002	DEBRIS ON ROOF	Various Other Heterogeneous	95.0	None	5.0 <1 Chrysotile Anthophyllite	5.0
150F-31-ES 030204992-0003	DEBRIS LEDGE ELEV. SHAFT / 3RD FL	Brown Other Heterogeneous	98.0	None	2.0 <1 Chrysotile Anthophyllite	2.0
150F-33-ES 030204992-0004	DEBRIS LEDGE ELEV. SHAFT / 3RD FL	Brown Other Heterogeneous	97.8	None	2.2 <1 Chrysotile Anthophyllite	2.2

George William

Analyst

Laboratory Manager
or other approved signatory

This laboratory is not responsible for % asbestos in total sample when the residue only is submitted for analysis. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc.

ACCREDITATIONS: NVLAP #101048-9 and NY STATE ELAP #11506

NY/0B-



ELAP # 11045

ASBESTOS ANALYTICAL REPORT

ASBESTOS CONTROL PROGRAM LABORATORY
96-05 HORACE HARDING EXPRESSWAY
CORONA, NEW YORK 11368
(718) 595-6309 FAX# (718) 595-6307

TEST METHODS: 1) 40 CFR Part 763, Subpart F, App. A
2) Polarized Light Microscopy plus Stratified Point-Counting Method
3) EPA/600/R-93/116

Incident #: 435348
Inspector : R. FRITZPATRICK
Premise : 150 FRANKLIN STREET
Boro : Manhattan
Analyst : L. ATTELONEY

Samples taken by EPA

Date Collected: 04/17/02
Received: 04/17/02
Analyzed: 04/17/02

Client #:	EPA 150F-2	EPA 150F-4	EPA 150F-32
DEP Sample #:	20417/A021002	20417/A021004	20417/A021032
Laboratory #:	20417/433	20417/434	20417/435
Location Sampled:	LEFT CORNER ROOF	FRONT CORNER ROOF	3RD ELEVATOR SHAFT
Color:	BROWN	BROWN	BROWN
Homogenous:	No	Yes	No
Asbestos Present:	No	No	No
Results (%)			
Cellulose	35	30	45
Matrix	65	70	55

Comments:

Reviewed by: L. Atteloney
Laboratory Director

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ELAP # 11045

ASBESTOS ANALYTICAL REPORT

ASBESTOS CONTROL PROGRAM LABORATORY
96-05 HORACE HARDING EXPRESSWAY
CORONA, NEW YORK 11368
(718) 595-6309 FAX/ (718) 595-6307

TEST METHODS: 1) 40 CFR Part 763, Subpart F, App. A
2) Polarized Light Microscopy plus Stratified Point-Counting Method
3) EPA/600/R-93/116

Incident #: 435348
Inspector : R. RAMMOHAN
Premise : 150 FRANKLIN STREET
Boro : Manhattan
Analyst : L. ATTELONEY

Date Collected: 04/17/02
Received: 04/17/02
Analyzed: 04/17/02

Client #:**DEP Sample #:** 20417/A078001**Laboratory #:** 20417/432**Location Sampled:** 3RD/ELEVATOR SHAFT**Color:** BROWN**Homogenous:** No**Asbestos Present:** No**Results (%)**

Cellulose	25
Matrix	75

Comments:**Reviewed by:**

L. Atteloney
Laboratory Director

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ELAP # 11045

ASBESTOS ANALYTICAL REPORT

ASBESTOS CONTROL PROGRAM LABORATORY
96-05 HORACE HARDING EXPRESSWAY
CORONA, NEW YORK 11368
(718) 595-6309 FAX# (718) 595-6307

TEST METHODS: 1) 40 CFR Part 763, Subpart F, App. A
2) Polarized Light Microscopy plus Stratified Point-Counting Method
3) EPA/600/R-93/116


Incident #: 435348
Inspector : R. FRITZPATRICK
Premise : 150 FRANKLIN STREET
Boro : Manhattan
Analyst : L. ATTELONEY

Date Collected: 04/17/02
Received: 04/17/02
Analyzed: 04/17/02

Client #:	EPA 150F-2	EPA 150F-4	EPA 150F-32
DEP Sample #:	20417/A021002	20417/A021004	20417/A021032
Laboratory #:	20417/433	20417/434	20417/435
Location Sampled:	LEFT CORNER ROOF	FRONT CORNER ROOF	3RD ELEVATOR SHAFT
Color:	BROWN	BROWN	BROWN
Homogenous:	No	Yes	No
Asbestos Present:	No	No	No

Results (#)

Cellulose	35	Cellulose	30	Cellulose	45
Matrix	65	Matrix	70	Matrix	55

Comments:**Reviewed by:**
Laboratory Director

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BUREAU OF ENVIRONMENTAL COMPLIANCE
ASBESTOS AND LEAD CONTROL PROGRAM
59-17 JUNCTION BOULEVARD
CORONA, NY 11368
JOEL A. MIELL, JR., P.E.
COMMISSIONER

BULK
ANALYSIS CHAIN OF CUSTODY

Incident No.: 435348 Date Sampled: 4/17/02
Premise: 150 FRANKLIN AVENUE Boro: MANHATTAN
Time: 1:30 am/pm am
Inspector: B. BENTON ROBERT FITZPATRICK, USEPA
Print Signature

Turnaround Time: Immediate ☒ 24 Hours ☐ 48 Hours ☐ 1 Week ☐

SAMPLE NUMBER	DESCRIPTION	LOCATION SAMPLED	LAB ID
1. 435348	DEBRIS	Back of building	432
2. EPA 150F-2	DUST & DEBRIS	Left corner of roof	433
3. EPA 150F-4	DUST & DEBRIS	Front corner of roof	434
4. EPA 150F-32-ES	DUST	3rd fl. elevator shaft window	435
5.			
6.			
7.			
8.			
9.			
10.			

ANALYSIS REQUESTED: Asbestos PLM ☐ Asbestos TEM ☐ Lead ☐

Date	Time	Accepted By	Comments
1. 4/16/02	1:30 am/pm <input checked="" type="checkbox"/> am	Print Robert Fitzpatrick Sign Robert Fitzpatrick-USEPA	Samples above given to DEP to expedite sample analysis.
2. 4/17/02	3:19 am/pm <input checked="" type="checkbox"/> am	Print GLENDA BENTON Sign Glenda Benton	Safe custody lab
3.	am/pm	Print Sign	
4.	am/pm	Print Sign	
5.	am/pm	Print Sign	

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL COMPLIANCE
ASBESTOS AND LEAD CONTROL PROGRAM
59-17 JUNCTION BOULEVARD
CORONA, NY 11368

JOEL A. MIELE, SR., P.E.
COMMISSIONER

P.04/05

BULK
ANALYSIS CHAIN OF CUSTODY

Incident No.: 435348

Date Sampled: 4/17/02

Premise: 150 FRANKLIN STREET

Boro: MANHATTAN

Time: 1:00 am ☒ pm

Inspector: R. RAMMOHAN
Print

Muehling
Signature

Turnaround Time: Immediate ☒ 24 Hours ☐ 48 Hours ☐ 1 Week ☐

SAMPLE NUMBER	ANALYSIS REQUESTED	LOCATION	LAB ID
1. <u>20417/A078 001</u>	<u>DUST</u>	<u>3rd FL. elevator shaft window</u> <u>interior ledge.</u>	<u>432</u>
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

ANALYSIS REQUESTED: Asbestos PLM ☒

Asbestos TEM ☐

Lead ☐

Date	Time	Print	Signature	Comments
1. <u>4/17/02</u>	<u>3:19</u> am <input checked="" type="radio"/> pm	Print <u>Glenida Bostick</u>	<u>Glenida Bostick</u>	<u>Safe custody lab</u>
		Sign		
2.	am <input type="radio"/> pm	Print		
		Sign		
3.	am <input type="radio"/> pm	Print		
		Sign		
4.	am <input type="radio"/> pm	Print		
		Sign		
5.	am <input type="radio"/> pm	Print		
		Sign		

EMSL Analytical, Inc.

307 West 38th Street, New York, NY 10018

Phone: 212-290-0051 Fax: 212-290-0058 Email: manhattanlab@emsl.com

EMSL

Attn: Joel R. Kupferman
 NY Env. Law & Justice Project
 315 Broadway #200
 New York, NY 10007

Fax: (212) 608-2113

Phone: 917-414-1983

Project: 105F-

Customer ID: NYEL60
 Customer PO: 105F-
 Received: 04/21/02 4:15 PM

EMSL Order: 030205215

EMSL Project ID:

Analysis Date 4/22/02

Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.1 Method

SAMPLE ID	DESCRIPTION	APPEARANCE	MATRIX MATERIAL	NON-ASBESTOS FIBERS	ASBESTOS TYPES	TOTAL ASBESTOS
#1 030205215-0001	Third Floor	Brown Fibrous Heterogeneous	94.9	2.2 Glass	2.9 Chrysotile	2.9
#2 030205215-0002	Roof Front	Black Fibrous Heterogeneous	99.1	<1 Glass	<1 Chrysotile	<1
#3 030205215-0003	Roof Rear	Brown Fibrous Heterogeneous	98.7	<1 Glass	<1 Chrysotile	<1

Second testing of samples taken by Law Project

Bob Georgans

Analyst



Laboratory Manager
 or other approved signatory

Polarized Light Microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. The above test must not be used to claim product endorsement by NVLAP nor any agency of the United States Government.

NYNCE-1

1

030205213 *KLW*EMSL Analytical, Inc.
Revised July 1, 1999

CHAIN OF CUSTODY

Asbestos

030204912 *TEM/JOE*

EMSL Rep:

Your Company Name:

New York Environmental Law & Justice Center

Street:

315 Broadway

Box #:

City/State:

*NY*Zip: *10007*

EMSL-Bill to:

Street:

Box #:

City/State:

Third Party Billing requires written authorization
from third party*same*

Phone Results to:

Name:

Joe R Kupferman

Telephone #:

917 414 1983

Project

Name/Number:

Fax Results to:

Name:

Joe R Kupferman

Fax #:

212-202-6388

Purchase Order #:

105F-

MATRIX

TURNAROUND

<input type="checkbox"/> Air	<input type="checkbox"/> Floor Tile	<input type="checkbox"/> Soil	<input type="checkbox"/> 3 hrs	<input type="checkbox"/> 6 Hours	<input checked="" type="checkbox"/> Same Day or 12 Hours*	<input type="checkbox"/> 24 Hours 1 day
<input type="checkbox"/> Bulk	<input type="checkbox"/> Drinking Water	<input type="checkbox"/> Dust	<input type="checkbox"/> 48 Hours 2 days	<input type="checkbox"/> 72 Hours 3 days	<input type="checkbox"/> 96 Hours 4 days	<input type="checkbox"/> 120 Hours 5 Days
<input type="checkbox"/> Wipe	<input type="checkbox"/> Wastewater	<input type="checkbox"/> Micro-Vac	<input type="checkbox"/> 144+ hours 6-10 Days			

TEM AIR, 3 hours, 6 hours, Please call ahead to schedule. There is a premium charge for 3 hour tat, please call 1-800-220-3675 for price prior to sending samples. You will be asked to sign and authorization form for this service. 12 hours (must arrive by 11:00 a.m Mon - Fri.), Please Refer to Price Quote

PCM - Air <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> OSHA <input type="checkbox"/> Other:	TEM AIR <input type="checkbox"/> AHERA <input type="checkbox"/> NIOSH-7402 <input type="checkbox"/> EPA Level II	TEM WATER <input type="checkbox"/> Wastewater <input type="checkbox"/> Drinking Water-EPA-100.1 <input type="checkbox"/> Water - NY Wastewater <input type="checkbox"/> Water-NY Drinking Water
PLM - Bulk <input type="checkbox"/> EPA 600/R-93/116 <input type="checkbox"/> EPA Point Count <input type="checkbox"/> NY Stratified Point Count <input type="checkbox"/> PLM NOB (Gravimetric) NY 198.1 <input type="checkbox"/> Other:	TEM BULK <input type="checkbox"/> Drop Mount (Qualitative) <input type="checkbox"/> Chatfield <input checked="" type="checkbox"/> TEM NOB (Gravimetric) NY 198.4	TEM MICROVAC / WIPE <input type="checkbox"/> ASTM D 5755-95 quantitative method

As per Joe's request, no request for this 3 samples. TAT = ASAP. PLM analysis. 917 414-1983

SEM Air or Bulk
☐ Qualitative
☐ Quantitative

OTHER
☐ Asbestos
☐ Silica

RECEIVED
 EMSL ANALYTICAL
 APR 15 PM 11:22

SAMPLE NUMBER	LOCATION	VOLUME (If Applicable)
	<i>4/21/02 4:50 PM</i>	
	<i>Joe R Kupferman</i>	
	<i>4/21/02</i>	

Client Sample # (s) *#1, #2, #3*Total Samples #: *3*

Relinquished:

*Joe R Kupferman*Date: *4/15/02*Time: *11:25*

Received:

Date:

Time:

Sample C620204

sampled in living room from table top

Result- 740 asbestos structures per square centimeter

EXHIBIT N

Sample E1203-2

sampled from supply air diffuser in the 10th floor public hallway

Result - 550,000 asbestos structures per square centimeter

The supply air grille in the hallway was found to have elevated levels of asbestos fibers well above the recommended limit of 1000 structures per square centimeter. This suggests that the ventilation system was contaminated by asbestos when the building collapsed.

Date: December 9, 2001
To: Joel Kapferman
From: Ed Olmsted, CIH, CSP
Subject: Asbestos Sampling 105 Duane Street

At your request an asbestos survey was completed at apartment 10C at 105 Duane Street in Manhattan. The purpose of the survey was to determine levels of asbestos contamination inside the building. The survey was performed on December 3, 2001 by Edward Olmsted, CIH, CSP.

The collapse of the World Trade Center buildings caused the release of dust and debris containing asbestos. The asbestos containing debris was spread throughout the collapse site and around the surrounding neighborhood. Other contaminants were also spread through the neighborhood. Many of these contaminants including the asbestos settled on surfaces and were drawn into buildings through the ventilation system. This survey was made to determine the level of asbestos in dust in the 10th floor apartment and hallway of the building.

Surface dust samples were collected according to the method 5755-95 published by the American Society of Testing and Materials (ASTM). This involves drawing dust from a surface area of 100 square centimeters of a 0.8 micron mixed cellulose ester filter. The dust was collected using a personal sampling pump operated at 2 liters per minute. The filter is analyzed by transmission electron microscopy for asbestos fibers. All of the samples were shipped overnight and analyzed by IATL.

The World Trade Center tower buildings 1 and 2 had asbestos containing fire proofing on the structural steel on some of the floors. This consisted primarily of chrysotile asbestos. Asbestos fibers are recognized as a human carcinogen, which primarily affect the respiratory system. The types of cancer associated with asbestos exposure include lung cancer, pleural mesothelioma and peritoneal mesothelioma. Asbestos can also cause asbestosis, a debilitating respiratory disease. The latency period between exposure to asbestos and development of disease is 15 to 25 years. The principle route of exposure to asbestos is through inhalation.

The ASTM method is intended for guidance on examining dust contamination of building surfaces and is intended as a general assessment of the building. There is no suggestion in the ASTM method that it can be used to assess general health risk from asbestos exposure, nor does it suggest that all building surfaces be maintained to the levels published in the standard. The method is generally applicable for the estimate of the concentration of asbestos fibers on surfaces starting from approximately 1000 fibers per square centimeter (f/cm²).

On December 3rd two surface dust samples were taken from the 10th floor to determine whether asbestos fibers were settled on surfaces. The results are reported in asbestos fibers per square centimeter of surface tested. The following summarizes the sample results:

Sample C620204 sampled in living room from table top
Result- 740 asbestos structures per square centimeter
Sample E1203-2 sampled from supply air diffuser in the 10th floor public hallway
Result - 550,000 asbestos structures per square centimeter

The supply air grille in the hallway was found to have elevated levels of asbestos fibers well above the recommended limit of 1000 structures per square centimeter. This suggests that the ventilation system was contaminated by asbestos when the building collapsed.

The duct system should be cleaned by a professional duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination.

Sincerely,

Edward Olmsted

Edward Olmsted

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William M. Ewing¹

FURTHER OBSERVATIONS OF SETTLED ASBESTOS DUST IN BUILDINGS

REFERENCE: Ewing, W. M., "Further Observations of Settled Asbestos Dust in Buildings," *Advances in Environmental Measurement Methods for Asbestos*, ASTM STP 1342, M. E. Beard and H. L. Rook, Eds., American Society for Testing and Materials, 2000.

ABSTRACT: Surface sampling for asbestos is a tool used to determine the potential for asbestos exposure. It is also employed to estimate when a surface is sufficiently clean of asbestos structures.

The sampling and analytical procedure employed has been described in ASTM standard method D 5755-95. Sampling was conducted in 66 buildings and from out-of-doors. The geometric mean surface concentration was 3.7 million asbestos structures per square centimeter (s/cm^2) in areas with asbestos-containing fireproofing. Samples collected from areas having asbestos-containing acoustical plaster had a geometric mean of 160,000 s/cm^2 . Samples collected in six buildings without friable asbestos-containing surfacing materials indicated a geometric mean of 1000 s/cm^2 .

KEYWORDS: asbestos, settled dust, surface sampling, chrysotile

INTRODUCTION

Asbestos surface dust sampling has gained wide acceptance as a tool to evaluate exposure from in-place asbestos-containing materials. The primary purpose of conducting such tests is to estimate the concentration of asbestos structures

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on surfaces. This information, coupled with the investigator's knowledge of building occupancy, activities, ventilation, and surfaces is valuable to reasonably anticipate when exposures to airborne asbestos may occur.

Much of the early surface sampling consisted of "rafter dust" or settled dust sampling for silica and on occasion, asbestos. These samples were usually analyzed by x-ray diffraction with a limit of detection around 2 - 4 percent.[1] This sampling was confined to industrial settings and not employed in buildings. During the 1980's some building inspectors collected wipe samples or bulk samples of surface dust and debris.[2] These samples were usually analyzed by polarized light microscopy (PLM) with results reported in percent asbestos by types, or simply as detected or not detected. A report by R.F. Carter in 1970 represents some early research on asbestos dust, including surface deposition and re-entrainment.[3] This study evaluated asbestos dust in an industrial setting and relied heavily on optical microscopy. It was not until the late 1980's that a standardized method for collecting asbestos surface dust began to evolve. In the past few years the method of choice has been the microvacuum technique followed by analysis with transmission electron microscopy (TEM).

SAMPLING AND ANALYTICAL METHODS

The samples herein were collected and analyzed as described in ASTM Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Concentrations (D 5755-95) or the earlier draft method prepared by the US Environmental Protection Agency (USEPA).[4, 5] The method incorporates the use of a personal air sampling pump calibrated at 2 L/min. A mixed cellulose ester filter membrane housed in a 25 mm sampling cassette is used as the collection media. At the inlet of the cassette is attached a 25 mm long piece of Tygon™ tubing with the end cut at a 45 degree angle.

All samples were collected from a known surface area, usually 100 cm². The surface of interest was examined visually and sometimes with the aid of a 10x hand lens for an area of evenly dispersed surface dust with no particles greater than 1 mm diameter. The samples were collected by vacuuming the dust from the surface as the cassette nozzle was passed across it.

For all samples discussed herein the surface would be considered non-porous. Such surfaces included polished stone, metal, polished wood, and plastic. The sample locations usually had visible dust on the surface. The cleaning history of the surface was usually unknown. Field blanks were collected at a rate of one sample per batch or 10 percent, whichever was greater.

Upon completion of sampling each sample was capped and sealed into a plastic bag for transport to the laboratory. In the laboratory, the samples were transferred into an aqueous solution and an aliquot was dispersed onto a new filter. This filter was analyzed by TEM for asbestos structures. Structures were classified as fibers, bundles, clusters, or

EPA UTILIZED MICROVAC IN TESTING 290 BROADWAY- ITS OWN BUILDING

PRESENTATION AND DISCUSSION OF RESULTS

The data summarized in Table 1 was presented previously but is reviewed here to provide a basis for comparison with new data presented herein.[6] The data in Table 1 includes 275 surface dust samples collected from various buildings throughout the United States. Additionally, there were 44 field blank samples collected in which one chrysotile asbestos structure was detected in each of six field blank samples, and no fibers detected in 38 blanks. The fibers detected were in field blanks and likely the result of opening and closing the sampling cassette in the field. Blank correction of samples collected in the same lot resulted in no change to the calculated value.

The samples collected from inside buildings with no surfacing ACM, and the samples collected from outside buildings in a large city demonstrate that asbestos structures can be found on such surfaces. Virtually all the asbestos structures found were chrysotile. In two of these buildings, area and personal air sampling was conducted while intentionally disturbing dust laden surfaces. These activities included dry dusting of suspended acoustical ceiling tiles with a 20+ year build-up of settled dust. No significant increase in the airborne asbestos concentration, as measured by TEM, was found in the personal or area samples. These observations suggest a surface concentration of 1000 s/cm² may be considered clean.

The geometric mean for 79 samples collected outside of buildings in a large city was 5100 s/cm². Higher values were generally found closer to street level. While emissions from break pads and clutch facings are a possible source, this was not confirmed.

TABLE 1 - Summary of Asbestos Surface Dust Samples by Building Category

Building Category	Number of Buildings	Number of Samples	Range (s/cm ²)	Geometric Mean (s/cm ²)
Outside buildings in a large city	5	79	<400 - 140,000	5100
Inside buildings with no surfacing ACM	6	28	<240 - 210,000	1000

TABLE 1 (cont.)—Summary of Asbestos Surface Dust Samples by Building Category

Building Category	Number of Buildings	Number of Samples	Range (s/cm ²)	Geometric Mean (s/cm ²)
Areas of buildings with acoustical plaster	12	34	<3500 – 74 million	160,000
Areas of buildings with exposed fireproofing	18	41	7000 – 140 million	3.6 million
Above ceilings/tiles with fireproofing	29	93	<3500 – 220 million	3.8 million

In the areas of buildings with acoustical plaster ceilings the geometric mean for 34 samples was 160,000 s/cm². The acoustical plaster in these buildings typically contained chrysotile asbestos in a range of 5–15 percent. These ceilings were often painted and usually had small areas of visible damage comprising less than 10 percent of the surface area. The range of surface concentrations found within buildings and across buildings is quite large. This is probably due to differences in deposition rates and the cleaning frequency of the surfaces sampled.

The highest concentrations of asbestos surface dust were found on surfaces below spray-applied friable asbestos-containing fireproofing. In 41 samples from surfaces below exposed fireproofing the geometric mean was 3.6 million s/cm². This was not significantly different from the geometric mean of 3.8 million s/cm² for 93 samples collected from above suspended ceiling tiles. Visually, these surfaces appeared dusty and probably represent a dust accumulation of 20+ years. It is not possible to state a deposition rate based on these data alone. One theory is the deposition of asbestos dust occurs at a steady rate over time. It is perhaps more likely that the deposition rate of asbestos onto surfaces accelerates over time as the source ages. The deposition of dust may also be at least partially attributed to disturbance of the source material which can cause episodic releases of dust.

Various studies have been conducted by this author and others designed to characterize asbestos exposure due to disturbance of ACM, or dust and debris from ACM [7–11]. Others have described in some detail the concept of "K factors" [3, 12]. The K factor being the ratio of the airborne asbestos level to the asbestos surface dust concentration resulting from a known activity. The results of these studies indicate that routine building maintenance and custodial activities (replacing ceiling tile, sweeping, dusting, vacuuming) can produce significantly elevated airborne asbestos exposures through the reentrainment of surface dust. This statement assumes the surfaces are non-

porous and special dust suppression methods are not employed. A significantly elevated airborne asbestos exposure is defined here as a 10-fold rise in concentration.

Asbestos-containing fireproofing was often applied to structural steel and decking of ceiling plenums. These plenums are frequently part of the building ventilation system. Return air from occupied spaces is pulled into the plenum, travels across the suspended ceiling system to return air ducts, and enters air shafts to return to the fan coil unit. At the fan coil unit, the return air is mixed with some fresh air from outdoors, heated or cooled, and distributed back to occupied spaces through supply air ducts and diffusers. To determine the extent to which these ductwork accumulate asbestos dust, surface dust samples were collected inside the return and supply air ducts of three multistory buildings. These buildings had fireproofing with approximately 15% chrysotile in a matrix of gypsum and vermiculite. The results are presented in Tables 2 and 3.

TABLE 2—Asbestos Dust Sampling Results from Return Air Ducts in Three Buildings with Structural ACM Fireproofing

Location/Description	s/cm ²
Building A, return air duct, 3 rd floor	20 million
Building B, return air duct, 4 th floor	3.3 million
Building B, return air duct, 3 rd floor	4.4 million
Building B, return air duct, 2 nd floor	6.0 million
Building C, return air duct, 1 st floor	1.2 million
Building C, return air duct, 3 rd floor	3.5 million
Building C, return air duct, 2 nd floor	2.2 million
Building C, return air duct, 3 rd floor	1.1 million

TABLE 3—Asbestos Dust Sampling Results from Supply Air Ducts/Diffusers in Three Buildings with Structural ACM Fireproofing

Location/Description	s/cm ²
Building A, supply air duct, 2 nd floor	3.8 million
Building B, supply air duct, 4 th floor	27 million
Building B, supply air duct, 3 rd floor	830,000
Building B, supply air duct, 2 nd floor	490,000
Building C, supply air duct, 3 rd floor	170,000
Building C, "new" supply air duct (6 years old), 1 st floor	27,000
Building C, "new" supply air duct (6 years old), 1 st floor	110,000
Building C, "new" supply air duct (6 years old), 1 st floor	79,000

TABLE 3 (cont.)—Asbestos Dust Sampling Results from Supply Air Ducts/Diffusers in Three Buildings with Structural ACM Fireproofing

Location/Description	s/cm ²
Building A, supply air diffuser, 1 st floor	160,000
Building A, supply air diffuser, 3 rd floor	79,000

The return air duct results in Table 2 show that 7 of the 8 samples were in a range of 1.1 million, 6.0 million s/cm² with a geometric mean of 2.6 million s/cm². If the one sample from building A is included the geometric mean value rises to 3.4 million s/cm².

The supply air duct results in Table 3 present findings of samples from original ductwork (about 25 - 30 years old), new ductwork (6 years old), and supply air diffusers. While the data is limited, it does indicate that asbestos dust concentrations in the supply air ducts are generally an order of magnitude lower than that found in return air ducts.

In the late 1980s surface dust samples were sometimes collected without a nozzle using an open face 37 mm diameter sampling cassette. In order to compare the 1980's technique with ASTM D 5755 a set of side by side samples were collected using each technique.

Fifteen pairs of samples (30 total) were collected in five buildings from horizontal metal surfaces having a visual accumulation of dust. The surfaces were all located beneath spray-applied asbestos-containing fireproofing. One sample of each pair was collected following ASTM method D 5755-95 from a surface area of 100 cm². The second sample of the pair was collected as follows.

1. An open face 37 mm cassette with a 0.8 μ m pore size MCE filter.
2. A flow rate of 2.0 L/min using a battery operated personal sampling pump.
3. A collection area of 929 cm² (1 ft²).

Three pairs of field blanks were also collected and submitted for analysis. All samples were submitted to the same laboratory and analyzed in the same manner with two exceptions. The 37 mm cassette samples were placed into an aqueous suspension of particle free water without a screening step to remove 1 mm or larger particles. The 25 mm cassette samples were placed into an aqueous suspension of 50 percent water and 50 percent alcohol and passed through a 1 mm screen. The classification of asbestos structures and the stopping rules followed were the same for all samples.

The results of the side-by-side samples are presented in Table 4. In every instance, the sample collected using the ASTM method D 5755-95 with the nozzle was greater than the sample collected with the open face cassette.

TABLE 4 - Results of Side-by-Side Asbestos Surface Dust Samples Using Open Face Versus Nozzle Equipped Cassette

Sample Location	Open Face Cassette	Nozzle Cassette
1	232,000	4.4 million
2	820,000	14.2 million
3	642,000	9.0 million
4	216,000	1.3 million
5	382,000	541,000
6	142,000	657,000
7	403,000	3.3 million
8	1.1 million	13.9 million
9	539,000	612,000
10	17,000	2.4 million
11	98,000	2.6 million
12	1.2 million	23.5 million
13	3.3 million	18.3 million
14	2.1 million	4.2 million
15	410,000	2.4 million
16B	ND'	ND'
17B	ND'	ND'
18B	ND'	ND'

'ND = no asbestos structures detected in blank sample

The one significant difference between the two methods is in the sample collection. The ASTM method employs a nozzle with a known inside diameter of 0.63 cm (0.25 in) and a flowrate of 2.0 L/min. This provides a face velocity of 106 cm/sec. The open face 37 mm cassette has an effective collection area (inside diameter) of 33 mm. Operating at 2.0 L/min, this provides a face velocity at the point of dust collection of 6.4 cm/sec. Accordingly, the ASTM method provides a collection velocity over 16 times the collection velocity of the open face method. The use of the 1 mm screen would not have had an effect since particles greater than 1 mm were not collected in any samples. The alcohol addition to the aqueous suspension for the D 5755-95 samples would not tend to provide higher structure concentrations.

OBSERVATIONS AND CONCLUSIONS

Surface dust sampling for asbestos can be a useful tool in preventing unnecessary exposures to activity generated asbestos aerosols. With knowledge of where high surface loadings of asbestos dust are located, preventive measures can be designed and implemented to reduce or eliminate exposures before they occur. Surface dust sampling may also be employed as a measure of cleanliness at the conclusion of an asbestos abatement project. When used in this manner it augments the information provided by the visual inspection and air sampling.

A surface may be considered clean when the asbestos concentration is below 1000 s/cm^2 , and contaminated when above 100,000 s/cm^2 . The problem arises when the asbestos concentration is between 1000 s/cm^2 and 100,000 s/cm^2 , and requires professional judgment by the investigator. The investigator must consider who will be exposed and what activities can reasonably be expected to impact the surface. The example below illustrates this point.

EXAMPLE: Surface dust sampling in a series of storage rooms for an office building finds an average asbestos concentration of 50,000 s/cm^2 on the shelving and stored boxes. Are the rooms sufficiently contaminated with asbestos to require they be locked and cleaned before access is permitted? The users of the storage rooms are secretaries and clerks of tenants. The activities include placing boxes in storage, retrieving boxes, and occasionally dusting off boxes with paper towels. The activities of moving boxes alone might or might not result in significant exposures. The dry dusting of boxes would almost certainly raise exposures. In this instance, use of the rooms should be discontinued until the surfaces are thoroughly cleaned.

There are other surface dust sampling and analytical methods available for asbestos dust. These include wipe samples, tape samples, and ASTM method D 5756-95. Each have their advantages and disadvantages. These are reviewed briefly below.

Wipe samples probably have the highest collection efficiency from non-porous surfaces, and provides a measure of total asbestos surface dust concentration. This compares to the microvacuum technique which measures that dust easily removed and therefore available for re-entrainment. A significant disadvantage to wipe sampling is the lack of a standard method for both collection and analysis. As a result, data developed to date often cannot be compared.

Tape samples, and other direct sampling techniques have been employed in some instances. Its principal advantage is to characterize particles as they exist on the surface. Disadvantages include a poor collection efficiency and the inability to use the method on very dusty surfaces.

ASTM method D 5756-95 is similar to ASTM method D 5755-95 except the analysis includes additional steps which provide for results to be reported as a mass quantity [13]. To date very little data, if any, has been published to provide a basis for understanding the results obtained. Should this method gain wider use, the mass of asbestos on a surface may become a useful index for investigators.

The ASTM Committee D-22.07 is currently working on a draft standard practice for employing asbestos dust sampling. If this practice is finalized, it may provide guidance on the number of samples, selection of sampling locations, quality control procedures, and interpretation of results. Recognizing that the ASTM practice guide may be years away, outlined below are some suggestions and comments which practitioners may find helpful.

The selection of sampling locations depends on the purpose of the sampling. Target sampling is used to pinpoint specific sites of interest, such as a location where an asbestos spill is suspected. Representative sampling is used to characterize a larger surface area based on a small number of samples. One method of obtaining representative samples is to divide the surface area of interest into a grid. Number each grid opening consecutively with two digit numbers (i.e., 01, 02, 03 . . . NN). Beginning in the middle of a random number table select pairs of numbers until the number of samples desired is obtained. Repeat this procedure to select replacement sample locations should the first choice not be suitable (i.e., not accessible).

The method suggests a minimum of three samples be used to characterize a surface. While this number was chosen rather arbitrarily, it appears to be a good rule of thumb considering the range of values encountered. Additional samples may be appropriate if the results of the three samples are close to the concentration of interest. For example, if the questions is, "Is the surface clean, defined as an average of 1000 s/cm^2 ?" If three samples are in the range of 500 - 2000 s/cm^2 , additional sampling would be appropriate. If the results are 10,000 - 300,000 s/cm^2 , additional sampling is not appropriate.

Dust sampling may be used to provide some qualitative information, such as where did the asbestos originate. If the dust analysis also finds vermiculite and calcium sulfate attached to asbestos matrices, the source is likely the product with these other constituents.

Additional research is needed to evaluate the relationship between specific activities and concentrations of asbestos in dust. Of particular interest is the amount of air movement and turbulence necessary to re-entrain dust from a surface.

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SOME STATISTICAL PRINCIPLES IN ASBESTOS MEASUREMENT AND THEIR APPLICATION TO DUST SAMPLING AND ANALYSIS

REFERENCE: Fowler, D. P. and Price, B. P., "Some Statistical Principles in Asbestos Measurement and Their Application to Dust Sampling and Analysis," *Advances in Environmental Measurement Methods for Asbestos, ASTM STP 1342*, M. E. Beard, H. L. took, Eds., American Society for Testing and Materials, 2000.

ABSTRACT: Basic statistical principles of deterministic and stochastic variability are examined for their application to asbestos sampling and analysis methods, especially the approved and draft ASTM sampling and analysis methods for asbestos in dust. The sensitivities of these methods are shown to be inadequate for reliably determining the presence of asbestos structures in dust at 1000 s/cm² using currently-required counting protocols. Appropriate sensitivities can only be attained by counting impractically large numbers of grid openings. The current ASTM practice of stating detection limits for asbestos counts based on the confidence intervals for Poisson-distributed variables is shown to be wrong. Basic physical and statistical considerations show that detection limits are almost never appropriate for these methods, except in the presence of irreducible contamination of the sampling/analytical process.

KEYWORDS: asbestos, dust, statistics, detection limit, sensitivity

Every ASTM method for measuring asbestos, whether in air or surface dust, includes a discussion of sensitivity and limit of detection (DL or LOD — hereafter referred to as DL). These concepts apply to the interpretation of the measurement data. They contain information about the degree of uncertainty in the measurements and, therefore, the degree of uncertainty in conclusions and decisions based on the measurements. However, the presentation of these concepts in ASTM methods typically is confusing and does not lead to an understanding or useful application of these concepts. Our purpose is to provide guidance for understanding and applying sensitivity and DL where appropriate.

Uncertainty is central to our discussion. We differentiate deterministic uncertainty from

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VERSION 7.0

**PREDICTING HEALTH IMPACTS
OF THE WORLD TRADE CENTER
DISASTER: 1. Halogenated
hydrocarbons, symptom syndromes,
secondary victimization, and the
burdens of history**

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November 14, 2001

Abstract

The recent attack on the World Trade Center, in addition to direct injury and psychological trauma, has exposed a vast population to dioxins, dibenzofurans, related endocrine disruptors, and a multitude of other physiologically active chemicals arising from the decomposition of the massive quantities of halogenated hydrocarbons and other plastics within the affected buildings. The impacts of these chemical species have been compounded by exposure to asbestos, fiberglass,

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crushed glass, concrete, plastic, and other irritating dusts. To address the manifold complexities of this incident we combine recent theoretical perspectives on immune, CNS, and sociocultural cognition with empirical studies on survivors of past large toxic fires, other community-scale chemical exposure incidents, and the aftereffects of war. Our analysis suggests the appearance of complex, but distinct and characteristic, spectra of synergistically linked social, psychosocial, psychological and physical symptoms among the 100,000 or so persons most directly affected by the WTC attack. The different 'eigenpatterns' should become increasingly comorbid as a function of exposure. The expected outcome greatly transcends a simple 'Post Traumatic Stress Disorder' model, and may resemble a particularly acute form of Gulf War Syndrome. We explore the role of external social factors in subsequent exacerbation of the syndrome – secondary victimization – and study the path-dependent influence of individual and community-level historical patterns of stress. We suggest that workplace and other organizations can act as ameliorating intermediaries. Those without access to such buffering structures appear to face a particularly bleak future.

Key Words: chemical exposure, disaster, ecological resilience, Gulf War Syndrome, historical burdens, immune cognition, racism, secondary victimization, terrorism, traumatic perturbation, weathering, World Trade Center

Introduction

The fiery collapse of New York City's World Trade Center has, at this writing, killed thousands and driven tens of thousands to seek medical attention. It appears to have directly and profoundly affected several hundred thousand people. Impacts range from expected extremities of psychological and psychosocial stress, to physical trauma, burns, and exposure to irritating dusts containing concrete, fiberglass, asbestos, ground plastics, and pulverized human remains. Less well understood is the potential for significant inhalation and skin-dose exposure to the highly toxic and carcinogenic combustion and other decomposition products of the thousand or so tons of halogenated and nitrogenated plastics and plastics additives in the affected buildings. Great quantities of these highly unstable and acutely combustion-toxic materials continue to smolder and burst into flame almost two months

after the event, covering lower Manhattan with a persistent, eye-burning cloud of stinking, choking, smoke.

Combinations of smoke inhalation, burns and trauma are reported to be the most common factors in the immediate hospitalizations. Very significantly, in our view, large numbers of persons with allergic skin and anaphylactic reactions were seen during the initial stages of the incident (Larkin, 2001). If recent case histories of multi-fatal and other toxic plastics fires and chemical releases provide guidance, psychological and psychosocial trauma, burns and other physical injuries, and toxic exposure, will interact synergistically to produce complex but characteristic patterns of symptoms on several timescales in a path-dependent manner at the individual and group levels – what has already come to be called ‘World Trade Center Syndrome’ by the popular press (NY Post, 2001; Newsweek, 2001). The long-term path of this syndrome will be profoundly affected by the response of larger, embedding social structures, in likely synergism with individual and community-level historical burdens carried by those exposed. Community response is most likely to occur as a virulent secondary victimization (e.g. Tarrier et al., 1999; Campbell and Raja, 1999), but can, in a best case scenario, serve as an ameliorating influence.

We begin with a review of recent theoretical developments which cross link processes of central nervous system (CNS), immune, and sociocultural cognition. This allows analysis of the effects of a sudden, traumatic, perturbation – characteristic combinations of physical, social and chemical assault – on ‘condensed’ cognitive systems at different timescales, and in the context of individual and community experiences of historical burden.

Next, we introduce the ‘new’ combustion toxicology, and summarize observed effects of large toxic fire and other chemical release events on injured survivors from this perspective. We then reinterpret studies of Gulf War Syndrome, and ultimately combine the analyses to try and predict the developing spectra of symptoms to be expected from the WTC disaster at different ecosystem levels, in the context of couplings across them.

We are particularly concerned with the likely interaction of larger, embedding crosssectional and longitudinal social structures and historical experiences with symptom patterns.

The problems are subtle and complex, and we are driven to employ cutting-edge methods. These require some initial development.

Genes, cognition, and culture

Recently, interactions between the central nervous system (CNS) and the immune system, and between the genetic heritage and the immune system have been recognized and even codified through journals such as *Neuroimmunology* and *Immunogenetics*. We argue that a cognitive socioculture – a social network embodying culture – in which individuals are embedded, and through which they are both acculturated and function to meet collective challenges of threat and opportunity, may interact strongly with individual immune function to produce a composite entity which might well be labeled an *Immunocultural Condensation* (ICC). We propose that ultimately CNS, immune system, and embedding socioculture become jointly convoluted to form a composite entity which will respond coherently, but in a complex manner, to sudden ‘delta function’ external perturbation. Elsewhere we have explored the response of such systems to long-term ‘structured’ systems of perturbation, for example embedding within an Apartheid system (R Wallace, 2001a, b). We will apply that work to understand how embedding social structures may either exacerbate or ameliorate the long-term effects of a sudden perturbation.

Increasingly, biologists are roundly excoriating simple genetic reductionism which neglects the role of environment. Lewontin (2000), for example, explains that genomes are not ‘blueprints,’ as genes do not ‘encode’ for phenotypes. Organisms are instead outgrowths of fluid, conditional interactions between genes and their environments, as well as developmental ‘noise.’ Organisms, in turn, shape their environments, generating what Lewontin terms a triple helix of cause and effect. Such interpenetration of causal factors may be embodied by an array of organismal phenomena, including, as we shall discuss, culture’s relationships with the brain and the immune system.

The current vision of human biology among evolutionary anthropologists is consistent with Lewontin’s analysis. That work is summarized by Durham (1991) to the effect that genes and culture constitute two distinct but interacting systems of inheritance within human populations and information of both kinds has influence, actual or potential, over behaviors which creates a real and unambiguous symmetry between genes and phenotypes on the one hand, and culture and phenotypes on the other.

Genes and culture are best represented as two parallel lines or ‘tracks’ of hereditary influence on phenotypes.

Regarding the interaction of these tracks, evolutionary anthropologists have concluded that, over hominid evolution, genes came to encode for increasing hypersociality, learning, and language skills, so the complex cul-

tural structures which better aid in buffering the local environment became widespread in successful populations (Bonner, 1980).

Every successful human population seems to have a core of tool usage, sophisticated language, oral tradition, mythology and music, focused on relatively small family/extended family groupings of various forms. More complex social structures are build on the periphery of this basic genetic/cultural object (Richerson and Boyd, 1995, 1998).

At the level of the individual human, the genetic-cultural object appears to be mediated by what evolutionary psychologists postulate are cognitive modules within the human mind. Each module was shaped by natural selection in response to specific environmental and social conundrums Pleistocene hunter-gatherers faced. One set of such domain-specific cognitive adaptations addresses problems of social interchange (Barkow et al., 1992; Cosmides and Tooby, 1992). The human species' very identity may rest, in part, on its unique evolved capacities for social mediation and cultural transmission. Anthropologist Robert Boyd has remarked that culture is as much a part of human biology as the enamel on our teeth.

Indeed, a brain-and-culture condensation has been adopted as a kind of new orthodoxy in recent studies of human cognition. For example Nisbett et al. (2001) review an extensive literature on empirical studies of basic cognitive differences between individuals raised in what they call 'East Asian' and 'Western' cultural heritages. They view Western-based pattern cognition as 'analytic' and East-Asian as 'holistic.' Nisbett et al. (2001) find that

1. Social organization directs attention to some aspects of the perceptual field at the expense of others.
2. What is attended to influences metaphysics.
3. Metaphysics guides tacit epistemology, that is, beliefs about the nature of the world and causality.
4. Epistemology dictates the development and application of some cognitive processes at the expense of others.
5. Social organization can directly affect the plausibility of metaphysical assumptions, such as whether causality should be regarded as residing in the field vs. in the object.

6. Social organization and social practices can directly influence the development and use of cognitive processes such as dialectical vs. logical ones.

Nisbett et al. conclude that tools of thought embody a culture's intellectual history, that tools have theories build into them, and that users accept these theories, albeit unknowingly, when they use these tools.

We may assume, then, the existence of both gene-culture and brain-culture condensations.

Immune cognition

Atlan and Cohen (1998) have proposed an information-theoretic adaptation of IR Cohen's (1992) 'cognitive principle' model of immune function and process, a paradigm incorporating pattern recognition behaviors analogous to those of the central nervous system.

We paraphrase Atlan and Cohen's description of immune system cognitive pattern recognition-and-response behavior as follows:

The meaning of an antigen can be reduced to the type of response the antigen generates. That is, the meaning of an antigen is functionally defined by the response of the immune system. The meaning of an antigen to the system is discernible in the type of immune response produced, not merely whether or not the antigen is perceived by the receptor repertoire. Because the meaning is defined by the type of response there is indeed a response repertoire and not only a receptor repertoire.

To account for immune interpretation IR Cohen has proposed a cognitive paradigm for the immune system. The immune system can respond to a given antigen in various ways, it has 'options.' Thus the particular response we observe is the outcome of internal processes of weighing and integrating information about the antigen.

In contrast to Burnet's view of the immune response as a simple reflex, it is seen to exercise cognition by the interpolation of a level of information processing between the antigen stimulus and the immune response. A cognitive immune system organizes the information borne by the antigen stimulus within a given context and creates a format suitable for internal processing; the antigen and its context are transcribed internally into the 'chemical language' of the immune system.

IR Cohen's (2000) cognitive paradigm suggests a language metaphor to describe immune communication by a string of chemical signals. This metaphor is apt because the human and immune languages can be seen to manifest several similarities such as syntax and abstraction. Syntax, for example, enhances both linguistic and immune meaning.

Although individual words and even letters can have their own meanings, an unconnected subject or an unconnected predicate will tend to mean less than does the sentence generated by their connection.

The immune system, in Atlan and Cohen's view, creates a 'language' by linking two ontogenetically different classes of molecules in a syntactical fashion. One class of molecules are the T and B cell receptors for antigens. These molecules are not inherited, but are somatically generated in each individual. The other class of molecules responsible for internal information processing is encoded in the individual's germline.

Meaning, the chosen type of immune response, is the outcome of the concrete connection between the antigen subject and the germline predicate signals.

The transcription of the antigens into processed peptides embedded in a context of germline ancillary signals constitutes the functional 'language' of the immune system. Despite the logic of clonal selection, the immune system does not respond to antigens as they are, but to abstractions of antigens-in-context.

Immune and sociocultural cognition

As we show at length in the Appendix, it is possible to give Atlan and Cohen's language metaphor of meaning-from-response a precise information-theoretic characterization, and to place that characterization within a context of recent developments which propose the 'coevolutionary' mutual entrainment – in a large sense – of different information sources to create larger meta-languages containing the original as subdialects. This work, a highly natural extension of formalism based on the Large Deviations Program of applied probability, also permits treating gene-culture and brain-culture condensations using a similar, unified, conceptual framework of information source 'coevolutionary condensation'.

Cohen's immune cognition model suggests the possibility that culture, in the sense of a local cognitive sociocultural network by which individuals are acculturated and within which they participate in collective response to patterns of threat and opportunity, and the individual immune system may be jointly convoluted. That is, there would appear to be, in precisely the sense of the gene-culture and brain-culture condensations of *immunogenetics* and *neuroimmunology*, an 'immunoculture condensation' as well.

Ultimately, however, these arguments suggest that CNS, immune and sociocultural cognition are strongly linked into a single composite entity by various kinds of 'crosstalk' – hormones and cytokines are neurologically active, while neurotransmitters are well known to have impact on the immune system. Contact with our fellows affects both.

Sudden perturbation

The WTC disaster constitutes significant and extremely broad perturbation of individual and collective life for a very large population, including both commuters and local residents of lower Manhattan. The modeling exercise of the Appendix suggests that the response to perturbation of an ‘information source’ made up of the convolution of CNS, immune and sociocultural cognition will be in terms of characteristic but ‘nonorthogonal’ eigenmodes of mixed patterns of pathology, so that a variable degree of mixing of different identifiable patterns of pathology – comorbidity of syndromes – will occur in proportion to the magnitude of the imposed perturbation. Equation (42) in particular suggests that, depending on the ‘time constants’ and ‘lag times’ of the elements of the syndrome, different aspects of pathology will ‘kick in’ at different times following the disaster. That is, although the ‘incident’ occurred at a single discrete time and place, the social, physiological, and psychological sequelae will not all appear simultaneously, but rather will develop according to their own internal ‘time clocks’ after delays which may themselves be highly, if systematically, variable. The perturbation itself will, further, interact with individual and group histories so that different individuals or groups may embark on different ‘paths’ of response.

The response may be multiply comorbid: At low levels of applied stress, be it physical, psychosocial or chemical trauma or their mix, a relatively small number of distinct syndromes of behavioral, psychological, social, or immune pathology should be observed, according to the model of the Appendix. As the ‘magnitude’ of perturbation experienced increases, however, these syndromes should become mixed, i.e. increasingly comorbid. Again, this effect should be complicated, as the ‘time of integration’ increases after perturbation, by the sequential appearance of symptoms and symptom patterns with differing time constants or lag times, in a broad sense.

Equation (43) suggests that ‘eigenpatterns’ of mixed pathology appear as synergistically amplified internal representations of external perturbation. If $\sigma(y)$ represents the standard deviation of pathology, and $\sigma(w)$ that of perturbation, then they will be related as

$$\sigma(y) \propto \frac{\sigma(w)}{|1 - \lambda|},$$

where λ is a kind of multiple correlation coefficient, so that, for ‘tightly coupled’ systems, $|\lambda| \rightarrow 1$, and this expression implies that applied perturbations will be greatly amplified by mixed pathologies of physiological,

psychological and social response. Ives (1995) has characterized natural systems for which $\lambda \rightarrow 0$ as ‘resilient’ in the sense that applied perturbations will not be amplified by internal system structures. See the Appendix for details.

Note particularly that, in this formulation, symptom patterns may express themselves within embedding social networks and associated social cognition as well as simply within individuals, that is, collective, as well as individual, ‘eigenpatterns’ of pathology. Thus patterns of pathology will be functions of ecosystem scale as well as of applied stress. Individual and collective ecologies are separate, but linked.

Further consideration, leading to equations (47-49) in the Appendix, suggests that the multiple correlation coefficient λ *may itself be a function of the maximum applied stress*, again depending on ecosystem scale. If $|w|_M$ represents that maximum applied perturbation, then

$$\lambda \rightarrow \lambda(|w|_M)$$

and the equation above becomes somewhat complicated. For example, if $\lambda(|w|_M)$ has a typical S-shaped dose-response to the maximum applied perturbation – rising toward 1 – then the ‘filter’ of the transformation $\lambda \rightarrow 1/|1 - \lambda|$ produces a sharply rising J-shaped effect.

Similarly, if $\lambda(|w|_M)$ displays an inverted-U ‘generalized signal transduction’, then that transformation produces a much sharper peak on the same scale. Signal transduction effects are to be expected where the applied perturbation carries physiological or social information, be it chemical, sensory, or whatever. Beyond a certain maximum amplitude, in a large sense, the signal ceases to be meaningful, and becomes only noise. The question of which pattern might predominate at individual and group levels of scale is an important empirical one.

Generalized signal transduction, as we have characterized it, is consistent with what Lifton terms ‘psychic numbing,’ a condition resulting from extreme or prolonged stress in which a person or group is so battered as to become more-or-less permanently unable to respond appropriately to further stress (e.g. Lifton and Markusen, 1990). Such social signal transduction, which perhaps might better be termed ‘pathological resilience’, has been observed in the South Bronx section of New York City, which, after suffering an official policy of ‘planned shrinkage’, saw vast areas lose between 50 and 80 % of their housing and population to contagious urban decay in a period

of a few years (D Wallace and R Wallace, 1998, 2000). Patterns of relation among low-weight birth, homicide rate, unemployment rate, percentage foreign-born, and percent on welfare were similar for Upper Manhattan and the South Bronx – the same ‘eigenmodes’ of exication – but the amplification factor for the former was 5.3 times as large for the latter, 12.5 vs. 2.4. We interpreted this to mean that the internal social structures of the Bronx had been permanently changed, i.e. ‘selected’ by the extreme experiences of forced population displacement and massive urban decay, so as to limit the magnitude of response to perturbation. Recognizably analogous effects, we propose, may be seen at the individual level, where a person is driven beyond the ability to respond.

Social factors can exacerbate or ameliorate symptom eigenmodes

Those exposed to the ‘perturbation’ of the WTC collapse will, according to our model, have a raised probability of developing a characteristic system of symptoms, a ‘World Trade Center Syndrome’, to quote the popular press. That syndrome will, in all likelihood, involve serious exacerbation of preexisting low level multifactorial ‘eigenpatterns’ already present within the affected population. This will be complicated, according to our model, by the emergence of a stratified ‘comormidity’ driven by increasing exposure to the disaster itself.

Once such a syndrome – or mixture of them – emerges, it or they will be affected by embedding social structures. According to the arguments of the later sections of the Appendix, the pattern of larger social response will, itself, likely be highly coherent, and indeed may constitute a kind of ‘higher language’ interacting with the perturbed ‘condensed information source’ of those within the affected group. The arguments of the Appendix suggest that the ‘language’ of that social response is very powerful indeed and can, as an externally-imposed ‘selection pressure’, literally write itself upon developing symptom patterns of embedded individuals suffering exposure to the WTC disaster.

Typical collective social responses might range from public displays of expressed emotion repeatedly triggered by public officials for political reasons of ‘national solidarity’, to grossly unrealistic expectations of ‘closure’ or ‘getting back to normal’. These may be compounded by continued exposure to the effects of the WTC disaster, repeated alarms, false or otherwise, for example relatively small ‘bioterrorist’ outbreaks have already been exaggerated for

political or other purposes, or simply from induced hypersensitivity. Indeed, other large multifatal attacks are highly likely, in the context of economic downturn, job-loss, and other stressors.

The latter part of the Appendix suggests that the onset of these effects – the ‘writing’ of systematic external stressors on symptom patterns – may itself be highly punctuated. That is, beyond a critical point, ‘collective expressed emotion’ will suddenly begin to exacerbate symptom patterns of those suffering ‘WTC syndrome’.

An alternative model suggests that intervening social structures – community groups, church groups, labor unions, artificial ‘created therapeutic communities’, or even workplace initiatives – might serve to buffer affected individuals from the larger embedding social pathology. That is, having one’s employer, union, or church take appropriate measures might well serve to dampen down patterns of symptoms rather than amplify them.

These speculations can be made quite formal by invoking the ‘higher order’ pattern recognition argument of the Appendix, assuming that the ‘WTC syndrome’ response constitutes, in fact, a phenotypic ‘choice’ made by the condensation of local cognitive sociocultural, CNS, and immune systems. That cognitive ‘choice’ of response might be expected to involve four possible outcomes:

- (1) no exacerbation of preexisting patterns,
- (2) short-term exacerbation,
- (3) persistent ‘sensitization’ to periodic re-excitation of pathological eigenmodes, i.e. generalized ‘flashbacks’ given appropriately conditioned triggers, or
- (4) permanently elevated pathological eigenpatterns.

The external selection pressures of the larger society will then, through the usual rate distortion arguments, ‘write themselves’ on the ‘language’ associated with and defined by this ‘decision oscillator.’ Thus the outputs of that oscillator will reflect those selection pressures. Supportive embedding social environments would be expected to produce outcomes (1) or (2), while ‘secondary victimization’ would induce the latter two.

Path dependence and symptom patterns: the burdens of history

The effects of both sudden perturbation and subsequent secondary victimization will be greatly affected by individual and community-level histories of stress, if recent studies can be generalized. Geronimus (1992, 1996) has,

for example, invoked individual-level ‘weathering’ in the context of social deprivation to account for differences in US Black/White birth outcomes. As described above, D Wallace and R Wallace (2000) found a draconian policy-driven ‘selection pressure’ acting on social network structures accounted for differences in ecosystem resilience between Upper Manhattan and the South Bronx. More recently Fischer et al. (2001) have applied a recognizably similar analysis to argue that ecological history is essential in predicting community responses to environmental perturbation. They conclude that if historical conditions strongly influence community and ecosystem responses to sudden change, then explicit consideration of ecological history may improve forecasting of ecological responses to environmental change and guide identification of highly sensitive systems. Fischer et al. (2001) find that past stressful environmental conditions can indeed increase sensitivity to subsequent perturbation, but that natural selection caused by perturbations may, on the other hand, alter responses to a repeated perturbation by increasing the tolerance of populations that succeed in persisting, a conclusion which seems consistent with the community-scale Bronx/Manhattan results of D Wallace and R Wallace (2000).

These considerations suggest, for the World Trade Center disaster, a scale-determined path dependence in the effects of both the initial perturbation and secondary victimization. Individuals with histories of chemical, income, psychosocial, or other stress would be expected to have exacerbated responses to perturbation and secondary victimization, unless they have been driven into the realm of generalized psychic numbing and pathological resilience. Similarly, communities which have traditionally borne burdens of discrimination or racism should be expected to have different, and possibly exacerbated, responses compared with those which have not.

At the individual level, we may expect stratification in symptom pattern and response to secondary victimization according to age, income, occupational history, and social status, while at the population level, we may expect significant differences according to ethnicity and ‘race’. Under the highly segregated US system of de-facto Apartheid, Zip Code of residence should serve as a good surrogate for population-level histories of deprivation and racism.

After a review of combustion toxicity, we are prepared to reinterpret several case histories.

A brief introduction to the ‘new’ combustion toxicology

Fumes and smoke from modern office and construction materials are not

like those from natural materials. Although wood, paper, natural fabrics, etc., can emit irritating fumes and soot in a fire, the intensity and irritancy is much less than most synthetic materials now commonly used as substitutes for them. Rigid polyvinyl chloride (PVC) emits 60 % of its weight as hydrogen chloride, HCl, in the early stages of a fire, which coats soot particles. These are small, smaller than those given off by, say, wood or cotton. They get into the lung and deliver a huge dose in a short time, destroying lung tissue by sheer corrosion.

Because of the flame retardant properties of chlorine, much more mass of the PVC goes off as soot and the smoke is extremely dense. People cannot see to escape. Plasticized PVC, as is used in communication cable, also produces highly acidic soot and fumes of dense smoke, but also gives off masses of phthalate anhydride, very irritating and explosive. Both forms of PVC produce large quantities of benzene, xylene, and toluene which are narcotic, and may give rise to secondary explosions.

A variety of halogenated species are present both as gases and in the soot. Large quantities of dioxins and dibenzofurans – notoriously powerful endocrine disruptors – form during the cooling phase, as they do in incinerators or burning landfills. PVC fumes and soot may contain as many as 300 species, as reported in the literature, ranging from formaldehyde to the polyaromatics, with and without chlorine. Most PVCs also contains a variety of additives which may include lead stearate as a stabilizer, phthalate plasticizers, and metal-based colorants.

The brominated fire retardants can be present in other plastics and in fabrics at more than 10 % by weight and form similar pyrolysis and combustion products. Other halogenated plastics and highly brominated-flame retarded plastics and fabrics behave analogously to PVC.

Nitrogen-based polymers such as urethane foam, acrylonitrile-butadiene-styrene (ABS) and some of the acrylics will likely have played a considerable role. Hydrogen cyanide, HCN, is emitted massively from these materials shortly before ignition. Cyanide also delivers a skin dose, besides a lung dose. Nitrogenated organics also form, of course. These should contain large quantities of flame retardants of different kinds, including brominated ethers or metal salts.

The WTC fuel load, between the two planes and the several buildings which burned, collapsed, and then smoldered copiously for weeks, would make the 1975 New York Telephone Exchange fire look like a minor event. That fire involved over 200,000 pounds of plasticized PVC (D Wallace, 1981,

1982, 1990, 1992).

The 1975 NY Telephone firefighters, and survivors of the 1980 MGM Grand Hotel plastics fire, suffered a spectrum of subsequent symptoms which we examine in some detail below.

Two toxic fire case histories

The New York Telephone Company and MGM Grand Hotel fires, and their effects on survivors, are described at great length in D Wallace (1981, 1982, 1990, 1992). We summarize that work briefly here.

As we indicated above, the Telephone Company fire involved about 100 tons of heavily plasticized PVC cable burning over a 14 hour period. Some 700 firefighters responded to the blaze, 239 of them reporting themselves as injured. 113 of these latter subsequently participated in a 1980 survey sponsored by the Uniformed Firefighters Association, the firefighters union.

The MGM Grand Hotel fire involved a very large, mixed load of various common plastics burning at ground level – PVC, ABS, etc. Rising smoke trapped hotel patrons in their rooms, killing 85 of them at a considerable distance from the fire itself. 54 injured survivors participated in a subsequent detailed study sponsored by the Plaintiffs Legal Committee, which oversaw the resulting lawsuit.

Firefighters and civilians constitute separately socialized populations – different and quite distinct ‘sociocultures’ – in their response to the fire environment. To the former, it is the ‘normal’ working condition, for which they are rigorously trained. To the latter, it is a horror and a gross and traumatic aberration from normal life. Very large or multifatal fires, or persistent episodes of contagious urban decay which devastate communities, however, will breach even the paramilitary cultural discipline of the fire service.

Tables 1-3, below, describe the pattern of reported firefighter symptoms from the NY Telephone Company fire on short, intermediate and long time scales, respectively at the fire, two weeks to three months after, and six months or more after the fire. 64 % of the respondents complained of persistent symptoms. It is of some note that the pattern differed significantly between those with long and short work histories. Those over thirty-five years of age and those who had served more than ten years as firefighters tended to have permanent damage. Indeed, of those who had served more than 15 years, 80 % reported permanent injury.

Tables 4 and 5, by contrast, examine the respiratory and non-respiratory complaints of the sample of injured survivors of the MGM Grand Hotel fire.

Reproductive, neurological, and psychological dysfunction, in contrast to the firefighter sample, dominate.

Besides the group pattern shown in Tables 4 and 5, certain individuals experienced special disabilities from the smoke, for example muscle spasms which show that certain parts of the nervous system that cause involuntary movement of the normally voluntary skeletal muscles were affected. Both Parkinsonism and epilepsy are based on these parts of the nervous system. In addition, sufferers of Parkinsonism and epilepsy have low levels of one or more catecholamines, as do depressed individuals. One injured survivor had Parkinsonism even before the fire, but required a much greater amount of medication to control his condition after the fire. A second person became epileptic after the fire and suffered grand mal seizures. These two individuals are index cases of the neurotoxic nature of the smoke.

Besides the physical injuries and individual psychological distress, social interactions appear to have been affected by the experience of the MGM fire, possibly synergistic with exposure to neurotoxins. Marriages became troubled and were dissolved. The divorce rate among the survivors was very high. This high rate of divorce is also seen in other disasters besides fires, and reflects personality changes and relational changes that often result from having risked death and knowing that others died in the same event.

In addition to divorce, another socioeconomic consequence of the MGM fire was the decline of several businesses that had sent key people to conventions or seminars that were held at the hotel. These people stayed overnight in the hotel, and several within the same office may have suffered personality changes. Individual productivity typically declined, but group interactions also suffered so that decisions could not be made, consensus could not be reached, and actions could not be taken. At least two mid-sized companies suffered greatly and became much smaller when several key managers could not perform.

The MGM Grand Hotel fire in particular shows precisely the inextricably mixed pattern of physical, neurological, psychological, and social pathology to be expected from the 'perturbation' of a traumatic toxic exposure incident.

Traumatic toxic incident of sufficient magnitude should be expected to produce a similar pattern among affected emergency services personnel, in spite of both discipline and experience. 'Post Traumatic Stress Disorder' is a grossly inadequate characterization.

These two examples appear to be fully consistent with the theoretical development we have presented as an introductory context, showing a distinct

and characteristic pattern of symptoms. The next case histories explore in more detail the relation between preexisting 'eigenmodes' and exposure.

Table 1: Immediate symptoms of Firefighters

INJURY	PERCENT AFFECTED
Sore throat, irritated eyes, dizziness, aching nostrils, confusion, weakness, and exhaustion	Over 50
Chest pains, nausea, chest congestion, and headache	35-50
Irritated skin and faintness	20-30
Loss of control of arms and/or legs	10-20

Table 2: Intermediate time symptoms of Firefighters

SYMPTOMS	PERCENT AFFECTED
RESPIRATORY:	
Chest congestion	51.2
Chronic cough	22.1
Sore throat	18.5
Sore chest	9.3
Hoarseness, wheezing, allergy to smoke, difficulty breathing, irritated nasal	

membranes, shortness of breath	Less than 5

NEUROLOGICAL:	
Muscular weakness	19.8
Impaired smell/taste	16.3
Increased irritability	10.5
Headaches	10.5
Perception difficulty	7.0
Confusion, anxiety, numbness of extremities	Less than 5

MISCELLANEOUS SYMPTOMS:	
Heart trouble, irritated eyes, irritated skin	2 complaints each
Chills, sinus trouble, weight loss, bowel problem, nausea, head congestion	1 complaint each
GENERAL WELL-BEING	
Fatigue	5.8
Impaired endurance	3.5

Table 3: Long-Term Effects among Firefighters

INJURY	PERCENT AFFECTED

RESPIRATORY:	
Impaired disease resistance	37.5
Coughing	33.3
Hoarseness	23.6
Shortness of breath	9.7
'Lung function' or pain	15.8
Chest congestion	9.7
Sensitivity to smoke	11.1
Sinus or nasal drip	6.9
Repetitive bronchitis	8.3
Sore throat	8.3

Asthma	6.9
Allergy, unspecified upper respiratory problem	Less than 5%

GROWTHS (epidermal or membrane lining)	13.9

HEART:	
Palpitations, acute myocardial infarction, prolapsed mitral valve, enlarged heart, unspecified damage	8.3

Headaches, perception difficulty	4 individual complaints
Fatigue, kidney-urinary tract	3 individual complaints
Weakness, pancreatitis/diabetes	2 individual complaints
Elevated blood count, elevated bilirubin, high pressure, gall bladder deterioration, irritation of hemorrhoid, irritated eyes, convulsive seizures	1 individual complaint

Table 4: Respiratory Complaints of 58 MGM Survivors

COMPLAINT	NUMBER	PERCENT

Frequent sore throat	30	51.7
Hoarseness	26	44.8
Sinusitis	23	39.7
Sensitive to dust/smoke	44	75.9
Coughs	27	46.6
Wheezing	26	44.8
Phlegm production	29	50.0
Shortness of breath	38	65.5
Bronchitis	21	36.2
Frequent upper respiratory		

infection	25	43.1
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Table 5: Non-Respiratory Symptoms of 57 MGM Survivors

SYMPTOMS	NUMBER	PERCENT
<hr/>		
CIRCULATORY SYSTEM:		
Developed heart problem	12	21.1
Hands/feet fall asleep	39	68.4
Hands/feet easily cold	22	38.6
Mottling or blue hands/feet	8	14.0
Blood pressure change	20	35.1
<hr/>		
NEUROLOGICAL/PSYCHONEUROLOGICAL:		
Headaches	34	59.6
Change in sleep pattern	42	73.7
Memory lapses	32	56.1
Irritable	43	75.4
Difficulty learning	14	24.6
Change in perception abilities	31	54.4
Coordination decline	15	26.3
Dizziness	27	47.4
Disorientation	20	35.1
<hr/>		
KIDNEY/BLADDER:		
Frequent urination	15	26.3
Pain/burning during urination	12	21.1
Lower back pains	27	47.4
<hr/>		
SKIN CHANGES:		
Acne-like breakouts	13	22.8
Rashes	12	21.1
Burns from the smoke	4	7.0
Infections	6	10.5
Skin growths (warts, moles)	3	5.3
Skin dry, sensitive	14	24.6

REPRODUCTIVE:*		
New menstrual difficulties	11	84.6*
Miscarriage	2	15.4*
Hysterectomy	2	15.4*
Dilation and curettage	1	7.7*

PSYCHOLOGICAL:		
Nightmares	42	73.7
Depression	40	70.2
Guilt	15	26.3
Anger	17	29.8
Change in relationships	24	42.1

GENERAL WELL-BEING:		
Change in appetite	16	28.1
Less endurance	31	54.4
General weakness	24	42.1
Ceased/decreased activity	17	29.8
Lack of sexual desire	14	24.6

OTHER COMPLAINTS:		
Sensitized eyes	11	19.3
Dizziness with position change	8	14.0
Heavy sweating	7	12.3
Drink more water	3	5.3
Tremors, spasms, clenching	6	10.5

* Percentage is that of the women of reproductive age in the data base, not of all 57 people.

The following affected less than 5 percent:
liver dysfunction, nausea, neck pains, impotence,
pigmentation of skin, loss of hair, ears hurt,
swollen glands, onset of epilepsy,
exacerbation of Parkinsonism,
return of menses to elderly women,

swollen testes, prostate infections.

Other chemical disasters

Bowler et al. (1994, 1996, 1997) have examined a spectrum of toxic disasters which spanned both ‘ethnicity’ and chemical species, finding unexpectedly analogous population-level patterns of symptom response – headaches, respiratory, visual, gastrointestinal and dermatologic. Exposure relationships were found with increasing symptoms and worsening of preexisting illnesses. The three groups were Whites exposed to metam sodium, Hispanics working in a microelectronics plant exposed to multiple organic solvents, and African-Americans exposed to sulphuric acid. Using a similar symptom instrument across exposures, Bowler et al. (1996) conclude that their results “suggest a robust symptom complex following chemical exposure regardless of the specific chemical”.

Bowler et al. (1997) state that the relationship of stress and illness has been well established since Hans Selye’s early work (1976) on the Stress Response Syndrome, and is further shown in the association of such reactive and serious disorders as PTSD. They cite the work of McFarlane et al. (1994), who found physical symptoms to be an ‘accompaniment’ of PTSD in a sample of firefighters who had higher rates of cardiovascular, respiratory, musculoskeletal, and neurological symptoms. McFarlane et al. suggest, as did Kinson and Rosser (1974), that much psychological work is needed to minimize the impact of chemical releases and disasters on subsequent physical and psychological illness.

While Bowler et al. (1997) did not conduct a multivariate analysis of their data, they found, in one case/control study of matched exposed/unexposed communities, that the same patterns were seen in both communities, with those of the exposed community much worse than in the unexposed, concluding that

“Although both towns were similar on reported illnesses prior to the [chemical] release and similar on other nonreported illnesses, it is notable that many of the exposed reported that their illnesses were worse six months after the release. Those who had prior acute or chronic bronchitis reported worsening of their condition by 14 and 7 times more (respectively). By a magnitude

of 5 times, those who had prior asthma or allergies also reported their condition to be worse.”

This result, again, suggests the amplification of similar underlying community ‘eigenmodes’ by chemical exposure.

The next studies, however, do use multivariate methods, and, in our view, successfully isolate eigenmodes.

Gulf War Syndrome

Recently a number of researchers have begun to critically examine characteristic patterns of ‘medically unexplained somatic symptoms’, including multiple chemical sensitivity (MCS), chronic fatigue syndrome (CFS), fibromyalgia (FM), irritable bowel syndrome (IBS) and Gulf War Syndrome (GWS). Kipen and Fiedler (1999) find that psychiatric explanations and nomenclature have less than a perfect fit for many cases of unexplained symptoms, although there is often very great comorbidity among them, often as much as 50 % between MCS and CFS, for example. In the case of Gulf War symptoms, careful epidemiology has shown that, compared with soldiers who did not deploy to the Persian Gulf, those who deployed had two- to threefold increases in symptoms, without apparent medical explanations (Kipen and Fieldler, 1999; The Iowa Group, 1997; Fukuda et al., 1998).

Haley et al. (1997) used multivariate methods to examine symptom patterns among about 250 Gulf War veterans in a construction battalion, and found three particularly distinct and characteristic clusters, roughly characterized as ‘impaired cognition’, ‘confusion-ataxia’, and ‘arthro-myoneuropathy’. Veterans with the second pattern were found to be 12.5 times more likely to be unemployed than those with no health problems. Haley et al. conclude that clusters of symptoms of many Gulf War veterans represent discrete factor-analysis derived syndromes that appear to reflect a spectrum of neurologic injury involving the central, peripheral, and autonomic nervous systems. Subsequent work by Haley et al. (2001) extends these studies.

Knoke et al. (2000) responded directly to the report of Haley et al. (1997) with their own multivariate study which compared Gulf War-era veterans who had and had not been deployed to the Persian Gulf. Closely similar clusters of syndromes were identified within both groups, although the deployed veterans showed these clusters with greater prevalence than the non-deployed, and the strongest clusters matched fairly well with the observations of Haley et al. (1997).

Doebbeling et al. (2000) conducted a similar deployed/non-deployed veterans study, and again found similar clusters of symptoms within both groups, with the deployed again having very much greater prevalence than the non-deployed.

Doebbeling et al. (2000) conclude, however, that the markedly increased prevalence of nearly every symptom assessed from all bodily organs among the Gulf War veterans is difficult to explain pathophysiologically as a single condition. Identification of the same patterns of symptoms among the deployed veterans and the nondeployed controls suggests that the health complaints of Gulf War veterans are similar to those of the general military population and are not, in their view, consistent with the existence of a unique Gulf War syndrome.

The modeling exercise of the Appendix, leading to equation (43), however, suggests a more consistent explanation of these results. Deployed and non-deployed veterans were embedded within very similar – and highly rigid and nonresilient – sociocultural structures, and seemed to represent very similar cross-sections of the US population. This suggests that the ‘multiple correlation coefficient’ representing the linking of internal mechanisms would satisfy the condition $\lambda \rightarrow 1$, giving a very large amplification pattern for perturbations, $\sigma(w)$. Combat experience is indeed a significant perturbation at both individual and social levels, and amplified ‘eigenmodes’ of characteristic patterns of mixed pathology are, from this model, the expected result at both scales. Some degree of comorbidity is inherent, since the response ‘eigenmodes’ are nonorthogonal.

Predicting the spectrum of WTC pathologies

On the basis of our theoretical development and these case histories, it is not difficult to construct an expected pattern of symptoms for both civilians and emergency workers having significant exposures to the WTC disaster, and this is left as an exercise for the reader. The great prevalence of uterine dysfunction among women exposed in the MGM Grand Hotel fire suggests, however, particularly nasty consequences for those in the WTC disaster: the presence of massive quantities of endocrine disruptors and other physiologically active chemical species in the aftermath of the WTC attack takes the matter far beyond either Post Traumatic Stress Disorder or Gulf War Syndrome.

To reiterate, responses will be scale-dependent, with different characteristic patterns seen the individual and group levels – the usual ‘ecosystem’

effect. These responses will also be dependent on individual and group histories of stress, deprivation, and the effects of racism. As described above, dose-response and signal transduction may be observed at both individual and group levels, for a number of systems, depending on the magnitude of perturbation. At the purely psychological level, signal transduction might well be described by Lifton's term 'psychic numbing'.

These patterns will be exacerbated or ameliorated by the imposed 'selection pressure' of influence by embedding social structures, in a manner determined in no small part by past individual and group experiences of stress, deprivation, and racism. External social pressures will drive, according to our model, much of the 'phenotype choice' of syndromic response to applied perturbation by affected individuals and groups. Path-dependent 'secondary victimization' by the larger society seems the most likely outcome, but intermediate structures such as labor unions, work-place initiatives, church groups, or artificial therapeutic communities, may serve to buffer such effects and perhaps ameliorate symptoms.

Note that this is a true 'selection pressure' effect, since those suffering syndrome exacerbation face shortened lifespan.

Less obvious, however, are the inevitable consequences of the couplings of cognitive process *across scale*. As one example of what are likely to be many subtle but critical cross-system impacts we examine in more detail the possible convolution of immune function into the more general pathology.

As is well known, dioxins can cause severe immunosuppression (e.g. Tonn et al., 1996), an effect possibly complicated by an inverted-U dose-response effect (e.g. Fang et al., 1996). This is to be contrasted to the standard dose-response effect on the mucociliary tract which is expected from exposure to irritants such as HF, HCl and HBr. As is increasingly understood, however, psychosocial stress may itself have an immunosuppressive effect which is indeed sufficient to interfere with vaccine efficacy.

Recent work by Kiecolt-Glaser and Glaser (1996, 1998, 2000), for example, has examined the effect of 'chronic stress' on the efficacy of influenza, hepatitis-B, and pneumococcal pneumonia vaccine among elderly caregivers of dementia patients, and among medical students.

They found, for influenza, that the caregivers showed a poorer antibody response following vaccination relative to control subjects, as assessed by ELISA and hemagglutination inhibition. Caregivers also had lower levels of *in vivo* virus-specific-induced interleukin 2 levels and interleukin 1β . The data demonstrate that down-regulation of the immune response to influenza

virus vaccination is associated with a chronic stressor in the elderly.

Similar effects were found among the elderly caregivers for response to pneumococcal pneumonia vaccination, leading to the conclusion that chronic stress can inhibit the stability of the IgG antibody response to a bacterial vaccine.

Medical students who reported greater social support and lower anxiety and stress demonstrated a higher antibody response to HEP-B surface antigen at the end of the study period.

Glaser et al. (2000) conclude that the differences in antibody and T-cell responses to HEP-B and influenza virus vaccinations provide a demonstration of how stress may be able to alter both the cellular and humoral immune responses to vaccines and novel pathogens in both younger and older adults.

In addition a vast body of animal model studies involving socially structured populations shows clear impacts of acute and chronic social and other stressors on immune competence (e.g. deGroot et al., 2001; Gryazeva et al., 2001). Elenkov and Chrousos (1999) in particular suggest that glucocorticoids and catecholamines, the end-products of the stress system at the individual level, might selectively suppress cellular immunity, Th1 phenotype, in favor of humoral response – again at the individual level.

We suggest, however, that the particular role of cognitive socioculture in human biology takes matters considerably beyond such individual-level stress models, and into realms for which, to paraphrase Robert Boyd's aphorism, culture is as much a part of the human immune system as are T-cells.

It seems likely that those exposed to both stress and toxic combustion products at the WTC disaster will enter the coming influenza season during the peak 3-9 month period of 'normal' grieving, and may be both markedly more susceptible to infection and markedly less responsive to the available vaccine than unexposed populations. This effect may be complicated by persisting mucociliary damage consequent on exposure to smoke irritants. Vaccine strategy for the coming season, and probably for many seasons to come, must be significantly altered in the New York metropolitan region if a large number of excess flu/pneumonia deaths are to be averted.

Analogous coupling mechanisms at both individual and larger social scales will become clear as matters unfold. A particularly important effect might well involve carcinogenesis, since dioxins are among the most potent of cancer-inducing substances. Affected individuals or groups may, however, be damaged by pathological group processes, so that 'second victimization', by further suppressing immune function, may indirectly promote cancer induction

as well.

‘Post Traumatic Stress Disorder’ does not seem an adequate description of the likely consequences of this attack for individuals, families, social networks, enterprises, communities, and larger organizational structures. In particular, the massive quantity of acutely combustion-toxic halogenated hydrocarbons within the affected buildings constitutes a serious, and continuing, exacerbation of the disaster.

Medical practitioners treating victims of the WTC disaster and their families over the next several years, and administrators or others dealing with larger affected groups, should expect characteristic but complex patterns of respiratory, immune, reproductive, neurological, psychological, behavioral, social and other pathology to emerge, persist, and interact for the foreseeable future. Further, this is not the first, nor is it likely the last, such incident: repeated exposures seem increasingly likely, and will be synergistic.

Given the current political climate, considerable secondary victimization – through neglect, or the result of deliberately cultivated collective expressed emotion – seems inevitable. This will likely much exacerbate symptom patterns. To reiterate, it may prove necessary to invoke labor union, workplace, religious, or artificial therapeutic communities as intermediate structures to ameliorate or even reverse these effects. Those without access to such structures face a bleak future indeed.

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MATHEMATICAL APPENDIX

The essence of the modeling approach is to, first, express the cognitive pattern recognition-and-response described as characterizing immune cognition by Atlan and Cohen (1998) in terms of a ‘language,’ in a broad sense, and then to show how that language can interact and coalesce with similar cognitive languages at larger scales – central nervous system (CNS) and the embedding local sociocultural network.

The next step is to model the way such a coalesced system may, in turn, interact with sudden external ‘perturbation.’ The ‘nonorthogonal eigenmode’ solution emerges from this discussion after a certain amount of development. We then proceed to model the effect of embedding structures as a kind of ‘selection pressure’ which writes itself on embedded information sources.

We begin with a summary of relevant information theory formalism.

Information theory preliminaries

Suppose we have an ordered set of random variables, X_k , at ‘times’ $k = 1, 2, \dots$ – which we call \mathbf{X} – that emits sequences taken from some fixed alphabet of possible outcomes. Thus an output sequence of length n , x_n , termed a path, will have the form

$$x_n = (\alpha_0, \alpha_1, \dots, \alpha_{n-1})$$

where α_k is the value at step k of the stochastic variate X_k ,

$$X_k = \alpha_k.$$

A particular sequence x_n will have the probability

$$(1) \quad P(X_0 = \alpha_0, X_1 = \alpha_1, \dots, X_{n-1} = \alpha_{n-1}),$$

with associated conditional probabilities

$$P(X_n = \alpha_n | X_{n-1} = \alpha_{n-1}, \dots, X_0 = \alpha_0).$$

(2)

Thus substrings of x_n are not, in general, stochastically independent. That is, there may be powerful serial correlations along the x_n . We call \mathbf{X} an information source, and are particularly interested in sources for which the long run frequencies of strings converge stochastically to their time-independent probabilities, generalizing the law of large numbers. These we call *ergodic* (Ash, 1990, Cover and Thomas, 1992, Khinchine, 1957. We will refer to these in the future as ACTK). If the probabilities of strings do not change in time, the source is called *memoryless*.

We shall be interested in sources which can be parametrized and that are, with respect to that parameter, *piecewise memoryless*, i.e. probabilities do not change markedly within a ‘piece,’ but may do so between pieces. This allows us to apply the simplest results from information theory, and to use renormalization methods to examine transitions between ‘pieces.’ Learning plateaus represent regions where, with respect to the parameter, the system is, to first approximation, memoryless in this sense. In what follows we use the term ‘ergodic,’ to mean ‘piecewise memoryless ergodic.’

For any ergodic information source it is possible to divide all possible sequences of output, in the limit of large n , into two sets, S_1 and S_2 , having, respectively, very high and very low probabilities of occurrence. Sequences in S_1 we call *meaningful*.

The content of information theory’s Shannon-McMillan Theorem is twofold:

First, if there are $N(n)$ meaningful sequences of length n , where $N(n) \ll$ than the number of all possible sequences of length n , then, for each ergodic information source \mathbf{X} , there is a unique, path-independent number $H[\mathbf{X}]$ such that

$$\lim_{n \rightarrow \infty} \frac{\log[N(n)]}{n} = H[\mathbf{X}].$$

(3)

See ACTK for details.

Thus, for large n , the probability of *any* meaningful path of length $n \gg 1$ – independent of path – is approximately

$$P(x_n \in S_1) \propto \exp(-nH[\mathbf{X}]) \propto 1/N(n).$$

(3)

This is the *asymptotic equipartition property* and the Shannon-McMillan Theorem is often called the Asymptotic Equipartition Theorem (AEPT).

$H[\mathbf{X}]$ is the *splitting criterion* between the two sets S_1 and S_2 , and the second part of the Shannon-McMillan Theorem involves its calculation. This requires introduction of some nomenclature.

Suppose we have stochastic variables X and Y which take the values x_j and y_k with probability distributions

$$P(X = x_j) = P_j$$

$$P(Y = y_k) = P_k$$

Let the joint and conditional probability distributions of X and Y be given, respectively, as

$$P(X = x_j, Y = y_k) = P_{j,k}$$

$$P(Y = y_k | X = x_j) = P(y_k | x_j)$$

The *Shannon uncertainties* of X and of Y are, respectively

$$H(X) = - \sum_j P_j \log(P_j)$$

$$H(Y) = - \sum_k P_k \log(P_k)$$

(4)

The *joint uncertainty* of X and Y is defined as

$$H(X, Y) = - \sum_{j,k} P_{j,k} \log(P_{j,k}).$$

(5)

The *conditional uncertainty* of Y given X is defined as

$$H(Y|X) = - \sum_{j,k} P_{j,k} \log[P(y_k|x_j)].$$

(6)

Note that by expanding $P(y_k|x_j)$ we obtain

$$H(X|Y) = H(X, Y) - H(Y).$$

The second part of the Shannon-McMillan Theorem states that the – path independent – splitting criterion, $H[\mathbf{X}]$, of the ergodic information source \mathbf{X} , which divides high from low probability paths, is given in terms of the sequence probabilities of equations (1) and (2) as

$$H[\mathbf{X}] = \lim_{n \rightarrow \infty} H(X_n | X_0, X_1, \dots, X_{n-1}) =$$

$$\lim_{n \rightarrow \infty} \frac{H(X_0, \dots, X_n)}{n + 1}.$$

(7)

The AEPT is one of the most unexpected and profound results of 20th Century applied mathematics.

Ash (1990) describes the uncertainty of an ergodic information source as follows;

“...[W]e may regard a portion of text in a particular language as being produced by an information source. the probabilities $P[X_n = \alpha_n | X_0 = \alpha_0, \dots, X_{n-1} = \alpha_{n-1}]$ may be estimated from the available data about the language. A large uncertainty means, by the AEPT, a large number of ‘meaningful’ sequences. Thus given two languages with uncertainties H_1 and H_2 respectively, if $H_1 > H_2$, then in the absence of noise it is easier to communicate in the first language; more can be said in the same amount of time. On the other hand, it will be easier to reconstruct a scrambled portion of text in the second language, since fewer of the possible sequences of length n are meaningful.”

Languages can affect each other, or, equivalently, systems can translate from one language to another, usually with error. The Rate Distortion Theorem, which is one generalization of the SMT, describes how this can take place. As IR Cohen (2001) has put it, in the context of the cognitive immune system,

“An immune response is like a key to a particular lock; each immune response amounts to a functional image of the stimulus that elicited the response. Just as a key encodes a functional image of its lock, an effective [immune] response encodes a functional image of its stimulus; the stimulus and the response fit each other. The immune system, for example, has to deploy different types of inflammation to heal a broken bone, repair an infarction, effect neuroprotection, cure hepatitis, or contain tuberculosis. Each aspect of the response is a functional representation of the challenge.

Self-organization allows a system to adapt, to update itself in the image of the world it must respond to... The immune system, like the brain... aim[s] at representing a part of the world.”

These considerations suggest that the degree of possible back-translation between the world and its image within a cognitive system represents the profound and systematic coupling between a biological system and its environment, a coupling which may particularly express the way in which the system has ‘learned’ the environment. We attempt a formal treatment, from which it will appear that both cognition and response to systematic patterns of selection pressure are – almost inevitably – highly punctuated by ‘learning plateaus’ in which the two processes can become inextricably intertwined.

Suppose we have a ergodic information source \mathbf{Y} , a generalized language having grammar and syntax, with a source uncertainty $H[\mathbf{Y}]$ that ‘perturbs’ a system of interest. A chain of length n , a path of perturbations, has the form

$$y^n = y_1, \dots, y_n.$$

Suppose that chain elicits a corresponding chain of responses from the system of interest, producing another path $b^n = (b_1, \dots, b_n)$, which has some ‘natural’ translation into the language of the perturbations, although not, generally, in a one-to-one manner. The image is of a continuous analog audio signal which has been ‘digitized’ into a discrete set of voltage values. Thus, there may well be several different y^n corresponding to a given ‘digitized’ b^n . Consequently, in translating back from the b-language into the y-language, there will generally be information loss.

Suppose, however, that with each path b^n we specify an inverse code which identifies exactly one path \hat{y}^n . We assume further there is a measure

of distortion which compares the real path y^n with the inferred inverse \hat{y}^n . Below we follow the nomenclature of Cover and Thomas (1992).

The *Hamming distortion* is defined as

$$d(y, \hat{y}) = 1, y \neq \hat{y}$$

$$d(y, \hat{y}) = 0, y = \hat{y}.$$

(8)

For continuous variates the *Squared error distortion* is defined as

$$d(y, \hat{y}) = (y - \hat{y})^2.$$

(9)

Possibilities abound.

The distortion between paths y^n and \hat{y}^n is defined as

$$d(y^n, \hat{y}^n) = (1/n) \sum_{j=1}^n d(y_j, \hat{y}_j)$$

(10)

We suppose that with each path y^n and b^n -path translation into the y -language, denoted \hat{y}^n , there are associated individual, joint and conditional probability distributions $p(y^n), p(\hat{y}^n), p(y^n, \hat{y}^n)$ and $p(y^n|\hat{y}^n)$.

The *average distortion* is defined as

$$D = \sum_{y^n} p(y^n) d(y^n, \hat{y}^n)$$

(11)

It is possible, using the distributions given above, to define the information transmitted from the incoming Y to the outgoing \hat{Y} process in the usual manner, using the appropriate Shannon uncertainties:

$$I(Y, \hat{Y}) \equiv H(Y) - H(Y|\hat{Y}) = H(Y) + H(\hat{Y}) - H(Y, \hat{Y})$$

(12)

If there is no uncertainty in Y given \hat{Y} , then no information is lost. In general, this will not be true.

The *information rate distortion* function $R(D)$ for a source Y with a distortion measure $d(y, \hat{y})$ is defined as

$$R(D) = \min_{p(y|\hat{y}); \sum_{(y, \hat{y})} p(y)p(y|\hat{y})d(y, \hat{y}) \leq D} I(Y, \hat{Y})$$

(13)

where the minimization is over all conditional distributions $p(y|\hat{y})$ for which the joint distribution $p(y, \hat{y}) = p(y)p(y|\hat{y})$ satisfies the average distortion constraint.

The Rate Distortion Theorem states that $R(D)$, as we have defined it, is the maximum achievable rate of information transmission which does not exceed distortion D . Note that the result is *independent of the exact form of the distortion measure* $d(y, \hat{y})$.

More to the point, however, is the following: Pairs of sequences (y^n, \hat{y}^n) can be defined as *distortion typical*, that is, for a given average distortion D , pairs of sequences can be divided into two sets, a high probability one containing a relatively small number of (matched) pairs with $d(y^n, \hat{y}^n) \leq D$, and a low probability one containing most pairs. As $n \rightarrow \infty$ the smaller set approaches unit probability, and we have for those pairs the condition

$$p(\hat{y}^n) \geq p(\hat{y}^n | y^n) \exp[-nI(Y, \hat{Y})]. \quad (14)$$

Thus, roughly speaking, $I(Y, \hat{Y})$ embodies the splitting criterion between high and low probability pairs of paths. These pairs are, again, the input ‘training’ paths and corresponding output path.

Note that, in the absence of a distortion measure, this result remains true for two interacting information sources, the principal content of the *joint asymptotic equipartition theorem*, [Cover and Thomas, 1992, Theorem 8.6.1].

Thus the imposition of a distortion measure results in a limitation in the number of possible jointly typical sequences to those satisfying the distortion criterion.

For the theory we will explore later – of pairwise interacting information sources – $I(Y, \hat{Y})$ (or $I(Y_1, Y_2)$ without the distortion restriction), can play the role of H in the critical development of the next section.

The RDT is a generalization of the Shannon-McMillan Theorem which examines the interaction of two information sources under the constraint of a fixed average distortion. For our development we will require one more iteration, studying the interaction of three ‘languages’ under particular conditions, and require a similar generalization of the SMT in terms of the splitting criterion for triplets as opposed to single or double stranded patterns. The tool for this is at the core of what is termed *network information*

theory [Cover and Thomas, 1992, Theorem 14.2.3]. Suppose we have (piecewise memoryless) ergodic information sources Y_1, Y_2 and Y_3 . We assume Y_3 constitutes a critical embedding context for Y_1 and Y_2 so that, given three sequences of length n , the probability of a particular triplet of sequences is determined by *conditional probabilities with respect to Y_3* :

$$P(Y_1 = y_1, Y_2 = y_2, Y_3 = y_3) = \prod_{i=1}^n p(y_{1i}|y_{3i})p(y_{2i}|y_{3i})p(y_{3i}).$$

(15)

That is, Y_1 and Y_2 are, in some measure, driven by their interaction with Y_3

Then, in analogy with the previous two cases, triplets of sequences can be divided by a splitting criterion into two sets, having high and low probabilities respectively. For large n the number of triplet sequences in the high probability set will be determined by the relation [Cover and Thomas, 1992, p. 387]

$$N(n) \propto \exp[nI(Y_1; Y_2|Y_3)],$$

(16)

where splitting criterion is given by

$$I(Y_1; Y_2|Y_3) \equiv H(Y_3) + H(Y_1|Y_3) + H(Y_2|Y_3) - H(Y_1, Y_2, Y_3)$$

Below we examine phase transitions in the splitting criteria H , which we will generalize to both $I(Y_1, Y_2)$ and $I(Y_1, Y_2|Y_3)$. The former will produce punctuated cognitive and non-cognitive learning plateaus, while the latter characterizes the interaction between selection pressure and sociocultural cognition, leading to a model of the effects of social structure on ‘eigenmodes’ of pathological response to perturbation.

Phase transition and coevolutionary condensation

The essential homology relating information theory to statistical mechanics and nonlinear dynamics is twofold (Wallace and Wallace, 1998, 1999):

- (1) A ‘linguistic’ equipartition of probable paths consistent with the Shannon-McMillan and Rate Distortion Theorems serves as the formal connection with nonlinear mechanics and fluctuation theory – a matter we will not fully explore here, and
- (2) A correspondence between information source uncertainty and statistical mechanical free energy density, rather than entropy. See Wallace and Wallace (1998, 1999) and Rojdestvenski and Cottam, (2000) for a fuller discussion of the formal justification for this assumption, described by Bennett (1988) as follows:

“...[T]he value of a message is the amount of mathematical or other work plausibly done by the originator, which the receiver is saved from having to repeat.”

This is a central insight to which we will return at some length below. In sum, we will generally impose invariance under renormalization symmetry on the ‘splitting criterion’ between high and low probability states from the Large Deviations Program of applied probability (e.g. Dembo and Zeitouni, 1998). Free energy density (which can be reexpressed as an ‘entropy’ in microscopic systems) is the splitting criterion for statistical mechanics, and information source uncertainty is the criterion for ‘language’ systems. Imposition of renormalization on free energy density gives phase transition in a physical system. For information systems it gives interactive condensation.

This analogy is indeed a mathematical homology:

The definition of the free energy density for a parametrized physical system is

$$F(K_1, \dots, K_m) = \lim_{V \rightarrow \infty} \frac{\log[Z(K_1, \dots, K_m)]}{V} \quad (17)$$

where the K_j are parameters, V is the system volume and Z is the ‘partition function’ defined from the energy function, the Hamiltonian, of the system.

For an ergodic information source the equivalent relation associates source uncertainty with the number of ‘meaningful’ sequences $N(n)$ of length n , in the limit

$$H[\mathbf{X}] = \lim_{n \rightarrow \infty} \frac{\log[N(n)]}{n}.$$

We will *parametrize* the information source to obtain the crucial expression on which our version of information dynamics will be constructed;

$$H[K_1, \dots, K_m, \mathbf{X}] = \lim_{n \rightarrow \infty} \frac{\log[N(K_1, \dots, K_m)]}{n}. \quad (18)$$

The essential point is that while information systems do not have ‘Hamiltonians’ allowing definition of a ‘partition function’ and a free energy density, they may have a source uncertainty obeying a limiting relation like that of free energy density. Importing ‘renormalization’ symmetry gives phase transitions at critical points (or surfaces), and importing a Legendre transform in a ‘natural’ manner gives dynamic behavior far from criticality, a matter leading to our analysis of the effects of sudden perturbation on coalesced cognitive systems.

As neural networks demonstrate so well, it is possible to build larger pattern recognition systems from assemblages of smaller ones. We abstract

this process in terms of a generalized linked array of subcomponents which ‘talk’ to each other in two different ways. These we take to be ‘strong’ and ‘weak’ ties between subassemblies. ‘Strong’ ties are, following arguments from sociology (Granovetter, 1973), those which permit disjoint partition of the system into equivalence classes. Thus the strong ties are associated with some reflexive, symmetric, and transitive relation between components. ‘Weak’ ties do not permit such disjoint partition. In a physical system these might be viewed, respectively, as ‘local’ and ‘mean field’ coupling.

We fix the magnitude of strong ties, but vary the index of weak ties between components, which we call P , taking $K = 1/P$.

We assume the array, sensory activity and ongoing activity depend on three parameters, two explicit and one implicit. The explicit are K as above and an ‘external field strength’ analog J , which gives a ‘direction’ to the system. We may, in the limit, set $J = 0$.

The implicit parameter, which we call r , is an inherent generalized ‘length’ on which the phenomenon, including J and K , are defined. That is, we can write J and K as functions of averages of the parameter r , which may be quite complex, having nothing at all to do with conventional ideas of space, for example degree of niche partitioning in ecosystems.

Rather than specify complicated patterns of individual dependence or interaction for sensory activity, ongoing activity and array components, we follow the direction suggested above and instead work entirely within the domain of the uncertainty of the ergodic information source dual to the large-scale pattern recognition process, which we write as

$$H[K, J, \mathbf{X}]$$

Imposition of invariance of H under a renormalization transform in the implicit parameter r leads to expectation of both a critical point in K , which we call K_C , reflecting a phase transition to or from collective behavior across the entire array, and of power laws for system behavior near K_C . Addition of other parameters to the system, e.g. some Q , results in a ‘critical line’ or surface $K_C(Q)$.

Let $\kappa = (K_C - K)/K_C$ and take χ as the ‘correlation length’ defining the average domain in r -space for which the dual information source is primarily dominated by ‘strong’ ties. We begin by averaging across r -space in terms of ‘clumps’ of length R , defining J_R, K_R as J, K for $R = 1$. Then, following Wilson’s [53] physical analog, we choose the renormalization relations as

$$\begin{aligned}
H[K_R, J_R, \mathbf{X}] &= R^{\mathcal{D}} H[K, J, \mathbf{X}] \\
\chi(K_R, J_R) &= \frac{\chi(K, J)}{R}
\end{aligned}
\tag{19}$$

where \mathcal{D} is a non-negative real constant, possibly reflecting fractal network structure. The first of these equations states that ‘processing capacity,’ as indexed by the source uncertainty of the system which represents the ‘richness’ of the inherent language, grows as $R^{\mathcal{D}}$, while the second just states that the correlation length simply scales as R .

Other, very subtle, symmetry relations – not necessarily based on elementary physical analogs – may well be possible. For example McCauley, (1993, p.168) describes the counterintuitive renormalization relations needed to understand phase transition in simple ‘chaotic’ systems.

For K near K_C , if $J \rightarrow 0$, a simple series expansion and some clever algebra (e.g. Wilson, 1971, the argument leading from his eqs. 4 and 5 to his eqs. 22 and 23) gives

$$\begin{aligned}
H &= H_0 \kappa^{s\mathcal{D}} \\
\chi &= \chi_0 \kappa^{-s}
\end{aligned}
\tag{20}$$

where s is a positive constant. Some rearrangement produces, near K_C ,

$$H \propto \frac{1}{\chi^{\mathcal{D}}}$$

(21)

This suggests that the ‘richness’ of the pattern recognition language is inversely related to the domain dominated by disjointly partitioning strong ties near criticality. As the nondisjunctive weak ties coupling declines, the efficiency of the coupled system as an information channel declines precipitously near the transition point: see ACTK for discussion of the relation between channel capacity and information source uncertainty.

Far from the critical point matters are considerably more complicated, apparently driven by appropriate (and usually counterintuitive) generalizations of a physical system’s ‘Onsager relations,’ described below in terms of a ‘thermodynamics’ of information sources.

The essential insight is that *regardless of the particular renormalization symmetries involved, sudden critical point transition is possible in the opposite direction for this model*, that is, from a number of independent, isolated and fragmented pattern recognition systems operating individually and more or less at random, into a single large, interlocked, coherent pattern recognition system, once the parameter K , the inverse strength of weak ties, falls below threshold, or, conversely, once the strength of weak ties parameter $P = 1/K$ becomes large enough.

Thus, increasing weak ties between them can bind several different pattern recognition or other ‘language’ processes into a single, embedding hierarchical metalanguage which contains the different languages as linked sub-dialects.

This heuristic insight can be made exact using a rate distortion argument:

Suppose that two ergodic information sources \mathbf{Y} and \mathbf{B} begin to interact, to ‘talk’ to each other, i.e. to influence each other in some way so that it is possible, for example, to look at the output of \mathbf{B} – strings b – and infer something about the behavior of \mathbf{Y} from it – strings y . We suppose it possible to define a retranslation from the B-language into the Y-language through a deterministic code book, and call $\hat{\mathbf{Y}}$ the translated information source, as mirrored by \mathbf{B} .

Take some distortion measure d comparing paths y to paths \hat{y} , defining $d(y, \hat{y})$. We invoke the Rate Distortion Theorem's mutual information $I(Y, \hat{Y})$, which is a splitting criterion between high and low probability pairs of paths. Impose, now, a parametrization by an inverse coupling strength K , and a renormalization symmetry representing the global structure of the system coupling. This may be much different from the renormalization behavior of the individual components. If $K < K_C$, where K_C is a critical point (or surface), the two information sources will be closely coupled enough to be characterized as condensed.

We will make much of this below; cultural and genetic heritages are generalized languages, as are neural, immune, and sociocultural pattern recognition.

Pattern recognition as language

The task of this section is to express cognitive pattern recognition-and-response in terms of a ergodic information source constrained by the AEPT. This general approach would then apply to the immune system, the CNS and sociocultural networks. Pattern recognition, as we will characterize it here, proceeds by convoluting an incoming 'sensory' signal with an internal 'ongoing activity' and, at some point, triggering an appropriate action based on a decision that the pattern of the sensory input requires a response. For the purposes of this work we do not need to model in any particular detail the manner in which the pattern recognition system is 'trained,' and thus adopt a 'weak' model which may have considerable generality, regardless of the system's particular learning paradigm, which can be more formally described using the RDT.

We will, fulfilling Atlan and Cohen's (1998) criterion of meaning-from-response, define a language's contextual meaning entirely in terms of system output.

The model is as follows: A pattern of sensory input is convoluted with a pattern of internal 'ongoing activity' to create a path

$$x = (a_0, a_1, \dots, a_n, \dots).$$

This is fed into a (highly nonlinear) 'decision oscillator' which generates an output $h(x)$ that is an element of one of two (presumably) disjoint sets B_0 and B_1 .

We take

$$B_0 = b_0, \dots, b_k$$

$$B_1 = b_{k+1}, \dots, b_m.$$

Thus we permit a graded response, supposing that if

$$h(x) \in B_0$$

the pattern is not recognized, and

$$h(x) \in B_1$$

that the pattern is recognized and some action $b_j, k + 1 \leq j \leq m$ takes place.

We are interested in paths which trigger pattern recognition exactly once. That is, given a fixed initial state a_0 such that $h(a_0) \in B_0$, we examine all possible subsequent paths x beginning with a_0 and leading exactly once to the event $h(x) \in B_1$. Thus $h(a_0, a_1, \dots, a_j) \in B_0$ for all $j < m$ but $h(a_0, \dots, a_m) \in B_1$.

For each positive integer n , let $N(n)$ be the number of paths of length n which begin with some particular a_0 having $h(a_0) \in B_0$, and lead to the condition $h(x) \in B_1$. We shall call such paths ‘meaningful’ and assume $N(n)$ to be considerably less than the number of all possible paths of length n – pattern recognition is comparatively rare – and in particular assume that the finite limit

$$H = \lim_{n \rightarrow \infty} \frac{\log[N(n)]}{n}$$

exists and is independent of the path x . We will – not surprisingly – call such a pattern recognition process ergodic.

We may thus define a ergodic information source \mathbf{X} associated with stochastic variates X_j having joint and conditional probabilities $P(a_0, \dots, a_n)$ and

$P(a_n | a_0, \dots, a_{n-1})$ such that appropriate joint and conditional Shannon uncertainties satisfy the relations

$$\begin{aligned}
H[\mathbf{X}] &= \lim_{n \rightarrow \infty} \frac{\log[N(n)]}{n} \\
&= \lim_{n \rightarrow \infty} H(X_n | X_0, \dots, X_{n-1}) \\
&= \lim_{n \rightarrow \infty} \frac{H(X_0, \dots, X_n)}{n+1}
\end{aligned}$$

We say this ergodic information source is *dual* to the pattern recognition process.

Different ‘languages’ will, of course, be defined by different divisions of the total universe of possible responses into different pairs of sets B_0 and B_1 , or perhaps even by requiring more than one response in B_1 along a path. Like the use of different distortion measures in the RDT, however, it seems obvious that the underlying dynamics will all be qualitatively similar.

Meaningful paths – creating an inherent grammar and syntax – are defined entirely in terms of system response, as Atlan (1983, 1987, 1998) and Atlan and Cohen (1998) propose, quoting Atlan (1987)

“...[T]he perception of a pattern does not result from a two-step process with first perception of a pattern of signals and then processing by application of a rule of representation. Rather, a given pattern in the environment is perceived at the time when signals are received by a kind of resonance between a given structure of the environment – not necessarily obvious to the eyes of an observer – and an internal structure of the cognitive system. It is the latter which defines a possible functional meaning – for the system itself – of the environmental structure.”

Elsewhere (R Wallace, 2000b, 2001) we have termed this process an ‘information resonance.’

Although we do not pursue the matter here, the ‘space’ of the a_j can be partitioned into disjoint equivalence classes according to whether states can be connected by meaningful paths. This is analogous to a partition into domains of attraction for a nonlinear or chaotic system, and imposes a ‘natural’

algebraic structure which can, among other things, enable multitasking (R Wallace, 2000b, 2001).

We can apply this formalism to the stochastic neuron: A series of inputs $y_i^j, i = 1 \dots m$ from m nearby neurons at time j is convoluted with ‘weights’ $w_i^j, i = 1 \dots m$, using an inner product

$$a_j = \mathbf{y}^j \cdot \mathbf{w}^j = \sum_{i=1}^m y_i^j w_i^j$$

(22)

in the context of a ‘transfer function’ $f(\mathbf{y}^j \cdot \mathbf{w}^j)$ such that the probability of the neuron firing and having a discrete output $z^j = 1$ is $P(z^j = 1) = f(\mathbf{y}^j \cdot \mathbf{w}^j)$. Thus the probability that the neuron does not fire at time j is $1 - f(\mathbf{y}^j \cdot \mathbf{w}^j)$.

In the terminology of this section the m values y_i^j constitute ‘sensory activity’ and the m weights w_i^j the ‘ongoing activity’ at time j , with $a_j = \mathbf{y}^j \cdot \mathbf{w}^j$ and $x = a_0, a_1, \dots, a_n, \dots$

A little more work, described below, leads to a fairly standard neural network model in which the network is trained by appropriately varying the \mathbf{w} through least squares or other error minimization feedback. This can be shown to, essentially, replicate rate distortion arguments, as we can use the error definition to define a distortion function $d(y, \hat{y})$ which measures the difference between the training pattern y and the network output \hat{y} as a function of, for example, the inverse number of training cycles, K . As we will discuss in some detail, ‘learning plateau’ behavior follows as a phase transition on the parameter K in the mutual information $I(Y, \hat{Y})$.

Park et al. (2000) treat the stochastic neural network in terms of a space of related probability density functions $[p(\mathbf{x}, \mathbf{y}; \mathbf{w}) | \mathbf{w} \in \mathcal{R}^m]$, where \mathbf{x} is the input, \mathbf{y} the output and \mathbf{w} the parameter vector. The goal of learning is to find an optimum \mathbf{w}^* which maximizes the log likelihood function. They define a loss function of learning as

$$L(\mathbf{x}, \mathbf{y}; \mathbf{w}) \equiv -\log p(\mathbf{x}, \mathbf{y}; \mathbf{w}),$$

and one can take as a learning paradigm the gradient relation

$$\mathbf{w}_{t+1} = \mathbf{w}_t - \eta_t \partial L(\mathbf{x}, \mathbf{y}; \mathbf{w}) / \partial \mathbf{w},$$

where η_t is a learning rate.

Park et al. (2000) attack this optimization problem by recognizing that the space of $p(\mathbf{x}, \mathbf{y}; \mathbf{w})$ is Riemannian with a metric given by the Fisher information matrix

$$G(\mathbf{w}) = \int \int \partial \log p / \partial \mathbf{w} [\partial \log p / \partial \mathbf{w}]^T p(\mathbf{x}, \mathbf{y}; \mathbf{w}) d\mathbf{y} d\mathbf{x}$$

where T is the transpose operation. A Fisher-efficient on-line estimator is then obtained by using the ‘natural’ gradient algorithm

$$\mathbf{w}_{t+1} = \mathbf{w}_t - \eta_t G^{-1} \partial L(\mathbf{x}, \mathbf{y}; \mathbf{w}) / \partial \mathbf{w}.$$

Again, through the synergistic family of probability distributions $p(\mathbf{x}, \mathbf{y}; \mathbf{w})$, this can be viewed as a special case – a ‘representation’, to use physics jargon – of the general ‘convolution argument’ given above.

Again, it seems that a rate distortion argument between training language and network response language will nonetheless produce learning plateaus, even in this rather elegant special case.

The foundation of our mathematical modeling exercise is to assume that both the immune system and a sociocultural network’s pattern recognition behavior, like that of other pattern recognition systems, can also be represented by the language arguments given above, and is thus dual to a ergodic information source, a context-defining language in Atlan and Cohen’s sense (1998), having a grammar and syntax such that meaning is explicitly defined in terms of system response.

Sociogeographic or sociocultural networks – social networks embedded place and embodying culture – serve a number of functions, including acting as the local tools for teaching cultural norms and processes to individuals. Thus, for the purposes of this work, a person’s social network – family and friends, workgroup, church, etc. – becomes the immediate agency of cultural dynamics, and provides the foundation for analysis of the ‘brain/culture condensation’.

Sociocultural networks serve also, however, as instruments for collective decision-making, a cognitive phenomenon. Such networks serve as hosts to a political, in the large sense, process by which a community recognizes and

responds to patterns of threat and opportunity. To treat pattern recognition on sociocultural networks we impose a version of the structure and general formalism relating pattern recognition to a dual information source:

We envision problem recognition by a local sociocultural network as follows: A ‘real problem,’ in some sense, becomes convoluted with a community’s internal sociocultural ‘ongoing activity’ to create the path of a ‘perceived problem’ at times $0, 1, \dots$, producing a path of the usual form $x = a_0, a_1, \dots, a_n, \dots$. That serially correlated path is then subject to a decision process across the sociocultural network, designated $h(x)$ which produces output in two sets B_0 and B_1 , as before. The problem is officially recognized and resources committed to if and only if $h(x) \in B_1$, a rare event made even more rare if resources must then be diverted from previously recognized problems.

For the purposes of this work, then, we will view ‘culture’ as, in fact, a sociocultural cognitive process which can entrain individual CNS and immune cognition.

To reiterate, we have, following the earlier discussion of Atlan and Cohen’s work (1998), implicitly assumed that the immune cognition can likewise be expressed as a pattern recognition-and-response language characterized by an information source uncertainty.

Toward a ‘thermodynamics’ of information source uncertainty

We suppose a cognitive system – more generally a linked and broadly coevolutionary condensation of several such systems – is exposed to a sudden perturbation of sensory and other activity – trauma, toxic chemicals, and the like – and wish to estimate the response of that system. This requires some considerable development.

Since the source uncertainty of a (coevolutionarily condensed) behavioral language, $H[\mathbf{X}]$ is the average uncertainty per symbol, we must have $H[\mathbf{X}] \leq C$, where C is the capacity of the underlying geographically-focused social network as an information channel. We suppose that capacity is a function of system-wide average variables, K, J, Q which represent the *ensemble* indices – associated with the entire individual-and-group.

Thus we may write

$$C = C(K, J, Q)$$

$$H = H[K, J, Q, \mathbf{X}].$$

(23)

We assume that as K, J, Q increase, that $C(K, J, Q)$ and H decrease monotonically.

The essential trick – which is highly counterintuitive – is to recognize that, in its definition,

$$H[K, J, Q, \mathbf{X}] = \lim_{n \rightarrow \infty} \frac{\log[N(K, J, Q, n)]}{n}$$

(24)

is the analog of the *free energy density* of statistical mechanics: Take a physical system of volume V which can be characterized by an inverse temperature parameter $K = 1/T$. The ‘partition function’ for the system is (K. Wilson, 1971)

$$Z(K) = \sum_j \exp[-K E_j]$$

(25)

where E_j represents the energy of the individual state j . The probability of the state j is then

$$P_j = \frac{\exp[-K E_j]}{Z(K)}.$$

Then the ‘free energy density’ of the *entire* system is defined as

$$F(K) = \lim_{V \rightarrow \infty} \frac{\log[Z(K)]}{V}.$$

(26)

The relation between information and thermodynamic free energy has long been recognized. As Elitzur (1996, p. 179) puts it

“Recall... the lesson of Maxwell’s Demon: Information, when applied under appropriate circumstances, can save work.”

Again, Bennett (1988, p. 230) finds that the value of a message is the amount of mathematical or other work plausibly done by its originator, which the receiver is saved from having to repeat.

Equation (24) expresses one of the central theorems of information theory in a form similar to equation (26). It is this similarity which suggests that, for some systems under proper circumstances, there may be a ‘duality’ which maps Shannon’s ergodic source uncertainty onto thermodynamic free energy density, and perhaps vice versa.

The method we propose here, based entirely on equation (24), the Shannon-McMillan Theorem for ergodic information sources, may prove to be more generally applicable to information systems, not requiring the explicit identification a ‘duality’ in each and every case.

The formal analogy – the thermodynamic duality – between free energy density for a physical system and ergodic source uncertainty, based on equations (24) and (26), suggests that we impose a *thermodynamics* on source uncertainty.

By a thermodynamics we mean, in the sense of Feigenbaum (1988, p. 530),

“...[T]he deduction of variables and their relations to one another that in some well-defined sense are averages of exponential quantities defined microscopically on a set.”

In our context the relation between the number of meaningful sequences on length n , $N(n)$, for (fixed) large n and the source uncertainty, i.e.

$$N(n) \approx \exp(nH[\mathbf{X}])$$

for large n provides the exponential dependence exactly analogous to performing statistical mechanics. We are, to reiterate, going to express $H[\mathbf{X}]$ in terms of a number of parameters which characterize the underlying community which carries the behavioral language.

We suppose that H , representing the information source of our coevolutionary condensation of CNS, immune and sociocultural cognition, is allowed to depend on a number of observable parameters, which we will not fully specify here.

If source uncertainty H is the analog to free energy density in a physical system, K is the analog to inverse temperature, the next ‘natural’ step is to apply a *Legendre transformation* to H so as to define a generalized ‘entropy,’ S , and other (very) rough analogs to classical thermodynamic entities, depending on the parameters.

Courant and Hilbert (1989, p.32) characterize the Legendre transformation as defining a surface as the envelope of its tangent planes, rather than as the set of points satisfying a particular equation.

Their development shows the Legendre transformation of a well-behaved function $f(Z_1, Z_2, \dots, Z_w)$, denoted g , is

$$g = f - \sum_{i=1}^w Z_i \partial f / \partial Z_i \equiv f - \sum_{i=1}^w Z_i V_i. \quad (27)$$

with, clearly, $V_i \equiv \partial f / \partial Z_i$.

This expression is assumed to be invertible, hence the ‘duality:’

$$f = g - \sum_{i=1}^w V_i \partial g / \partial V_i.$$

Transformation from the ‘Lagrangian’ to the ‘Hamiltonian’ formulation of classical mechanics (Landau and Lifshitz, 1959) is via a Legendre transformation.

The generalization when f is not well-behaved is via a variational principle (Beck and Schlogl, 1993) rather than a tangent plane argument. Then

$$\begin{aligned} g(V) &= \min_Z [f(Z) - VZ] \\ f(Z) &= \min_V [g(V) - VZ]. \end{aligned}$$

(28)

In the first expression the variation is taken with respect to Z , in the second with respect to V .

For a badly behaved function it is usually possible to fix up a reasonable invertible structure since the singularities of f or g will usually belong to ‘a set of measure zero,’ for example a finite number of points on a line or lines on a surface where we may designate inverse values by fiat.

We first consider a very simple system in which the ergodic source uncertainty H depends *only* on the inverse strength of weak ties K , giving an analog to the ‘canonical ensemble’ of statistical mechanics which depends only on temperature. We define S , an entropy-analog which we term the ‘disorder,’ as the Legendre transform of the Shannon uncertainty $H[K, \mathbf{X}]$:

$$S = H - KdH/dK \equiv H - KU$$

(29)

where we take $U = dH/dK$ as an analog to the ‘internal energy’ of a system. Note that S and H have the same physical dimensionality.

Since

$$dS/dK = dH/dK - U - KdU/dK = -KdU/dK$$

we have

$$dS/dU = -K$$

and

$$dU \propto PdS.$$

This is the analog to the classic thermodynamic relation $dQ = TdS$ for physical systems. Thus what we have defined here as the disorder S is indeed a generalized entropy.

Note that since $dS/dU = -K$ we have

$$S = H - KU = H + U dS/dU$$

or

$$H = S - U dS/dU$$

which explicitly shows the dual relation between H and S .

Again let $N(n)$ represent the number of meaningful sequences of length n emitted by the source \mathbf{X} . Since

$$H[\mathbf{X}] = \lim_{n \rightarrow \infty} \frac{\log[N(n)]}{n}$$

for large n , we have

$$U = dH/dK = \lim_{n \rightarrow \infty} \frac{1}{nN} dN/dK.$$

(30)

For fixed (large) n , U is thus the *proportionate* rate of change in number of meaningful sequences of length n with change in K . This is something like the rate of change of mass per unit mass for a person losing weight: A small value will not be much noticed, while a large one may represent a rigorous starvation causing considerable distress.

Some rearrangement gives

$$I \equiv (S - H) = -KdH/dK = UdS/dU \quad (31)$$

We define $I = S - H$ as the *instability* of the system.

If $-dH/dK$ is approximately constant – something like a heat capacity in a physical system – then we have the approximate linear relation

$$I \approx b_K K$$

with

$$b_K \equiv -\partial H/\partial K.$$

We generalize this as follows:

Allow H to depend on a number of parameters, for example average probability of weak ties, the inverse level of community resources, and or other factors which we call $Z_i, i = 1....$ Then, taking $H = H[Z_i, \mathbf{X}]$, we obtain the equations of state

$$S = H - \sum_{j=1}^s Z_j \partial H / \partial Z_j = H - \sum_{j=1}^s Z_j V_j.$$

$$V_i \equiv \partial H / \partial Z_i \quad (32)$$

and the *instability relation*

$$\begin{aligned}
I = S - H &= - \sum_{j=1}^s Z_j \partial H / \partial Z_j = \sum_{j=1}^s V_j \partial S / \partial V_j, \\
&= - \sum_{j=1}^s V_j Z_j = -\mathbf{Z} \cdot \nabla_{|\mathbf{Z}} H,
\end{aligned}
\tag{33}$$

taking $\mathbf{Z} = (Z_1, Z_2, \dots, Z_s)$.

I represents the degree of disorder above and beyond that which is inherent to the ergodic information source itself.

We suggest that risk behaviors, patterns of anxiety, and of depression and demoralization, or other indicators of distress, are primary environmental indices of community instability.

Instability, as we have defined it, is driven by the declining capacity of behavioral language to convey messages across a community's sociogeographic networks.

We suppose that the capacity, C , of the underlying communication channel defined by the sociogeographic networks linked across the community declines with increasing K , so that $C = C(K)$ is monotonically decreasing in K . An ergodic information source can be transmitted without error by a channel only if $H[K, \mathbf{X}] < C(K)$ – again see ACTK – so that declining C will inevitably result in rising I .

I is, according to this development, driven by parameters characterizing public policy and underlying economic and social constraints – the Z_j and V_j .

For a social system, equation 33 is interpreted as stating that the rate of intentional violent deaths, depression or other indices of distress, is proportional to a community's experience of instability.

It may be possible to generalize the development to include temporal effects if we suppose that H depends on $d\mathbf{Z}/dt \equiv \dot{\mathbf{Z}}$ as well as on \mathbf{Z} . Note that terms of the form $\partial H/\partial t$ would violate ergodicity. Then we would take

$$I = -(\mathbf{Z}, \dot{\mathbf{Z}}) \cdot \nabla|_{(\mathbf{Z}, \dot{\mathbf{Z}})} H \equiv$$

$$\sum_j -Z_j \partial H / \partial Z_j - \dot{Z}_j \partial H / \partial \dot{Z}_j.$$

(34)

This suggests that both parameter gradients and their rates of change can be globally destabilizing.

In linear approximation, assuming $-\partial H/\partial Z_i = -V_i = b_{Z_i} \approx \text{constant}$, equation (22) can be rewritten as

$$I \approx b_K K + b_J Q + b_M M.$$

The use of environmental index variates for critical system parameters will generally result in a nonzero intercept, giving the final equation

$$I \approx b_K K + b_J Q + b_M M + b_0.$$

(35)

Note that the intercept b_0 may, in fact, be quite complex, perhaps incorporating other parameters not explicitly included in the model. But it may include as well an ‘error term’ representing stochastic fluctuations not entirely damped by large population effects, or even some ‘nonlinear’ structure when the b_{Z_i} are not quite constant.

Most importantly for our analysis here, if the ‘potentials’ $V_i = \partial H / \partial Z_i$ cannot be approximated as constants, then simple linear regression will fail entirely, and equations (32) and (35) will represent an appropriate generic model – possibly with ‘error terms’ – however *the system will be both nonlinear and nonmonotonic*, hence representing signal transduction in physiological systems.

In sum, we claim the instability relation derived from a fairly simple quasi-thermodynamic argument applied to an ergodic information source parametrized by various significant indices, (as well as, perhaps, their rates of change), explains the high degree to which simple regression models based on those parameters account for observed patterns of physiological, psychological, psychosocial, or immune response to perturbation. We further claim that extension of this model into nonlinear and nonmonotonic realms is quite direct, a matter we will not further treat here.

Ecological resilience of cognitive condensations

In reality, matters are significantly more complex than we have described so far: physiological and psychological responses are indeed produced by sudden deterioration of an individual’s underlying circumstances, but may, in turn, affect these as well, basically through nonlinear, feedback loops.

Thus the inherently nonlinear model for response as produced by increasing stimulation, $I = -\sum_j V_j Z_j$ is replaced by an even more nonlinear structure:

$$I(t) = -\sum_j V_j(I(t)) Z_j(I(t)).$$

(36)

In a first iteration using linear approximation, we can replace this equation with a series for which *each* of s variates – ‘independent’ as well as ‘dependent’ – is expressed in terms of s linear regressions on all the others:

$$x_i(t) = \sum_{j \neq i}^s b_{i,j} x_j(t) + b_{i,0} + \epsilon(t, x_1(t) \dots x_s(t)).$$

(37)

Here the $x_j, j = 1 \dots s$ are both ‘independent’ and ‘dependent’ variates involved in the feedback, $b_{i,0}$ is the intercept constant, and the ϵ terms are ‘error’ terms which may not be small, in this approximation.

In matrix notation this set of equations becomes

$$X(t) = \mathbf{B}X(t) + U(t)$$

(38)

where $X(t)$ is a s -dimensional vector, \mathbf{B} is an $s \times s$ matrix of regression coefficients having a zero diagonal and U is an s -dimensional vector containing the constant and ‘error’ terms. *‘Error’ terms are taken as including public and economic policy changes which are external to the internal feedback loops.*

We suggest that, on the timescale of applied perturbations and of initial responses, the \mathbf{B} -matrix remains relatively constant. Following the analysis of Ives (1995) this structure has a number of interesting properties which permit estimation of the effects of external perturbation on the likelihood of triggering phase change in marginalized communities.

We begin by rewriting the matrix equation as

$$[\mathbf{I} - \mathbf{B}]X(t) = U(t)$$

(39)

where \mathbf{I} is the $s \times s$ identity matrix and, to reiterate, \mathbf{B} has a zero diagonal. We reexpress matter *in terms of the eigenstructure of \mathbf{B}* .

Let \mathbf{Q} be the matrix of eigenvectors which diagonalizes \mathbf{B} . Take $\mathbf{Q}Y(t) = X(t)$ and $\mathbf{Q}W(t) = U(t)$. Let \mathbf{J} be the diagonal matrix of eigenvalues of \mathbf{B} so that $\mathbf{B} = \mathbf{Q}\mathbf{J}\mathbf{Q}^{-1}$. In R. Wallace, Y Huang, P Gould and D Wallace (1997) we show the eigenvalues of \mathbf{B} are all real. Then, for the eigenvectors Y_k of \mathbf{B} , corresponding to the eigenvalues λ_k ,

$$Y_k(t) = \mathbf{J}Y_k(t) + W_k(t). \quad (40)$$

Using a term-by-term shorthand for the components of Y_k , this becomes

$$y_k(t) = \lambda_k y_k(t) + w_k(t). \quad (41)$$

Define the mean $E[f]$ of a time-dependent function $f(t)$ over the time interval $0 \rightarrow \Delta T$ as

$$E[f] = \frac{1}{\Delta T} \int_0^{\Delta T} f(t) dt. \quad (42)$$

We assume an appropriately ‘rational’ structure as $\Delta T \rightarrow \infty$, probably some kind of ‘ergodic’ hypothesis.

Note that this form of expectation does not include the effects of differing timescales or lag times. Under such circumstances, increasing ΔT will begin to ‘pick up’ new effects, in a path-dependent manner: The mathematics of equation (42) suddenly becomes extremely complicated.

The variance $V[f]$ over the same interval is defined as $E[f - E[f]]^2$.

Again taking matters term-by-term, we take the variance of the $y_k(t)$ from the development above to obtain

$$V[(1 - \lambda_k)y_k(t)] = V[w_k(t)]$$

so that

$$V[y_k] = \frac{V[w_k]}{(1 - \lambda_k)^2}$$

or

$$\sigma(y_k) = \frac{\sigma(w_k)}{|1 - \lambda_k|}.$$

(43)

The y_k are the components of the eigentransformed pathology, income, crowding, community size etc. variates x_i and the w_k are the similarly transformed variates of the driving externalities u_i .

The eigenvector components y_i are characteristic but non-orthogonal combinations of the original variates x_i whose standard deviation is that of the (transformed) externalities w_i , but *synergistically amplified* by the term $1/|1 - \lambda_i|$, a function of the eigenvalues of the matrix of regression coefficients \mathbf{B} . If $\lambda_i \rightarrow 1$ then any change in driving factors external to the community, like public policy or economic practice, will cause great instability within the affected community.

A simple example suffices. Suppose we have the two empirical regression equations

$$x_1 = b_1x_2 + b_{01}$$

and

$$x_2 = b_2 x_1 + b_{02}$$

where x_1 is, for example, an index of violent crime and x_2 is an index of the ‘strength of weak ties.’ These equations say that weak ties affect violence and violence affects weak ties. Then, after normalizing x_1 and x_2 to zero mean and unit variance, the **B**-matrix becomes

$$\mathbf{B} = \begin{pmatrix} 0 & R \\ R & 0 \end{pmatrix}$$

where $R = b_1 = b_2$ is simply the correlation between x_1 and x_2 .

This matrix has eigenvalues $\pm|R|$ and eigenvectors $[\pm 1/\sqrt{2}, 1/\sqrt{2}]$. As the variates become more closely correlated, $R \rightarrow 1$ and the ratio of the standard deviation of the eigenvector with positive components and that of the external perturbations, $1/[1 - R]$, diverges.

There is a kind of physical picture for this model. Imagine a violin strung with limp, wet cotton twine. Then $R \approx 0$ and no amount of bowing – an external perturbation – will excite any sound from the instrument. Now restring that violin with finely tuned catgut (to be somewhat old fashioned). Then $R \approx 1$ and external perturbation – bowing – will now excite loud and brisant eigenresonances.

Ives (1995) defines an ecosystem for which $\lambda \approx 0$, so that $1/|1 - \lambda| \approx 1$, as *resilient* in the sense that applied perturbations will have no more effect than their own standard deviation.

As a brief digression, in consonance with our previous arguments on phase transition, we might suppose that there are domains of quasi-stability marked by different possible relations of the form

$$X(t) = \mathbf{B}_k X(t) + U_k(t)$$

(44)

and that a sufficiently perturbed system will suddenly change between them. Suppose there to be a threshold value for an eigenresonance Y , which

we call Y_C , such that if it is exceeded, then the system ‘falls off the table’ into a more pathological one. If Y has a normal distribution, then the probability that the system exceeds the critical limit Y_C , which we write Q_C , will be given by

$$\begin{aligned}
 Q_C &= \frac{1}{\sqrt{2\pi}\sigma(Y)} \int_{Y_C}^{\infty} \exp[-Y/2\sigma^2(Y)] dY \\
 &= \frac{1}{2} [1 - \text{ERF}(\frac{Y_C}{\sqrt{2}\sigma(Y)})]
 \end{aligned}
 \tag{45}$$

where ERF is the error function.

For large Y_C and $\lambda \rightarrow 1$ this becomes

$$Q_C \approx \frac{1}{Y_C|1-\lambda|} \sqrt{V[w]/2\pi} \propto \frac{1}{Y_C|1-\lambda|} \sigma(w).
 \tag{46}$$

A full nonlinear address of these matters is clearly necessary, but will be difficult. Such treatments are becoming routine in population and community ecology (e.g. Higgins et al., 1997), but are still rare in epidemiological or physiological studies. The essential point is that a nonlinear deterministic ‘backbone’ serves to amplify external perturbations (Higgins et al., 1997):

“...[R]elatively small environmental perturbations can markedly alter the dynamics of deterministic biological mechanisms, producing very large fluctuations...”

This, then, is our version of Holling's (1973, 1992) mechanism for the loss of ecological resilience by which the small can affect the large.

In the next section we begin to examine one form of this mechanism which generalizes our linearized treatment.

‘Nonlinearizing’ the model by connecting domains of quasi-stability

Equation (44) suggests, in consonance with ecosystem theory (e.g. Holling, 1973, 1992), that different ‘domains of quasi-stability’ obeying equation (43) may emerge in a punctuated manner as a function of the magnitude of external perturbation. Indeed, D Wallace and R Wallace (2000) invoked precisely this mechanism to explain observation of different amplification factors associated with a similar excited eigenvector for a comparative study of large scale pathology in Upper Manhattan and the Bronx. These are two communities with greatly differing histories of perturbation in the 1970's. While Upper Manhattan was greatly damaged by politically-induced outbreaks of contagious urban decay, the ‘South Bronx’ was literally devastated, losing between 50 and 80 % of its occupied housing in the same period, and became an urban proverb (e.g. D Wallace and R Wallace, 1998). The amplification factors for a mix of pathologies ranging from homicide to low birth weight at the scale of about 30 Health Areas in each Borough differed by a factor of five, with the Bronx showing the lower value, while the respective excited eigenvectors were virtually identical, a highly counterintuitive result. We attributed this pattern to the evolution of a qualitatively different social network structure in the Bronx, driven by the selection pressure of massive burnout and population displacement.

We are led to generalize equation (43) as

$$\sigma(y) = \frac{\sigma(w)}{|1 - \lambda(|w|_M)|} \quad (47)$$

where $|w|_M$ is the maximum absolute value of the ‘magnitude’ of perturbation in an appropriate sense over the time average integral of equation(42).

That is, domains of quasi-stability represented by equation (44) are, in this model, seen as smoothly connected, depending on both the ecosystem scale and the scale of perturbation.

At the individual level of scale we might expect the multiple correlation coefficient $\lambda(|w|_M)$ to take the usual S-shaped dose-response form, for example

$$\lambda(|w|_M) = \frac{1}{1 + \exp(-a|w|_M + b)}, \quad (48)$$

where a and b are appropriate scaling constants. When plugged into equation (47) this produces a sharply rising J-shaped curve near b/a for the amplification factor.

At the group level of scale, the individual survivors of the process leading to equation (48) might respond collectively to the massive perturbation with a signal transduction pattern: beyond a certain point of collective stress, a signal ceases to be collectively ‘meaningful,’ and the social group undergoes a kind of phase-transition-like withdrawal, so that $\lambda(|w|_M)$ takes on a broad ‘inverted-U-shaped’ peak. This kind of effect is often modeled in the signal transduction literature as a stochastic resonance, having the functional form

$$\lambda(|w|_M) = a \frac{1/x^2}{1 + b \exp[1/(2|w|_M)]} \quad (49)$$

where a and b again are appropriate scaling constants. Plugging equation (49) into equation (47) results in an acutely sharpened peak, with a considerable reduction in the full width at half height (FWHH). Signal-sharpening of

this nature is, for neural networks, often seen as a critical step in processes of perception. We are led to suggest that roughly analogous mechanisms may characterize the organizational and social levels of scale.

The behavior of equation (49), if seen at the individual level, might characterize what Lifton has called ‘psychic numbing’, in which a profoundly battered individual permanently loses the ability to respond emotionally, a condition which Lifton views as ‘not compatible with a definition of survival’ (Lifton and Markusen, 1990).

‘Higher order’ pattern recognition

The next step in the argument is to examine the way in which ‘structured’ social factors can affect individual or collective response to perturbation. This will require some development.

Suppose the pattern recognition language previously considered is, in some sense, iterated, so that its output sequence of the decision oscillator $h(x) \in B_0, B_1$ serves as the input to a higher order decision oscillator, h^b having, for example, a simple binary output: $h^b = Th1$ or $h^b = Th2$. Thus the sequence of $x^b \equiv b_0, b_1, \dots, b_k, \dots$ becomes the object of interest, leading to the binary output. In all likelihood, however, the output of h will be condensed by integration or renormalization, as discussed before. Thus the x^b will first be mapped or coded onto a simplified alphabet. In any event, the *original* paths in $x = a_0, a_1, \dots, a_k, \dots$ can be placed in equivalence classes, according to those which, ultimately, after iteration, lead to outputs which might be labeled ‘Th1’ or to ‘Th2’.

The process can, of course, be iterated to a higher level, so that, if the switch is indeed thrown, the Th2 paths will become input for another decision oscillator.

Obviously, at this point mathematical possibilities begin to grow exponentially, including the necessity of examining ‘meaningful’ binary sequences of internal and external signals, and it seems likely that recourse to empirical study will be required to prune the thicket.

Generalized cognitive condensations

We suppose a cognitive system – more generally a linked, hierarchically structured, and broadly coevolutionary condensation of several such systems – is exposed to a structured pattern of sensory activity – the training pattern – to which it must learn an appropriate matching response. From that

response we can infer, in a direct manner, something of the form of the excitatory sensory activity. We suppose the training pattern to have sufficient grammar and syntax so as to itself constitute a ergodic information source Y . The output of the cognitive system, B , is deterministically backtranslated into the ‘language’ of Y , and we call that translation \hat{Y} . The rate distortion behavior relating Y and \hat{Y} , is, according to the RDT, determined by the mutual information $I(Y, \hat{Y})$. We take the index of coupling between the sensory input and the cognitive system to be the number of training cycles – an exposure measure – having an inverse K , and write

$$I(Y, \hat{Y}) = I[K]$$

(50)

$I[K]$ defines the splitting criterion between high and low probability pairs of training and response paths for a specified average distortion D , and is analogous to the parametrized information source uncertainty upon which we imposed renormalization symmetry to obtain phase transition.

We thus interpret the sudden changes in the measured average distortion $D \equiv \sum p(y) d(y, \hat{y})$ which determines ‘mean square error’ between training pattern and output pattern, e.g. the *ending* of a learning plateau, as representing onset of a phase transition in $I[K]$ at some critical K_C , consonant with our earlier developments.

Note that $I[K]$ constitutes an interaction between the cognitive system and the impinging sensory activity, so that its properties may be quite different from those of the cognitive condensation itself.

From this viewpoint learning plateaus are an inherently ‘natural’ phase transition behavior of pattern recognition systems. While one may perhaps, in the sense of Park et al. (2000), find more efficient gradient learning algorithms, our development suggests learning plateaus will be both ubiquitous and highly characteristic of a cognitive system. Indeed, it seems likely that proper analysis of learning plateaus will give deep insight into the structures underlying that system.

This is not a new thought: Mathematical learning models of varying complexity have been under constant development since the late 1940’s (e.

g. Luce, 1997), and learning plateau behavior has always been a focus of such studies.

The particular contribution of our perspective to this debate is that the distinct coevolutionary condensation of immune, CNS, and local sociocultural network cognition which distinguishes human biology must respond as a composite in a coherent, unitary and coupled manner to sensory input. Thus the ‘learning curves’ of the immune system, the CNS and the embedding sociocultural network are inevitably coupled and must reflect each other. Such reflection or interaction will, of necessity, be complicated.

Our analysis, however, has a particular implication. Learned cultural behavior – sociocultural cognition – is, from our viewpoint, a nested hierarchy of phase transition learning plateaus which carries within it the history of an individual’s embedding socioculture. Through the cognitive condensation which distinguishes human biology, that punctuated history becomes part of individual cognitive and immune function. Simply removing ‘constraints’ which have deformed individual and collective past is unlikely to have the desired impact: one never, really, forgets how to ride a bicycle, and a social group, in the absence of affirmative redress, will not ‘forget’ the punctuated adaptations ‘learned’ from experiences of slavery or holocaust. Indeed, at the individual level, sufficiently traumatic events may become encoded within the CNS and immune systems to express themselves as Post Traumatic Stress Disorder.

Noncognitive condensation in response to selection pressure

As discussed above, sociocultural networks serve multiple functions and are not only decision making cognitive structures, but are cultural repositories which embody the history of a community. Sociocultural networks, like human biology in the large, and the immune system in the small, have a duality in that they make decisions based on recognizing patterns of opportunity and threat by comparison with an internalized picture of the world, and they respond to selection pressure in the sense that cultural patterns which cannot adapt to external selection pressures simply do not survive. This is not learning in the traditional sense of neural networks. Thus the immune system has both ‘innate’ genetically programmed and ‘learned’ components, and human biology in the large is a convolution of genetic and cultural systems of information transmission.

We suggest that sociocultural networks – the instrumentalities of culture – likewise contain both cognitive and selective systems of information transmission which are closely intertwined to create a composite whole.

We now examine processes of ‘punctuated evolution’ inherent to evolutionary systems of information transmission.

We suppose a self-reproducing cultural system – more specifically a linked, and in the large sense coevolutionary, condensation of several such systems – is exposed to a structured pattern of selective environmental pressures to which it must adapt if it is to survive. From that adaptive selection – changes in genotype and phenotype analogs – we can infer, in a direct manner, something, but not everything, of the form of the structured system of selection pressures. That is, the culture contains markers of past ‘selection events’.

We suppose the system of selection pressures to have sufficient internal structure – grammar and syntax – so as to itself constitute an ergodic information source Y whose probabilities are fixed on the timescale of analysis. The output of that system, B , is backtranslated into the ‘language’ of Y , and we call that translation \hat{Y} . The rate distortion behavior relating Y and \hat{Y} , is, according to the RDT, determined by the mutual information $I(Y, \hat{Y})$.

We take there to be a measure of the ‘strength’ of the selection pressure, P , which we use as an index of coupling with the culture of interest, having an inverse $K = 1/P$, and write

$$I(Y, \hat{Y}) = I[K].$$

(51)

P might be measured by the rate of attack by predatory colonizers, or the response to extreme environmental perturbation, and so on.

$I[K]$ thus defines the splitting criterion between high and low probability pairs of input and output paths for a specified average distortion D , and is analogous to the parametrized information source uncertainty upon which we imposed renormalization symmetry to obtain phase transition. The result is robust in the absence of a distortion measure through the joint asymptotic equipartition theorem, as discussed above.

We thus interpret the sudden changes in the measured average distortion $D \equiv \sum p(y)d(y, \hat{y})$ which determines ‘mean error’ between pressure and response, i.e. the *ending* of a ‘learning plateau’, as representing onset of a phase transition in $I[K]$ at some critical K_C , consonant with our earlier developments. In the absence of a distortion measure, we may still expect phase transition in $I[K]$, according to the joint AEPT.

Note that $I[K]$ constitutes an interaction between the self-reproducing system of interest and the impinging ecosystem’s selection pressure, so that its properties may be quite different from those of the individual or conjoined subcomponents (R Wallace and RG Wallace, 1998, 1999).

From this viewpoint highly punctuated ‘non-cognitive condensations’ are an inherently ‘natural’ phase transition behavior of evolutionary systems, even in the absence of a distortion measure. Again, while there may exist, in the sense of Park et al. (2000), more efficient convergence algorithms, our development suggests plateaus will be both ubiquitous and highly characteristic of evolutionary process and path. Indeed, it seems likely that proper analysis of non-cognitive evolutionary ‘learning’ plateaus – to the extent they can be observed or reconstructed – will give deep insight into the mechanisms underlying that system.

Convolution between selection pressure and sociocultural cognition

Selection pressure acting on sociocultural networks can be expected to affect their cognitive function, their ability to recognize and respond to relatively immediate patterns of threat and opportunity. In fact, those patterns themselves may in no small part represent factors of that selection pressure, conditionally dependent on it. We assume, then, the linkage of *three* information sources, two of which are conditionally dependent on and may indeed be dominated by, a highly structured embedding system of externally imposed selection pressure which we call Y_3 . Y_2 we will characterize as the pattern recognition-and-response language of the sociocultural network itself.

In IR Cohen’s sense, this involves comparison of sensory information with an internalized picture of the world, and choice of a response from a repertory of possibilities. Y_1 we take to be a more rapidly changing, but nonetheless structured, pattern of immediate threat-and-opportunity which demands appropriate response and resource allocation – the ‘training pattern’. We reiterate that Y_1 is likely to be conditionally dependent on the embedding selection pressure, Y_3 , as is the hierarchically layered history expressed by Y_2 .

According to the triplet version of the SMT which we discussed above, then, for large n , triplets of paths in Y_1, Y_2 and Y_3 may be divided into two sets, a smaller ‘meaningful’ one of high probability – representing those paths consistent with the ‘grammar’ and ‘syntax’ of the interaction between the selection pressure, the cognitive sociocultural process, and the pattern of immediate ‘sensory challenge’ it faces – and a very large set of vanishingly small probability. The splitting criterion is the conditional mutual information:

$$I(Y_1, Y_2|Y_3).$$

We parametrize this splitting criterion by a variate K representing the inverse of the strength of the coupling between the system of selection pressure and the linked complex of the sociocultural cognitive process and the structured system of day-to-day problems it must address. $I[K]$ will, according to the ‘phase transition’ developments above, be highly punctuated by ‘mixed’ plateau behavior representing the synergistic and inextricably intertwined action of both externally imposed ‘selection pressure’, in the most general sense, and internal sociocultural cognition.

DAILY NEWS

EXHIBIT Q

Daily News (New York)

November 1, 2001, Thursday SPORTS FINAL EDITION

SECTION: NEWS; Pg. 10**HEADLINE:** FIRE MAY SMOLDER FOR MONTHS**BYLINE:** By GREG GITTRICH DAILY NEWS STAFF WRITER**BODY:**

Girders of red-hot steel driven as many as six stories below ground by the collapse of the World Trade Center are fueling an underground blaze that threatens to smolder and cough up smoke for months.

The unprecedented structural fire does not have enough oxygen to rapidly devour its enormous fuel supply - desks, carpets, computers, paper, cars and other combustible material contained in and under the 110-story twin towers, experts say.

"So what you've got is a smoldering situation," said George Miller, president of the National Association of State Fire Marshals. "Judging from my 32 years of experience, this could burn for a long time."

Exactly how long "a long time" is, no one knows for sure. But fire engineers and safety experts told the Daily News that the blaze likely will continue burning for months - until most of the 1.2 million tons of debris are hauled away.

A fire needs three things to survive: fuel, oxygen and a heat source.

"If you can break that formula in any way, it will go out," said Marko Bourne, a spokesman for the fire administration of the Federal Emergency Management Agency. "The problem is how to do that with this fire."

While the blaze is starved for oxygen, the scalding steel buried below ground will retain its heat until enough air reaches it or water douses it, said Don Carson, a hazardous materials expert for the National Operating Engineers Union.

The jets that exploded into the towers showered them with gallons of jet fuel and raised the temperature of the structural beams to about 2,000 degrees.

"There are pieces of steel being pulled out that are still cherry red," Carson said as he stood amid the smoking debris this week. "It's like the charcoal that you put in your grill. . . . You light it and it stays hot."

Firefighters continue to soak the ravaged 17-acre area with water, but the heavy streams seep only so far into the layered debris.

As chunks of steel and concrete are raised by excavation machines, the city's Bravest wet the exposed areas and extinguish flames that erupt from crevices when oxygen rushes in.

"We will put it out," said a Bronx firefighter. "It's just a matter of time."

The Fire Department has yet to declare the blaze under control. No blaze like it Bourne said the blaze is so "far beyond a normal fire" that it is nearly impossible to draw conclusions about it based on other fires. While it is not unusual for underground fires to smolder for long periods of time, these usually occur in landfills or coal mines.

Several mines in Pennsylvania and Canada have been burning for decades. The classic example cited by experts is a strip mine in Centralia, Pa., that ignited in 1962 and continues to burn.

DAILY NEWS

Forest fires also can rage for months. But Don Smurthwaite of the National Interagency Fire Center said not to come to him for answers to the Ground Zero blaze.

"We can always count on that season-ending event - rain or snow - to take care of the fire," Smurthwaite said. "The fires in the World Trade Center are entirely different. All the fuel they need is right there." GRAPHIC: FIRE BELOW GROUND ZERO Hot metal debris as much as six stories below ground fuels a smoldering fire that may last for months. As cranes remove twisted rubble, oxygen pours in and reignites the red hot mass.

Fenton, Anne

From: david prezant [prezd@dnamail.com]
Sent: Tuesday, June 10, 2003 2:08 PM
To: Fenton, Anne
Subject: Re: revision letter

> The Uniformed Firefighters Association, Uniformed Fire Officers Association the EMT> ' > s and Paramedics Union of NYC and the New York City Fire Department are deeply concerned over the long-term physical and mental health issues firefighters and EMS are facing due to their exposure during the rescue and recovery efforts at Ground Zero. By September 2003 the FDNY will have retired 1400 firefighters due to World Trade Center related illnesses. These unions and the Fire Department believe that this unprecedented retirement rate will continue as more firefighters are examined and diagnosed with 9/11 related illnesses. Of note, Mt. Sinai WTC screenings indicated that of the participating emergency responders, 78% reported at least on WTC related pulmonary symptom that developed or worsened as a result of their work at Ground Zero. And approximately 1 in 5 of this sample reported symptoms consistent with Post Traumatic Stress Syndrome. The workers screened by MT Sinai were not as exposed as NYC Firefighters. The NYC Firefighter WTC Medical Monitoring/Treatment Program run by the FDNY Bureau of Health Services with the joint sponsorship of the UFA, UFOA and EMS/Paramedic Unions has found the following (a) In the first month 4 firefighters required life support (mechanical ventilation) of chest surgery for severe respiratory distress following WTC exposure during the collapse and 95% of NYC Firefighters complained of new-onset respiratory symptoms (mostly cough) during that first week. Details were published in the CDC MMWR Journal in Sept 2002; (b) over the first 6 months following the collapse 343 FDNY firefighters required more than 1 month of medical leave for new-onset respiratory illnesses such as asthma. Details of this were published in the New England Journal of Medicine in Sept 2002; (c) nearly 2 yrs later over 400 FDNY firefighters are in the process of receiving permanent disability for new onset post-WTC asthma and respiratory injury, (d) in random voluntary testing of the highest exposed group of NYC Firefighters present during the first day of the collapse 25% have new onset, post-WTC airway hyperreactivity/asthma on objective medical testing (methacholine challenge testing). This has persisted on serial testing over the next year. Details are being published in the American Journal of Respiratory and Critical Care Medicine in July 2003. Many in this group also has findings on Lung CAT scans of airway injury/inflammation (e) in those NYC Firefighters who were not present during the collapse but there doing intense rescue/recovery efforts over the next 48 hours nearly 7% have new-onset, post-WTC, persistent airway hyperreactivity and (f) The Bureau of

Health Services Counseling Services Unit with support from Project Liberty and additional funding from the IAFF/UFA/UFOA has provided stress counseling to over 5,000 members of our workforce. Most remaining at work providing valuable service to our city despite their problems.

WE strongly believes that the 25 million dollars that was appropriated specifically for firefighter/EMS long-term health monitoring needs to be distributed to the FDNY Bureau of Health Services as soon as possible. This program is already in operation and is carefully monitored by an expert adversary board that includes many notable experts in this and related fields. This program is in danger of ending without the funding that has already been appropriated but not yet provided. Furthermore, our initial findings clearly indicate that additional services are needed. Partnerships have been formed to provide these services but we cannot begin this time sensitive work with the funding already appropriated. There is no need for federal indirect costs and siphoning of this money to political programs. Rather, we strongly urge that every dollar go for its original intention, the medical care of our rescue workers. 25 million should immediately be transferred to this program.

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> The two year anniversary of the 9/11 is quickly approaching - 2 years have gone by and almost 4 months have passed since this money was appropriated. Firefighters and EMS personnel have not received any benefits from this money because it has not been distributed. These dedicated firefighters and EMS workers rightfully deserve long term health monitoring funding immediately.

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The Public Health Fallout from September 11:

Official Deception and Long-Term Damage

By Joel R Kupferman¹

The environmental and public health nightmare that began in New York City on September 11, 2001 was unprecedented in nature, and its scope is still being discovered – mainly without the help of the Bush Administration’s environmental agencies. The persistent “WTC cough”, hundreds of new cases of asthma, the broad wind-borne dissemination of toxic elements, a by-now unmanageable spread of toxic dust initially carried out of the World Trade Center and debris-collection sites by rescue workers and since spread by former rescue vehicles like city buses and fire trucks – these are some of the reasons why, at this writing, more than 500 firefighters have sustained permanent disabilities that have forced them to retire,² why 25 percent of nurses examined at a downtown hospital in March 2002 had serious respiratory disorders,³ and why these cases are the tip of a very large iceberg.

The way the Environmental Protection Agency responded in the crisis was, sadly, an opportunity to glimpse the Bush Administration’s larger attitude toward environmental policy and toward public access to key environmental information. The EPA, which misled the public about the health impact of asbestos found in the ambient air and also failed to investigate or respond thoroughly on a range of crucial issues, led other federal, state and local authorities to rest easily with their own misdirected policies, affecting the long-term health of no one knows how many New Yorkers. In the context of the Bush Administration’s broader hostility to civil liberties, and its particular, determined retreat from environmental protections and engagement, the environmental/public health story of the World Trade Center collapse is a chilling reminder of the

¹ Joel Kupferman is executive director and senior attorney for the Environmental Law and Justice Project, in New York.

² “Firefighters Newsletter,” Barasch, McGarry, Salzman, Penson and Lim, December 2002.

³ Conversation with Dr. David Parkinson of the Long Island Occupational and Environmental Health Clinic in Port Jefferson, New York, March 2002. Dr. Parkinson had examined the nurses where they work at NYU-Beekman Hospital in downtown Manhattan.

damage that unaccountable government can do – damage that in this case will linger for generations.

To protect an environment, including its inhabitants, requires that people have a say about the issues that affect their lives, and that the press and citizen groups hold the government to account for its stewardship of air, soil, and water. This public participation should not be hindered by political differences or undue pressure for a particular form of patriotism. At the cornerstone of urban environmentalism are the principles of self-determination and equal protection, a free-flowing exchange of information and ideas at all levels of governance. This is not merely the wish-list of the neighborhood activist. The Freedom of Information Act (FOIA) was enacted for just this purpose. The comparable New York State regulation provides a compelling preamble:

The people's right to know the process of government decision and the documents and statistics leading to determinations is basic to our society. Access to such information should not be thwarted by shrouding it with the cloak of secrecy or confidentiality. . . . Any conflicts among laws governing public access to records shall be construed in favor of the widest possible availability of public records.

These principles are all the more essential in a public emergency.

Another underlying precept of environmentalism is the inter-relatedness of seemingly disparate ecosystems. As researchers document PCBs migrating from urban hazardous waste sites to Arctic sea ice algae and making their way into the breast milk of Inuit women, so we must apply this concept to our cities. Toxins leaching into the ground water at the Ground Zero excavation must be assumed to have a relationship with the Hudson River, just two blocks away. As the US Geologic Survey researches winds transporting Saharan red sand to the Caribbean islands and eventually Texas, so may we assume that the steady, black plume rising for weeks from the former World Trade Center had an impact on the millions of people living in its path -- certainly in Brooklyn, Manhattan, Queens, Staten Island and Long Island, and probably beyond.

Policymakers at the EPA, and the manufacturers of literally thousands of common office and building fixtures in lower Manhattan, could not have predicted the wholesale and cataclysmic demolition of some fifteen million square feet of office space. But it would be overly simplistic to

attribute the actions of public health and environmental officials to confusion under pressure, at least after the first few days. It has become evident that federal, state and city agency actions and decisions were closely tied to economic and political motivations that placed other goals ahead of public health, and that these decisions led agencies to withhold critical health information from even the communities most at risk. The principles of environmental justice – the right to clean air, water and other resources – were sacrificed early and then over and over, to the interests of political recovery and the bottom line.

The risks of wholesale liability loomed large. Much of the World Trade Center complex was demolished into a fine powder that spread as far as wind and water might take it; the reach of possible public health consequences, with their requirements for government response and compensation, was initially incalculable. Firefighters and police officers, iron workers and operating engineers, medical personnel and many others, were originally thought to be limited by law to consideration under Workers' Compensation and similar programs – that is, they could collect based on the limited liability of their employers in exchange for “no-fault” determinations. But those surrounding the disaster – survivors and residents – had no such limitations. In the larger affected area, beyond Ground Zero, as dictated by the principle of inter-relatedness, millions of potential victims were placed at risk and could conceivably make demands for public aid or compensation.

Through its air-quality testing choices and its management of information to the public, the EPA sought to limit the government's responsibility, and liability, even at the cost of exposing people to health risks they had a right to know about and the option to avoid. This was made possible, in part, by the laziness of the local press, which should have investigated inconsistencies and demanded transparency. But the principal fault lies with those charged with carrying out environmental law and protecting the public.

Fire and Ash

_____As the twin towers collapsed, thousands of fleeing workers and area residents were coated

with a thick, white dust that quickly began to irritate their skin and lungs. Grey clouds of highly corrosive material containing concrete particles, asbestos, finely crushed windows and fiberglass and heavy metals choked the streets. Gasping survivors gulped down the toxin-laden dust as the entire area - buildings, streets, and ground, interiors and exteriors – was blanketed with fallout. Once the rescue effort could be organized, an arbitrary dividing line, first at 14th Street in Manhattan, was then moved quickly southward to Canal Street and finally to Chambers Street, only five blocks from the northern perimeter of Ground Zero. The luxury developments of Battery Park City were evacuated, and residents fled much of the area below Canal Street as large parts of lower Manhattan were without power, water and telephone service.

Immediately landlords lost rental income; the retail, entertainment and tourism economies of the city shut down; the real estate market took a nosedive. Schools, the financial markets, government agencies, and all but the most necessary places of business closed. Roads, subways, bridges and tunnels connected to this area would remain closed, or with limited access, for months. Layoffs began, and what had been worrisome signs of recession before September 11 intensified. At the same time, the nation began an outpouring of affection for the city that had perhaps not been seen since the Giants won the pennant in '51. Whatever our grief was locally -- and it was great -- we in New York sensed that we were not alone.

It became somebody's job to make sure the secondary economic and political tragedy did not eclipse the WTC fire and collapse itself. A "clean" environmental bill of health for what was left of lower Manhattan was the way to get the city and the country back to work. The push was on to shift the public's understandable shock to an uneasy restoration of order, including the difficult task of trying to keep decimated financial markets from fleeing what was now deemed a major target of our enemies, and attracting back tourists. While the world mourned, the clock began ticking to re-open the New York Stock Exchange, a block away from the disaster site.

At the site itself, an inferno burned on, despite continuous streams of water from several directions and the government's continuous reassurances that the fire would soon die out. With the exception of a single day, when the wind turned north, the huge plume of black smoke emerging

from Ground Zero drifted southeast, day after day, over much of lower Manhattan, Brooklyn and southern Queens.

As the EPA and its colleague state and city agencies like to insist, precisely what was in that plume will never be known; capturing the smoke for testing presented obvious hazards. But common materials of modern offices – synthetic fabrics, plastics, laminates and building supplies containing formaldehyde; fluorescent lamps containing mercury; the di-electric fluids that encase electrical cables; approximately four pounds of lead from each computer; PCBs from capacitors, electrical cable insulation, and transformers – were clearly elements in highly toxic fires and dust storms. The plume contained, at the very least, toxic lead, asbestos, volatile organic compounds, dioxins, mercury, nickel, vanadium, sulphur, PAHs, PCBs, and furans.

And there was more. The World Trade Center had housed many facilities specific to the tenant government agencies, including a Secret Service shooting range that kept millions of rounds of lead ammunition on hand. An array of hazardous chemicals was stored in a U.S. Customs lab, including thousands of pounds of arsenic, lead, mercury, and chromium, among other toxic substances.⁴ The City of New York maintained an emergency generator at its command center located at 7 WTC, with a large, above-ground fuel storage tank that had been exempted from violation of local building codes. And more still: some 130,000 gallons of PCB-contaminated transformer oil at an electrical substation at 7 WTC likely contributed to its collapse and to the toxic residue later found in the area.

On September 13, against a backdrop of mounting patriotism, EPA chief Christine Todd Whitman helicoptered into the city to deliver to television cameras the most uplifting news New Yorkers could hope for in those terrible days. As governor of New Jersey, Whitman had amassed a track record of effectively subordinating environmental concerns to those of industry, but in this extraordinary situation, her message was reassuring. Whitman reported that the EPA was “greatly relieved to have learned that there appear to be no significant levels of asbestos dust in the air in

⁴ Toxic Targeting, Inc., “Toxic Targeting Computerized Report – WTC Complex New York New York 10048, September 11, 2001,” September 18, 2001. Produced for the New York City Department of Design Construction.

New York City.”⁵ The news came as welcome contrast to the grim reports of the thousands of body bags that Mayor Giuliani had ordered in. “We are working closely with rescue crews to ensure that all appropriate precautions are taken,” said Whitman. “We will continue to monitor closely.”⁶

That monitoring appeared to produce even better news, as Whitman reported on September 21, after the financial markets had reopened. She was relieved, she said, to be able to say “that a host of potential contaminants are either not detectable or are below the Agency’s concern levels...Results we have just received on drinking water quality show that not only is asbestos not detectable, but also we cannot detect any bacterial contamination, PCBs or pesticides.”⁷ This appeared to be enough for most news outlets in the city and nationally. With a few notable exceptions, warning of possible respiratory exacerbation for individuals with already compromised systems, the news media latched onto the good news with servile uniformity.

In the meantime, hundreds upon hundreds of rescue workers – firefighters, police, iron workers, operating engineers, and others -- entered and left what became known as Ground Zero, aiding in the rescue effort. They were surrounded by concentric rings of aid workers who provided food, clothing and support, many of them volunteers from all over the country. As the fire raged on for weeks, a self-contained city sprang up below Canal Street: makeshift command centers and relief stations were set up in Stuyvesant High School and other local schools, in fire-houses and local hotels and any other public spaces that could be commandeered. A dismal order gradually replaced the initial, impassioned chaos.

The Ground Zero workers were surrounded by a foul, corrosive and irritating odor that permeated lower Manhattan, provoking the widely reported “WTC cough.” The hacking cough, which plagued many New Yorkers well beyond the immediate area for months, was just one sign

⁵ EPA press release, “EPA Initiates Emergency Response Activities, Reassures Public About Environmental Hazards,” September 13, 2001, http://www.epa.gov/wtc/stories/headline_091301.htm

⁶ Ibid.

⁷ EPA press release, “NYC Monitoring Efforts Continue to Show Safe Drinking Water and Air,” September 21, 2001, http://www.epa.gov/wtc/stories/headline2_092101.htm

that residents' long-term health was being compromised. According to Dr. Stephen M. Levin, medical director of a major center on environmental and occupational medicine, "Some of the asthma contracted by New Yorkers will persist for the rest of their lives."⁸

After the search for survivors waned and workers at the site shifted into a recovery mode, the priority established by the EPA, the Occupational Safety and Health Administration (OSHA), and the Federal Emergency and Management Agency (FEMA) in deference to commercial downtown interests became the cleanup of the streets' exterior areas. John L. Henshaw, assistant secretary of labor for OSHA -- in an understated comment that would characterize the agencies' disinformation all down the line -- advised, "Keeping the streets clean and being careful not to track dust into buildings will help protect workers from remaining debris."⁹

But in the meantime, the most rudimentary elements of proper handling of a toxic disaster were being ignored. In one instance, which would have been laughable in other circumstances, the EPA publicized sending in vacuum trucks, but the trucks were sent without the HEPA filters necessary to suck up the dust.¹⁰ Further, the EPA did not carry out serious testing of the dust, as described below, and did only minimal and spotty testing of ambient air much beyond Ground Zero, despite the evident dispersal of dust in the wind; there was, in other words, only the most limited attempt to determine the nature and scope of the health risk to the city's population before cleanup advisories were issued. And EPA, OSHA, and the city's Department of Health did not provide much in the way of personal protective gear and respirators to the workers at Ground Zero and debris-removal areas; a study by the National Institute of Environmental Health Sciences determined that, to the extent that workers got protection, it was mainly due to the activism of the

⁸ Stephen Levin, medical director, Mount Sinai- Selikoff Center for Occupational and Environmental Medicine, quoted in Christine Haughney, "Health Effects at World Trade Center Debated," *Washington Post*, January 6, 2003, p.1.

⁹EPA press release, "EPA, OSHA Update Asbestos Data, Continue to Reassure Public about Contamination Fears," September 16, 2001, http://www.epa.gov/wtc/stories/headline_091601.htm

¹⁰ Kenneth R. Bazein, "WTC Trucks Had Wrong Dust Filters," *New York Daily News*, August 14, 2002.

operating engineers' union, not the appropriate – and much wealthier – government agencies.¹¹

At this critical juncture -- in a move that has since been criticized soundly by such diverse observers as the City Council¹², accountability advocate Congressman Jerrold Nadler,¹³ and the *Wall Street Journal* -- the EPA determined that it was only responsible for cleaning and decontaminating the outsides of buildings in lower Manhattan, not for the cleanup of building interiors where people worked and lived. The EPA delegated the interiors of buildings to the overwhelmed and beleaguered N.Y.C. Department of Environmental Protection (DEP); the DEP was supposed to help residents ensure the safety of their homes with trained cleaning personnel, proper de-contamination equipment, and the like. The EPA's position in this case contradicted both its own recent experience and the law that governs it. Just days before September 11, in the town of Libby, Montana, the EPA had taken complete responsibility to clean all the homes of that former asbestos mining center – where, as it happened, asbestos levels, while patently unsafe, were lower than those found by independent sampling in lower Manhattan.¹⁴ The EPA had taken total responsibility for the Libby cleanup because, under the Clean Air Act's NESHAP standards, the federal government is required to ensure that people are not exposed to asbestos at dangerous levels, especially in airborne or friable (readily convertible to airborne) forms. The EPA also fast-tracked Libby to a place on the National Priorities List as a Superfund site, because the governor of Montana requested it; as a result, Libby does not have to wait years for EPA to assess its hazards and make comparative cost-benefit judgments. But the World Trade Center collapse did not get this kind of treatment; Governor Pataki did not request it, and the EPA did not

¹¹ NIEHS WETP National Clearing House for Worker Safety and Health Training, press release, "NIEHS WETP Response to the World Trade Center (WTC) Disaster: Initial WETP Grantee and Preliminary Assessment of Training Needs," October 23, 2001.

¹² N.Y.C. Council, "Report from the Committee on Environmental Protection: Air Quality and Environmental Impacts due to the World Trade Center Disaster," December 2001.

¹³ White Paper "Lower Manhattan Air Quality," March 2002.

¹⁴ Remarks of EPA Administrator Christine Todd Whitman at Town Hall meeting, Libby, Montana, September 7, 2001. <http://yosemite.epa.gov/administrator/speeches.nsf>. Also, USEPA Region VII memorandum, from Christopher Weiss, senior toxicologist, to Paul Peronard, on-scene coordinator: "Amphibole Mineral Fibers in Source materials in Residential and Commercial Areas of Libby Pose an Imminent and Substantial Endangerment to Public Health," December 20, 2001.

undertake it voluntarily.

As the *Wall Street Journal* would report eight months later, the DEP, in turn, also passed the buck, allowing landlords to determine if their own buildings were clean without the DEP testing to check.¹⁵ In a memo to New York City landlords dated May 11, 2002—two days after the *Journal* article -- the DEP tried to back-pedal by demanding that landlords provide “copies of the environmental hazards assessments including bulk sample [samples of tests on dust] results and air monitoring results and a summary of clean-up activities” for their buildings.¹⁶ As of January 2003, only ninety landlords had responded to the DEP’s demand,¹⁷ and the DEP had not stepped up pressure on them to comply. The Clean Air Act and New York City asbestos laws require a certain quality of clean-up effort where asbestos is discovered, but with the EPA saying the air was clean, as discussed below, and with the DEP taking no action to test buildings, landlords were allowed to superficially assuage the clean-up issue with improper cleaning methods and in the process, destroyed easily accessible evidence of toxins. New Yorkers were left at the mercy of their landlords to determine whether their homes or workplaces were safe.

The city’s health department (DOH) did as badly or worse. When the department surveyed downtown residents for a January 2002 study, 59 percent of respondents indicated that they had received information about how to clean their apartments of the WTC dust, under protocols issued by the health department itself. The DOH protocols, issued on September 17, 2001, advised residents facing re-entry into their apartments around Ground Zero, “The best way to remove dust is to use a wet rag or wet mop...Where dust is thick, directly wet the dust with water and remove it in layers with wet rag and mops.”¹⁸ Nowhere in the advisory did the health department inform that the “dust” inside these homes might well contain asbestos and myriad other toxic substances; nor did the protocols suggest that professional testing and de-contamination (otherwise known as

¹⁵ Jim Carlton, “Buck-Passing Delayed EPA in 9/11 Cleanup,” *Wall Street Journal*, May 9, 2002.

¹⁶ R. Radhakrishnan, PE, director, Asbestos Control Program, NYC DEP, “Notice to Building Owners Located South of 14th Street, Manhattan”, May 11, 2002.

¹⁷ Conversation with Russell Peunies, attorney, DEP Legal Affairs Bureau, January 24, 2003.

¹⁸ Flyer, DOH, “Recommendations for People Re-Occupying Commercial Buildings and Residents Re-entering their Homes,” undated – at www.ci.nyc.ny.us/html/doh/html/alerts/wtc.3.html

abatement) should be sought, for residents' protection and as required by law if the dust contained more than 1 percent asbestos.¹⁹ It was this advisory that the EPA repeatedly cited in referring concerned residents to local authorities for guidance on cleaning building interiors.

The remains of the WTC complex were removed along various routes to the closed Fresh Kills landfill in Staten Island: truck convoys passed through the Brooklyn Battery Tunnel through Red Hook (with wind blowing dust off the tops of the trucks' contents), and barges moved on the Hudson River. In Fresh Kills, New York City detectives and FBI personnel sifted through the debris. A report produced by an industrial hygienist for the NYC Detectives' Endowment Association, and passed to my organization, found that while respirators were available to these workers from OSHA upon request, the agency had not provided training and fitting as necessary in their use, nor had the detectives received "quality information . . . on what the health and safety hazards might be and what controls are being implemented to reduce these hazards."²⁰ Several of the detectives were felled by the noxious fumes that rose off the landfill.

Firefighters' and detectives' associations, since immediately after the disaster, had been approaching the organization I direct, the New York Environmental Law and Justice Project, to ask for advice and share information. We were receiving a stream of statements from rescue workers and their unions, increasingly worried about exposures. At the same time, office workers and neighborhood residents near Ground Zero were complaining of eyes tearing and skin itching. They spoke of the dust that covered their furnishings and floors, of being denied the right to wear a mask indoors at their city jobs for fear of creating "panic," of clogged air filters in newly-bought home filtering machines, and awakening at night in spasms of coughing. They talked about needing asthma inhalers and nebulizers for the first time and reported that non-union contractors

¹⁹ This is required under the Clean Air Act's National Emissions Standards for Hazardous Air Pollutants (NESHAP) Regulations (40 CFR, Part 61) and under the Asbestos School Hazard Detection and Control Act (ASHERA), OSHA Standards 20 CFR 1926.1101

²⁰ "Preliminary Report on Health and Safety Evaluation of the Fresh Kills Landfill Project Supporting the WTC Disaster Recovery," by Emilcott Associates for the NYC Detectives' Endowment Association, September 27, 2001. OSHA's respiratory protection standard 29CFR1910.134 requires fit- testing of all tight-fitting respirators.

were being hired by landlords to “clean up” in a haphazard fashion. These people were finding it very hard to get precise, practical information from city and federal agencies. Meanwhile residents were tracking whatever dust was on their clothes around to their jobs, schools and other locations. And what incensed rescue and clean-up workers most was that they were not given even basic advice on how to limit their own and their families’ exposure. Thousands of workers -- who displayed bravery beyond measure -- were exposed to a surfeit of toxic substances, while very few were encouraged to wear the scant personal protective gear available, and even fewer were advised of the potential hazards they were unknowingly tracking home to their families on their clothes and effects.

In late November 2001, Dr. Stephen Levin of the prestigious Mount Sinai-I.J. Selikoff Center for Occupational and Environmental Medicine testified before the New York State Assembly’s Standing Committees on Environmental Conservation, Health, and Labor. He noted then that conditions “seen in adults who have been at *or near*” (emphasis added) the WTC site “for as little as twenty-four to thirty-six hours” included “reactive airways disease, new onset or exacerbation of pre-existing asthma, RADS [reactive airway dysfunction syndrome], sinusitis, irritant rhinitis, persistent cough, and diffuse irritation of nasal mucosal surfaces.” Particularly among first-responders “or individuals who were hit by the cloud of dust and debris” following the collapse, Dr. Levin found “a dramatic increase in GERD [gastro-esophageal reflux] symptoms,” which in some people are life-threatening.²¹ As of late January 2003, Dr. Levin had examined some 3,500 rescue workers and volunteers, starting immediately after the WTC collapse, and found that half suffered from either serious respiratory disorders and/or psychological distress.²²

The obvious questions should have been: What was in this dust and smoke, what is causing the present ailments, and what long-term health effects might result? But the EPA, in an abdication of its responsibility, did at most insufficient testing of the area, and very limited – and unpublicized

²¹ Testimony, New York State Assembly Standing Committees on Environmental Conservation, Health and Labor, November 26, 2001.

²² Conversation with Dr. Stephen Levin, January 24, 2003.

-- testing of interiors. The agency began testing the ambient air within a few days of the attack, and continued for several weeks. But it circumscribed the range of its monitoring arbitrarily – with almost no air sampling in Brooklyn, for example, though that borough got the full impact of wind-borne fallout from the burning plume. Paul Bartlett, Queens College environmental scientist and an international expert in the dispersion of toxic substances, found EPA and other agencies' monitoring inadequate to determine the degree and extent of exposure. According to Bartlett, their "detection limits are aimed at threshold levels for occupational exposure. They aren't treating this as a disaster, so they're not asking to what extent and how far are people being exposed or who is possibly being affected by the release of chemicals. They're just checking what emissions are exceeding regulations."²³

What testing EPA did do was initially withheld from the scientists and medical community, labor unions with men on-site, and local leadership. When pressed to back up assertions that all was well, the EPA tended to point, for support, to the New York City Department of Environmental Protection, the local agency with responsibility for hazardous waste cleanup and disposal. But the DEP – ill equipped for a disaster of these dimensions but unwilling to admit it – refused to release its data in timely fashion even to a joint committee of the state legislature. Moreover, when that data was finally obtained and made public by the Environmental Law and Justice Project, in November 2001 through a state Freedom of Information Law request, it revealed that the DEP had conducted testing without using the highest-quality equipment available, such that its results were always less refined and informative than they should have been about the true risks and potential impact.

To be fair, on September 11 no one could comprehend the full severity and repercussions of what had happened. But as the weeks passed, the agencies' evasions became policy. Medical experts were seeing health effects but could not properly diagnose or help patients because they did not have adequate information. Environmental scientists were expecting to learn the

²³ Quoted in Michael Ellison, "Heroes of Ground Zero At Risk Breathing Toxic Cocktail," *Guardian*, October 27, 2001.

components of the fallout in order to make immediate decisions that would affect cleanup, recovery and future systemic planning. And meanwhile, the EPA and OSHA kept saying there was no problem.

The EPA's Testing and Reporting

It was not until three weeks after September 11 that the EPA website began posting a “representative sampling” of air-monitoring results, from various places in lower Manhattan. In those three weeks, the agency was testing the ambient air but not releasing the results, and it was not testing settled dust with the highest-scrutiny techniques available but choosing, instead, cheaper and non-aggressive techniques that, predictably, yielded lower results. Nor was it testing air inside offices or apartments near Ground Zero, where people were told it was safe to return within three days of the disaster.

One thing the EPA did report, in the days just after September 11, was that its own headquarters at 290 Broadway – a few blocks from Ground Zero – had been tested and found safe for asbestos. The tests had reportedly shown the presence of airborne asbestos but at “less than one-tenth of the maximum level allowed in workplaces by the Occupational Safety and Health Administration.”²⁴ Bonnie Bellow, regional spokeswoman for the EPA, would announce on Friday, September 14 that, according to tests the previous day, “There’s nothing at this point that indicates that business can’t resume in the Wall Street area on Monday as well.”²⁵ The agency also noted, however, that parts of its building had later undergone thorough asbestos cleaning. The logical question arose: If all is well, why was 290 Broadway undergoing an asbestos abatement? This question was not posed by the press, though, and EPA did not clarify the contradiction on its own.

²⁴ Dr. Cate Jenkins, “3/6/02 Draft: Asbestos in Settled Dust and Soils,” March 6, 2002. Dr. Jenkins, PhD, is an environmental scientist with the Waste Identification Branch, HWID, Office of Solid Waste, at US EPA.

²⁵ Quoted in Dan Fagin, “Tests Not a Danger Here,” *Newsday*, September 15, 2001.

Neither did EPA reveal a key fact about its headquarters cleanup: it had hired an industrial hygienist to use a particular type of high-sensitivity sampling method, called micro-vacuum, which sucks out even the tiniest particles and subjects them to highest-scrutiny analysis.²⁶ This seems only responsible, and indeed it was. But the EPA, in failing to reveal the facts, was then able to take a position that micro-vac testing was unnecessary for schools and residences in lower Manhattan. Not only did EPA fail to *require* the use of the most thorough tests to seek evidence of asbestos and other toxic substances in the lower Manhattan; it actively discounted results obtained when the micro-vac was used independently in the neighborhood. At 105 Duane Street, residents hired a certified industrial hygienist who used micro-vac on December 3 and found 555,000 asbestos structures per square centimeter in samples from the air-supply vent (at least fifty times the recommended safe level). The EPA criticized the testing method and contended the finding was an aberration. The landlord then failed to do a proper abatement on the building, based on EPA and DEP assurances that the test results could be ignored. Actions like this prompted an EPA scientist, Cate Jenkins, to criticize the agency in a series of memos that circulated in the scientific community and became well known to organized downtown residents.²⁷

The EPA was not the only agency withholding relevant health-affecting information, putting out positive spin, and giving residents instructions and guidance that fell short of what was legally required. A U.S. Department of Health and Human Services “fact” sheet on dust and debris issued September 16 advised: “The most immediate hazards to health and well-being are from unstable buildings, broken glass, jagged metal and other harmful things.” In response to the question, “What is in the dust?” the flyer advised, “We expect that materials that would be present would be at concentrations lower than those normally associated with health hazards,” and made no mention whatsoever of asbestos, lead, concrete, fiberglass, or any of the other known toxic substances contained in WTC building components and contents, defining dust only as “fine

²⁶ This information only came out a month later, with the release of documents requested under FOIA.

²⁷ Dr. Cate Jenkins, memo March 6, 2002 and memo “Libby v. Manhattan Different Asbestos Testing Methods,” February 14, 2002.

particles that originally made up materials of the WTC and the aircraft that struck it.”

Given the official agencies’ determination to be upbeat, and the evidence of people’s endangerment, it became important to take some independent samples, which I did for the Environmental Law and Justice Project on September 19, at Vesey and Liberty Streets on the outer perimeter of Ground Zero.²⁸ ATC Associates, a laboratory that had been used by New York City and its Board of Education, analyzed the samples. Four samples indicated content of between 1 percent and 5 percent chrysotile asbestos -- that is, up to five times the level at which the law requires immediate de-contamination -- and a very high level of fiberglass, which the National Toxicology Program defines as a “likely carcinogen.” (Soon after the Law Project’s results became public, the New York State Department of Health threatened local labs with loss of their licenses if they processed any more “independent sampling,” according to a lab director who received such a warning.²⁹)

On September 24, the Law Project hand-distributed these findings to the local area’s residents and emergency workers, in a fact sheet produced with the help of Monona Rossol, an experienced industrial hygienist. Although the EPA, Mayor Giuliani and the city’s health department called the Law Project’s warnings alarmist, some members of the media began to call. One in particular, Juan Gonzalez of the *Daily News*, began to follow the environmental story closely and to publish what he could.

_____When EPA began posting a “representative sampling” of air-quality monitoring data on its website, on October 3, the postings involved three grades of filtering of information: first, the EPA had tested narrowly as to location and as to matter tested, as noted above; given that the samples posted were selective and so few, and taken mostly outdoors rather than indoors, they did not give an accurate picture of what people were exposed to. Second, the postings were a selection from the total pool of EPA data available – all of which should have been made available for scientific,

²⁸ I used a plastic spoon and zip-loc bags, but this method does not affect the quality of the sampling in terms of discovering its toxic content. (I also dressed in protective gear.)

²⁹ Conversation with local lab director, late September 2001. And conversation with Dr. Robert Simon, director, ETI Lab, Fairfax, Virginia, September 29, 2001. Dr. Simon’s lab had also confirmed our test results.

health-agency, journalistic and public-health communities to examine. Third, the EPA's explication of the selective data it posted was disingenuous and scientifically misleading, and as with the other filtering this minimized the findings of dangerous toxins. For example, the website featured a significant number (27 out of 442) of ambient air samples taken in September that registered above the current AHERA (Asbestos Hazard Emergency Response Act) standard for permissible exposure levels, which is 70 structures per millimeter squared. The agency explained these as "spikes" in toxicity, momentary aberrations, even though its own testing was too spotty to establish whether such results would have been aberrations or not. And it argued that they should be averaged into the rest of the data, such that the results would not exceed AHERA or other regulatory limits, even though that is not how toxicity works: beyond certain levels, even short-term exposure to certain toxics is alarmingly dangerous.

The accompanying EPA press release on October 3 also contained some troubling inconsistencies. The agency continued to argue that the public's health was not at risk, advising yet again that testing "found no evidence of any significant public health hazard to residents or visitors to the New York metropolitan area." The agency further recommended, "There is no need for concern among the general public, but residents and business owners should follow recommended procedures for cleaning up homes and businesses if dust has entered."

In that press release the EPA advised the public that it had "been evaluating samples of air against an extremely stringent standard, the AHERA standard." The statement went on to stress that "levels of asbestos above the AHERA standard do not imply that there is an immediate health threat to the public." Indeed, it said, "asbestos exposure becomes a health concern when high concentrations of asbestos fibers are inhaled over a long period." Quite apart from misrepresenting the asbestos threat, as explained further below, the EPA misused the AHERA standard, which is intended for evaluating *after* a cleanup has taken place.

The results of the bulk sampling data, as posted on the website, were also worrisome. Forty-eight of 177 bulk samples collected by EPA contained more than 1 percent asbestos, but on the website the EPA did not report how much more. And the press release glossed this over,

stating blandly, “The existence of dust that contains more than 1 percent of asbestos does not in itself constitute a significant health hazard – ambient air samples are more accurate measures of actual exposure potential, and asbestos is primarily considered hazardous after long-term exposure – but dust samples do provide important information about potential exposure.”

These statements directly contradict scientific knowledge and the EPA’s own rules, established in 1986 pursuant to the Toxic Substances Control Act. Those rules state, first of all, “Available evidence supports the conclusion that there is no safe level of exposure to asbestos. This conclusion is consistent with present theory of cancer etiology and is further supported by the many documented cases where low or short-term exposure has been shown to cause asbestos-related disease.”³⁰

The rules go on to state:

Most occupational studies have been conducted on populations exposed to high airborne concentrations of asbestos for long periods of time. However, short-term 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 exposures to high concentrations....³¹

In sum, according to EPA’s own rules, there are no safe levels of exposure to asbestos, but in its press releases the agency advised that the asbestos-laden samples posed no danger. The public was being told that only long-term, high levels of exposure were dangerous, while EPA rules make clear that even short-term and low levels of asbestos exposure cannot be classified as safe.

News outlets like the *New York Times* and *New York Post* fell into line with confirmations of the EPA story. As later reported in *The American Prospect* by media reporter Alyssa Katz, the *Times* ran no fewer than thirteen stories emphasizing the safety of the site between September 12 and February 24, 2002.³² The Environmental Law and Justice Project wrote a letter to the *Times*,

³⁰ 51 FR 15728

³¹ Ibid.

³² Alyssa Katz, “Toxic Haste: New York’s Media Rush to Judgment on New York’s Air,” *The American Prospect*, February 25, 2002.

which was published in mid-October 2001, describing the results of our samples, including the presence of up to 5 percent asbestos in the dust. But there were no follow-up calls from the press.

Where were the media? As *Daily News* reporter Juan Gonzalez details in his compelling book, *Fallout: The Environmental Consequences of the World Trade Center Collapse*, there was substantial pressure on the press to self-censor in the aftermath of September 11. He writes, for example, of the demotion of a *Daily News* editor who had attempted to assemble a team to report on the environmental hazards around Ground Zero. Gonzalez told *The American Prospect's* Katz, “In 25 years as a reporter, I’ve never faced as much scrutiny or as much difficulty getting stories in the paper as I have had around this issue.”³³

The media’s portrait of a scientific public-health consensus was, actually, way off the mark, and it would not have been difficult to find inconsistencies if reporters had been encouraged to investigate. In November 2001, OSHA made a presentation for the Standing Committees on Environmental Conservation, Health and Labor of New York’s State Assembly, where it reported that, based on its sampling results at the WTC site, the agency was “confident that asbestos does not pose an airborne hazard to workers.”³⁴ Yet the National Institute of Environmental Health Sciences, though its Worker Education and Training Program, had already issued a report in October that cited “significant risks that have been and continue to be faced by these on-site and recovery workers.” The NIEHS report stated: “... the exposure data, as well as the potential for serious exposure to toxic materials (including asbestos) among the construction response workers, raises significant concerns” and found Ground Zero “to be a very dangerous working environment where many workers lack the hazard-specific training required under current OSHA standards.”³⁵ Among that study’s sources was a city Department of Health “WTC Disaster Site Worker Injury and Illness Surveillance Update;” that is, the city’s own surveys were showing hazards. Because of

³³. Ibid

³⁴ Testimony, Patricia Clark, regional administrator, US Department of Labor, OSHA, before the New York State Assembly Standing Committees, November 26, 2001.

³⁵. NIEHS WETP report, op.cit..

reports like this one, the information was circulating at some levels; but it was not being provided to rescue workers and city residents who needed to protect themselves.

Speaking of this period, Bruce Lippy, an industrial hygienist with the operating engineers' union's National Hazmat Program, later stated that "60 percent of our samples were greater than the EPA clearance level . . ." ³⁶ And the city's health department reported in January 2002 that 50 percent of residents in lower Manhattan continued to experience symptoms likely related to the World Trade Center disaster, such as nose, throat and eye irritation. ³⁷ As of January 2003, over 1,000 claims have been filed against the City of New York by firefighters who sustain respiratory damage and/or were exposed to dangerous toxic substances as a result of the city's failure to provide them with respirators during rescue and recovery efforts at the WTC. ³⁸

FOIA: What Federal, State and City Agencies Knew

On September 21, 2001, the Environmental Law and Justice Project requested, under the Freedom of Information Act, all monitoring data studies and reports of air, dust, and bulk, including but not limited to hazardous materials and water samples taken in lower Manhattan and Staten Island landfills in response to the WTC collapse. On October 19, the Project picked up more than 600 pages of testing results from EPA monitoring points and stations, primarily located at or near Ground Zero. What the documents revealed was that, in spite of their assurances to the contrary, EPA, OSHA and the various other health and environmental agencies -- which met weekly throughout the crisis -- knew of the dangers present at Ground Zero and beyond, on the ground and in the air. EPA's own data listed findings above regulated levels -- information not posted on its website. (Later, the agency would claim this was an oversight.)

The documents also revealed that analyses prepared for the EPA by scientists were held

³⁶ Quoted in James L. Nash, "Cleaning Up after 9/11: Respirators, Power and Politics," *Occupational Hazards*, May 10, 2002.

³⁷ NYC Department of Health press release, "NYC Department of Health Releases Community Needs Assessment of Lower Manhattan," January 11, 2002.

³⁸ Barash, McGarry, Salzman, Penson, & Lim, "Firefighters Newsletter," Vol. I, December 2002.

back from publication, though their findings were highly relevant to health care providers trying to diagnose and treat those with acute symptoms, to say nothing of the public at large, which deserved to know its own risks. Among the reports that were withheld or delayed was one by Paul J. Lioy, which was based on testing done within a week of the WTC collapse but which was not released until April 2002. The testing was conducted at EPA's own labs in Kansas City and involved bulk samples of settled dust and smoke gathered on September 16 and 17. The labs found metals, radionuclides, ionic species, asbestos (in concentrations ranging from 0.8 percent to 3 percent), PAHs, PCBs, and a host of other toxic substances that can cause cancer and/or respiratory and/or debilitating illnesses.³⁹

The documents also revealed how high the concentration of dangerous contaminants remained even three weeks after the towers' collapse. After people were back in the area at EPA's urging, living and working full-time, the documents show that the following results were coming from the agency's downtown stations.

EPA Daily Summary, September 21: "Dust Samples: Twenty-four dust samples were analyzed between September 19 and 20, which included samples from the general area of Stuyvesant High School and Battery Park. Twelve of the 24 samples showed asbestos levels slightly above the EPA levels of concern."

EPA Daily Summary, September 26: "AIR: Non-FIXED Samples in New York City
Dioxin- Analysis of four air samples showed all samples were at or above EPA's removal action guidelines, which is [sic] based on a 30-year, 24-hour exposure risk scenario. However, there is no short-term exposure problem. These samples were captured at the plume still emanating from fires within the World Trade Centers debris pile. We expect that these levels measured will only persist for a few weeks until the fires are extinguished."

EPA Daily Summary, October 4: "Ambient Air Sampling: Metals - 10 samples were taken on October 2 within the vicinity of the emergency response operations. Of these chromium results for 4 samples exceeded EPA's removal guideline"

EPA Daily Summary, October 14: "Dioxin - Ten samples were collected on October 2 and analyzed for dioxin/furans. Four of the samples showed results above the guideline level at which

³⁹. Paul J. Lioy et.al., "Characterization of the Dust/Smoke Aerosol that Settled East of the World Trade Center(WTC) in Lower Manhattan after the Collapse of the WTC 11 September 2001," *Environmental Health Perspectives*, July 2002, pp. 703-712.

EPA would take some type of action to reduce people's exposure.”

EPA Daily Summary, October 14: "Carbon monoxide - A direct reading of carbon monoxide was detected at 19 parts per million (ppm) at one location (Greenwich and Liberty). This is above the National Ambient Air Quality Standard (NAAQS) 8-hour average of 9 ppm, but is below the NAASQ 1-hour average of 35 ppm and the OSHA permissible level of 50 ppm.."

EPA Daily Summary, Ambient Air Sampling "VOCs [volatile organic compounds]- .. Benzene was detected at three locations above the OSHA limit in the plume on the debris pile. Benzene was not detected at three parameter locations."

EPA Daily Summary, Ambient Air Sampling, October 15: "VOCs - Sampling for volatile organic compounds (VOCs) was conducted on Oct. 13 and Oct. 14 in the smoke plume within the debris pile at ground zero. Benzene exceeded the OSHA time-weighted average permissible level at two locations, on both days. Benzene was not detected in the breathing zone (approx. 5-6 feet above ground) at 3 locations several blocks from ground zero."

We forwarded the information to Juan Gonzalez, of the New York *Daily News*, whose reporting reached the front page next day.⁴⁰ⁱ This data was also immediately placed on the Law Project's website, which was visited by hundreds of government agencies, scientific groups and medical institutions over the next several months.

Additional requests for documents were filed, under New York State's Freedom of Information Law (FOIL), with both the state's Department of Environmental Conservation (DEC) and the city's Department of Health (DOH). Among information requested of the DEC was air monitoring data from stations in the city and mobile units near the WTC, for asbestos, fiberglass, cellulose, particulates and other toxic and hazardous materials. DEC initially declined to provide any information, stating, "Your FOIL request...is at this time being denied due to on-going criminal investigation."⁴¹ Only after an appeal and repeated demands did the Environmental Law and Justice Project obtain the relevant documents on November 13, 2001. They indicated, among other things, that during spot testing the DEC's monitors became clogged with dust; the monitors should have been replaced or re-set, but they were not. This was the agency to which the EPA had delegated oversight of interiors of buildings.

⁴⁰ The newspaper's front page carried Gonzalez's article on October 26, with the headline "Toxic Zone."

⁴¹ Email from Louise Munster, Freedom of Information Officer, NYS DEC, Region 1, to the Environmental Law and Justice Project, September 24, 2001.

The city health department's testing results, when finally released after appeals, were even more disturbing. The DOH documents showed that when the offices of City Hall workers – the mayor's deputy chief of staff, for example -- and others in downtown Manhattan were tested, an "overload" of dust was found. Normal procedure requires that the testing machines be recalibrated and the tests be re-done so that the overload material can be analyzed for asbestos and other toxic, but the DOH did not conduct further tests. And it did not tell the public about the overload dust finding. On its website, such results were merely listed as "n.a."

Decontamination and Downtown Health

During 2002, as the WTC site was cleared and the city returned to some version of normalcy, environmental and health concerns seemed limited to the people living near Ground Zero and the rescue workers who remained ill, like the hundreds of firefighters who either took medical leave or continued working with new respiratory problems. The rest of the city went on with life, but downtown, long-term concerns developed into a long-term, unhappy dialogue with city, state and federal agencies. This is not to say that New Yorkers in general were sanguine: a poll taken in March 2002 found that 70 percent did not believe the EPA's assurances about Ground Zero air safety.⁴² But downtown New Yorkers – most of whom had returned to their homes well before the end of 2001 -- were even more skeptical, and, increasingly organized, were pressing hard for both information and remedial action.

Parents of children enrolled in lower Manhattan schools such as P.S. 58, Stuyvesant High School, and the Borough of Manhattan Community College, for example, had serious concerns about the safety of the buildings where the young people spent their days. The buildings had been commandeered as emergency quarters from September 11 onwards, and required decontamination. Such corporate giants as Shearson Lehman, in abating their own affected property at the World Financial Center, had opted to completely dispose of all fibrous materials,

⁴² *Daily News*/New York 1 poll, at http://www.732-2m2m.com/tt/2002March_articles.htm

from couches to carpets to rugs. By contrast, despite threatened lawsuits and protests from lower Manhattan citizen groups, the city's Department of Education throughout 2002 opted not to take the same thorough measures in area schools. When parents at Stuyvesant High School hired an environmental engineer to use the ultrasonication method – an EPA-approved⁴³, low-cost, sophisticated test for carpets and other woven fabrics, which are reservoirs for asbestos and a source of continued release of asbestos particles – they found 60,000 to 2.5 million structures of asbestos per square centimeter in school carpets, an extraordinarily high concentration.⁴⁴ This was *after* the school had undergone an EPA-backed abatement. The Department of Education called the parents' test results "inconclusive,"⁴⁵ choosing instead to dicker about what "background levels" of asbestos were acceptable for exposing young people.

The EPA's refusal to handle abatements on the insides of residential buildings became a focus of community activism. In April 2002, in part to keep pressure on EPA to meet its responsibilities, my organization tested a residential loft building -- just north of the Chambers Street cleanup boundary set by EPA -- which happened to house a day care center, and found asbestos. Initially the EPA's response was "Not our department." But when an EPA official relented and agreed to cooperate with DEP in taking samples from the building, it found asbestos in concentrations up to 5 percent – five times the cut-off level for immediate abatement. (By contrast, the DEP found zero asbestos at the same site – utilizing the same technology it, and private companies, had utilized since September 11 – which suggests that all along its testing methodology must have been seriously inadequate and its results therefore wildly optimistic.) In a victory for downtown residents, the EPA announced ten days later that it would undertake the substantial cleanup of all requested apartments south of Canal Street, thus expanding its zone of responsibility northward by ten blocks and finally acknowledging its responsibility for interiors. This was a \$5-10 million obligation it had tried to shirk for nine months.

⁴³ EPA method number 600/j-93/167

⁴⁴ Howard Bader, environmental engineer, quoted in Cate Jenkins memorandum, "Stuyvesant High School Testing," August 29, 2002.

⁴⁵ Conversation with Deputy Schools Chancellor Klasfeld, September 4, 2002.

The efficacy of the EPA-funded cleanup remained controversial, however, challenged by tenant organizations such as 9/11 Environmental Action as well as by Congressman Nadler and State Senator David Patterson, EPA scientist Cate Jenkins, Joel Shufro of the New York Committee on Occupational Safety and Health (NYCOSH), former Councilwoman Katherine Freed, Dr. Marjorie Clark of Lehman College, attorney Barbara Olshansky with the Center for Constitutional Rights, and others. Many felt it was too little and very much too late. And it did not include office buildings and their tenants. Meanwhile, the DEP, as noted above, was embarrassed into demanding reports on cleanups from landlords, in May 2002,⁴⁶ but neither enforced its demand nor checked on building conditions itself.

Then there was the management of contaminated city vehicles: faced with a devastating loss of personnel and equipment, the city quickly reclaimed any trucks, fire engines and buses that had initially been used to respond to the disaster. In April 2002, the Uniformed Firefighters Association, concerned about members' exposure, asked the Environmental Law and Justice Project to conduct testing on fire engines; our testing showed up to 5 percent chrysotile asbestos on vehicles that had *already* been “decontaminated” by a city contractor. In our capacity as environmental counsel to the firefighters, the Law Project obtained an internal FDNY memo which, in August 2002 – nearly a year after the disaster, plenty of time for agencies to share basic public-health information – informed Fire Department tour commanders city-wide that caked WTC debris on respirators and apparatus (this includes trucks) “does not constitute an immediate health hazard. Asbestos is only a hazard when it becomes friable and airborne.”⁴⁷ This statement is extremely misleading. The asbestos found on the trucks (and respirators) is already WTC dust and can easily become broken up into breathable particles when disturbed by fire-fighting activity.

The memo continued: “OSHA does not have any exposure limits for this time type of

⁴⁶. NYC DEP memo to New York City landlords dated May 11, 2002.

⁴⁷. Memo from Salvatore J. Cassano, chief of operations, NYFD Bureau of Operations, August 2, 2002.

exposure, as it is not a hazard.”⁴⁸ Unfortunately for those who have to wear these supposedly non-hazardous respirators, the Law Project -- in random testing of oxygen tanks and masks that are stored on fire trucks and worn by firefighters to enter burning buildings – found dust containing asbestos. Why is this not being remedied?

City buses used to transport rescue workers to and from Ground Zero are another area of concern, as they do not appear to have undergone proper abatement. Officials of the Transit Workers Union have reported to the Environmental Law and Justice Project that, so far as they have been able to discover, the city has not conducted a thorough abatement on these vehicles, which were returned to service transporting city residents and reportedly continue in use at this writing. Further, a spokesman for the Army Corps of Engineers informed us that other government vehicles used in the rescue effort do not appear to have undergone proper abatement.⁴⁹ Why not, now that the immediate emergency is over and a long-term view of the consequences should be the top priority for the responsible agencies?

It is not alarmist to ask such questions, but merely sensible. And policymakers should be pursuing solutions to these problems, even if it means admitting that mistakes were made, because that is how to improve response for any future emergency, and it is the only way to retrieve the public’s confidence.

The Bigger Picture

Accompanying the environmental and public health disaster in New York City is an erosion of civil liberties nationwide since September 11. The USA PATRIOT Act permits the government to shroud itself in secrecy and restrict civil liberties in the war on terrorism. Undercutting the right of citizens to obtain crucial information and to be partners in this complicated process, volumes of information critical to environmental activism and policy are

⁴⁸ Ibid.

⁴⁹ Conversation with Lt. Colonel Douglas W. Sarvel, Army Corps of Engineers - NY District, October 2002.

being “scrubbed” from government websites in the name of deterring terrorism, including EPA website postings of key guidelines and databases.⁵⁰ For example, the National Advisory Committee for Acute Exposure Guidelines Levels (AEGs) for Hazardous Substances, managed by the EPA, will no longer post exposure guidelines for short-term emergency exposure levels. In March 2002 the EPA announced that it would limit public access to – and data posted on -- the Envirofacts databases, a directory of toxic sites nationwide and the toxicity of the substances found there.

Freedom of Information Act requests, meanwhile, have been presented as competing with our security, such that we may lose our capacity to learn what we are breathing. Attorney General Ashcroft, in a Department of Justice memorandum on FOIA issued just weeks after September 11, contrasted “full compliance” with the FOIA with the “fundamental values that are held by our society” -- defined as “safeguarding our national security, enhancing the effectiveness of our law enforcement agencies, protecting sensitive business information, and not least, preserving personal privacy.”⁵¹ The public’s right to know cannot compete.

At the same time, the EPA’s inaction around September 11 set a dangerous precedent by undermining the authority of all environmental statutes. In the midst of a disaster that necessitated extensive action, the EPA, New York State’s DEC and the city’s DEP enforced the law less aggressively than in periods of normalcy. As of this writing, the DEP has issued only three asbestos violations for lower Manhattan since September 11.⁵²

Among the environmental laws that are at risk, in this climate, are the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)⁵³; the Resource

⁵⁰ OMB Watch keeps a list of information removed from government websites. See www.ombwatch.org/article/archive/104.

⁵¹ Attorney General John Ashcroft, Memorandum for Heads of all Federal Departments and Agencies – at http://www.epic.org/open_gov/foiagallery/memorandum.html

⁵² Conversation with Russell Pecunies, January 24, 2003.

⁵³ 42 USC Sec 9601-9674 CERCLA empowers the EPA to act to prevent environmental contamination and to ensure that, when contamination occurs, it is thoroughly cleaned up, both with short-term measures and with long-term remedial action to provide a permanent remedy.

Conservation Recovery Act (RCRA); the Community Right-to- Know Act⁵⁴, and the National Contingency Plan, which gives the EPA powers, in an emergency, that the agency failed to make use of in responding to September 11.⁵⁵ Under the National Contingency Plan, the President is authorized to act whenever a hazardous substance is released into the environment which may present an imminent danger to the public health or welfare. The Administration, under law, could have pulled out all the stops to test, analyze and remediate the toxic results of the WTC collapse – and could have required state and local agencies to do the same – but, although the appropriate technology was available and although billions of dollars had already been set aside for the New York recovery effort, it chose not to do so.

Further, in a new use of an old office, the White House has attacked independent scientific inquiry within the federal purview, by subjecting any agency regulation or collection of information to a review process by the Office of Information and Regulatory Affairs, within the Office of Management and Budget. For example, in December 2002, after the EPA's cleanup of Libby, Montana, the OMB thwarted the EPA's plan to alert Americans nationwide about the dangers of Zonolite insulation – manufactured in Libby -- which contains highly cancerous fibers and is present in fifteen to thirty-five million American homes. The OMB cited cost reasons for not alerting the public to this hazard.⁵⁶

In another bureaucratic maneuver with large implications, the EPA administrator is now authorized -- by an executive order dated May 6, 2002 -- to classify information as "secret."⁵⁷ This

⁵⁴ See J. Echeverria and Julie Kaplan, *Poisonous Procedural "Reform": In Defense of Environmental Right to Know*, Georgetown Environmental Law and Policy Institute, gelpi@law.georgetown.edu

⁵⁵ The National Contingency Plan gives the EPA and other agencies great powers to collect data and mitigate environmental trauma. 42 USC 9604. 40 CFR 300. Acknowledging the EPA's power and responsibility in the WTC crisis, Whitman testified to the Senate Appropriations Committee that her agency is "assigned lead responsibility for cleaning up buildings and other sites contaminated by chemical or biological agents as a result of terrorism." Testimony, November 28, 2001.

⁵⁶ Andrew Schneider, "White House Office Blocked EPA's Asbestos Cleanup Plan," *St. Louis Post-Dispatch*, December 29, 2002, p. A1.

⁵⁷ Designation Under Executive Order 12958 Federal Register, Vol. 67, No.90

new power threatens the release of such information as was obtained on the toxic fallout of the WTC collapse. And within the EPA, dissent and self-evaluation have become a lot harder: the Office of the Ombudsman, charged with the agency's internal oversight and for many years quite independent, has had its wing clipped. After publicly questioning the agency's decisions around the World Trade Center disaster, exposing the inaction of the EPA, and cooperating with the inquiry of officials like Congressman Jerrold Nadler, in late November 2001 Ombudsman Robert Martin and his chief investigator, Hugh Kaufman, were told that the office was to be placed under the direct control of the EPA Inspector General. This would effectively end the ombudsman's autonomy, as he or she now must clear all public statements before they are issued.⁵⁸ Martin resigned.

These setbacks for transparency are part of a wider political agenda in which the weakening of EPA's role in protecting the environment and enforcing protective laws is a foregone conclusion. In February 2002, the director of the agency's Office of Regulatory Enforcement, Eric V. Schaeffer, resigned in protest, charging that the EPA was "fighting a White House that seems determined to weaken the rules we are trying to enforce."⁵⁹ A week later, he testified before the Senate Governmental Affairs Committee that the EPA was weakening air pollution standards to appease the energy industry, in violation of the Clean Air Act. Energy companies, he pointed out, release one-fourth of the five million tons of sulphur dioxide emitted annually and two million tons of nitrogen oxide – producing acid rain and choking smog that each year lead to 10,600 deaths; 5,400 cases of chronic bronchitis; childhood asthma; and over 1.5 million lost work days.⁶⁰ EPA used to penalize these companies. But as Schaeffer predicted in his testimony, in November 2002 the EPA announced changes in pollution standards for power plants, changes that weaken emission controls. A nongovernmental study published in 2002 found a

⁵⁸ Robert Martin, resignation letter to Gov. Whitman, April 22, 2002.

⁵⁹ Eric Schaeffer's resignation letter is at www.ewg.org/reports/epa/schaefferltr.html

⁶⁰ Testimony, March 7, 2002.

“steep decline” in environmental enforcement and fines under the Bush administration.⁶¹

Important as environmental rules, standards and enforcement are to public health, access to complete and accurate information is even more essential, because it is the guarantee of official accountability. In this regard, it is especially worrisome that so-called “whistle-blower” provisions will become vestigial law - leaving little room for dissent and challenge in the face of improper action. As the *Washington Post* reported in October 2002, “President Bush’s interpretation of the new corporate accountability law that deals with whistle-blower disclosures to Congress” was used by the U.S. Labor Department’s solicitor to deny protected status to a government lawyer who sought to pass reports on toxic materials on federally owned land to a U.S. Congressman.⁶²

^{For} private workers – and virtually all the WTC cleanup work has now been privatized – there are no protections whatsoever if they wish to publicize inadequate cleanup methods or inadequate protective measures. Not only does New York State have an extremely weak whistle-blower law, but these private sources of information are not covered by it; they are at the mercy of employers.

It is only in a climate of open government that responsibilities for public health and environmental protection can be taken up with the vigor and dedication that were needed to face the tragedy of September 11, 2001. Demands for transparency from independent activists, journalists, and the public at large are not only protected by the Constitution, they are a requirement of mature citizenship. The health fallout from World Trade Center disaster will be with us for many years to come, and the fallout in terms of mistrust of the environmental authorities represents a challenge that should motivate us all.

⁶¹ ABT Associates, “Particulate Related Health Impacts of Eight Electric Utility Systems,” prepared for the Rockefeller Family Fund, at www.rffundorganization.com. Eric Schaeffer now heads this organization’s environmental enforcement project.

⁶² Christopher Lee “Whistle-Blower Case at Issue: Senators Decry Intervention by Labor Department Solicitor,” *Washington Post*, October 25, 2002, p. A27

END NOTES

i



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July 22, 2003

David P. Bottimore, Senior Project Manager
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Dear Mr. Bottimore:

In the hope of providing panelists with the broadest array of pertinent information, I am forwarding the enclosed documents to you for distribution to all panelists engaged in the technical peer review process of the draft document entitled Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster. Please also share this cover letter with all panelists and enter the letter and the documents into the public record of the review process.

Enclosed please find for distribution the following documents:

1. Four interim Health Hazard Evaluation (HHE) reports issued by the National Institute for Occupational Safety and Health (NIOSH), one each for the following sites - Borough of Manhattan Community College (199 Chambers Street), Stuyvesant High School (345 Chambers Street), the Office of the Attorney General of the State of New York (120 Broadway), and offices of clerical workers employed by the City of New York (40 Rector Street).

Note references to persistent symptoms and to current lack of knowledge about health effects from complex exposures.

2. Malievskaya, Rosenberg, Markowitz. "Assessing the Health of Immigrant Workers Near Ground Zero: Preliminary Results of the World Trade Center Day Laborer Medical Monitoring Project," American Journal of Industrial Medicine, 00:1-2 (2002).

Note findings that workers who engaged in clean-up activities away from Ground Zero, and therefore are presumed to have experienced lower exposures than Ground Zero workers, nevertheless suffered adverse health effects, including onset or exacerbation of respiratory and/or systemic health problems.

3. Herbert, Levin. World Trade Center Worker and Volunteer Medical Screening Program - Report of Initial Findings to the National Institute for Occupational Safety and Health of the Centers for Disease Control and Prevention, January 24, 2003.

Note preliminary findings of high incidences of pulmonary, ear/nose/throat, and mental health symptoms among workers engaged in restoration of essential services throughout Lower Manhattan (i.e., not working at Ground Zero).

4. Chatfield, Kominsky. "Summary Report: Characterization of Particulate Found in Apartments After Destruction of the World Trade Center," October 12, 2001.

Note findings of significantly elevated concentrations of asbestos inside both "low-exposure" and "high exposure" apartment buildings in Lower Manhattan.

5. Ewing. "Asbestos In Settled Dust Concentrations in New York City Before September 11, 2001," (abstract), presented to the 2002 Johnson Conference A Review of Asbestos Monitoring Methods and Results for the New York World Trade Center, Libby Vermiculite, and Fibrous Talc, July 21-25, 2002. The conference was sponsored by ASTM Committee D22 on Sampling and Analysis of Atmospheres.

Note measurement of background levels of asbestos at the World Trade Center prior to September 11, 2001. Surface dust samples collected on May 25, 2000 outdoors at the World Trade Center averaged 2500 s/cm² (indirect TEM preparation). Area and personal air samples found 0.14 s/cc (indirect TEM preparation).

6. EPA Region 8. "Phase 2 Sampling and Quality Assurance Project Plan, Revision 0, for Libby, Montana - Environmental Monitoring for Asbestos, Evaluation of Exposure to Airborne Asbestos Fibers During Routine and Special Activities," March 2001.

Note discussion of EPA Region 8 methodologies for environmental sampling and risk assessment in residential areas of Libby, Montana.

7. EPA Region 8, Memorandum, "Amphibole Mineral Fibers in Source Materials in Residential and Commercial Areas of Libby Pose an Imminent and Substantial Endangerment to Public Health," December 20, 2001.

Note discussion of and sampling results for indoor dust (pages 7 - 8 and 10 - 11). Note also discussion of exceedences of OSHA standards for residents engaged in simulated household activities (pages 12 - 16). In particular, note the following discussion (page 12):

It is important to recognize that occupational exposure standards for asbestos are not generally applicable or protective for residents or workers in non-asbestos environments because occupational standards are intended to protect individuals who a) are fully aware of the hazards of the occupational environment, b) have specific training and access to protective equipment such as respirators and/or protective clothing and, c) actively participate in medical monitoring. None of these conditions apply to residents or to workers at typical commercial establishments. Thus, simple compliance with the OSHA standards is not evidence that exposure levels are acceptable in a home or in a non-asbestos workplace. Indeed, risks to residents or workers occur at exposure levels substantially below the OSHA workplace standards...

8. City of New York, Department of Environmental Protection. "Asbestos Rules and Regulations."

Note that extensive regulatory requirements for record-keeping, environmental sampling, protection of public and worker health, and abatement work practices apply to "all procedures physically taken to control fiber release from asbestos-containing materials."

that varying concentrations of silica were detected in all samples, and that varying concentrations of dioxin were detected in all samples.

15. Two environmental sampling reports for apartments in the same residential building on Harrison Street, dated November 19, 2002 and January 30, 2003. To protect the privacy of the clients, identifying references have been excised.

Note elevated indoor levels of asbestos in both locations.

16. A letter and attached environmental sampling results from ETNY Consulting and Monitoring, to Ms. Ilona Kloupte, a resident at 300 Albany Street.

Note results for metals, asbestos, cement dust, and fibrous glass.

17. "Summary of TEM Results for Asbestos (ASTM D5755 Dust Microvac)" for 2 apartments on Duane Street. To protect the privacy of the clients, identifying references have been excised.

Note elevated indoor levels of asbestos.

Thank you for your assistance and attention.

Sincerely,

A handwritten signature in black ink, appearing to read "DM Newman", with a long horizontal flourish extending to the right.

David M. Newman
NYCOSH (New York Committee for Occupational Safety and Health)
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DEPARTMENT OF HEALTH & HUMAN SERVICES



United States Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational
Safety and Health
Robert A. Taft Laboratories
4676 Columbia Parkway - R10
Cincinnati OH 45226-1998

August 30, 2002
HETA 2002-0096

Dear management and labor union representatives from BMCC and York Colleges:

Enclosed please find the interim report of the National Institute for Occupational Safety and Health (NIOSH) evaluation of the workers at the Borough of Manhattan Community College (BMCC) and York College. We are providing to you the comparison of rates of eye, ear, nose, throat and skin irritation, respiratory symptoms and gastrointestinal symptoms as well as symptoms of depression and post traumatic stress disorder between workers at BMCC and York Colleges. The evaluation of BMCC and York is part of a larger evaluation we are doing of workers employed near the World Trade Center (WTC) site. We will be doing further analyses of the collected information but with a combined dataset that includes all of the sites around the WTC that are included in the evaluation. When these further analyses are complete, we will be sending you a final report.

We would like to take this opportunity to thank all of you for your assistance with this project. We hope that the information provided in this report will answer some of the questions that have been raised since September 11th. We would be happy to answer any questions you have about this report and make a formal presentation at the colleges, if you feel that it is indicated. Those individuals who participated in our survey and provided contact information on their questionnaire will receive a personal letter informing them of the results and recommending medical follow up when indicated.

Please feel free to contact us at (513) 458-7159 for Sherry Baron and (513) 841-4327 for Ken Wallingford.

Sincerely,

Sherry Baron, MD, MPH

Ken Wallingford, MS CIH
Hazard Evaluation and Technical Assistance Branch
National Institute for Occupational Safety and Health

NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
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Evaluation of Physical and Mental Health Symptoms Following the World Trade Center (WTC) Disaster: Borough of Manhattan Community College and York College

Background

In December 2001, a number of labor unions representing workers employed in the vicinity of the WTC contacted the National Institute for Occupational Safety and Health (NIOSH) to request an evaluation of health complaints, such as cough and nose or throat irritation as well as mental health concerns, among their members working near the WTC site. Among these unions were District Council 37 of the American Federation of State, County and Municipal Employees (AFSCME) and the Professional Staff Congress (PSC), which represent the instructional and non-instructional staff at the Borough of Manhattan Community College (BMCC).

In response to these requests, NIOSH investigators met with labor and management representatives and determined that further evaluation was warranted. To address these concerns, NIOSH investigators designed a survey to assess whether employees who work near the WTC site were experiencing more physical and mental health symptoms compared to similar workers employed in New York City, but outside of the WTC site area. Due to the nature of the terrorist attack, residents all over the New York metropolitan area were affected by the WTC collapse. Thus, by choosing a comparison population from within New York City, we wanted to evaluate the additional effect caused by working near the WTC site. Four worker groups were selected for the study, Stuyvesant High School employees, Borough of Manhattan Community College employees, government office workers from a New York City government office building at 40 Rector Street and the State Attorney General's building at 120 Broadway and Metropolitan Transportation Authority New York City Transit workers employed in the stations, trains and buses that serve lower Manhattan and the WTC area. For each work group a comparison population was chosen that had the same or similar employer but was not near the WTC site area. The comparison population chosen for the Borough of Manhattan Community College was York College in Jamaica, Queens. This letter will provide interim results of the survey at the colleges. Further analyses will be conducted during the next few months and these results will be reported at a later date.

BMCC is a community college located two blocks north of the WTC site at the intersection of Chambers and West Streets. It has a student body of approximately 24,000, and offers classes between 8 A.M. and 10 P.M. While BMCC employs approximately 1700 instructional and non-instructional staff only 600-650 of the employees are full-time faculty or staff. While most of the full-time staff work regular eight-hour shifts, the faculty, which accounts for more than half of the full-time employees, are only required to be at the site during their teaching hours or for administrative meetings. The large part-time instructional and non-instructional staff includes professors teaching one or two classes and students or others who may work in clerical and other support services for a few hours per week up to close to a full 40-hour work week.

York College, the comparison college, like BMCC, is one of the City University of New York (CUNY) colleges. It is located in Jamaica, Queens; about 15-20 miles from the WTC site and serves approximately 6000 students. York College has about 1000 staff; however, as with

BMCC, only about 400-450 are full-time faculty or staff. The time schedule of classes is similar to that of BMCC.

On September 11th, classes at BMCC were cancelled after the crash of the two planes into the WTC, and the staff and students were instructed to leave the facility immediately. Because the site became a command center for the rescue and recovery operation, security and maintenance staff were asked to provide services in order to clean up and protect the building. The building was reopened for all staff on September 26th and classes resumed on October 1st. Although most of the college is housed in one large building, some classes were held at Fiterman Hall which is located directly across from the WTC. Fiterman Hall suffered major damage during the collapse and could not be reoccupied. To accommodate the students and faculty who had been using the damaged facility, several mobile classrooms were placed along West Street, adjacent to the BMCC complex. York College was closed on September 11th following the collapse of the WTC, following a decision by the CUNY administration to cancel classes in all of their colleges. The college reopened on September 12th with a normal schedule.

Selection Criteria for York College (Comparison Site)

Prior to the selection of a comparison college, a walk-through evaluation of BMCC was performed on January 17, 2002. Based on the walk-through evaluation of BMCC, two environmental factors were determined to be disqualifiers for the selection of the comparison college, (1) the lack of central air-conditioning; and (2) the presence of significant indoor environmental quality health complaints within the previous five years. After discussions with knowledgeable individuals and a site visit on January 30, 2002, York College was selected as the comparison college.

To characterize the differences between BMCC and York, a building inspection checklist (Appendix 1) was developed using the knowledge from previous NIOSH indoor environmental quality research studies. The building inspection checklist included selected environmental risk factors associated with either a significant increase or decrease in occupant reporting of the most common building-related health symptoms.

Walk-through evaluations were conducted at both colleges to complete the building inspection checklists at approximately the same time as the health symptom survey. The walk-through evaluations of York College and BMCC were conducted on March 11 and 12, 2002, respectively. During these walk-through evaluations, a variety of environmental factors were noted including the buildings' architectural style, physical structure characteristics, construction methods and materials, interior rooms orientation and uses, ventilation systems design and performance, preventive maintenance practices, housekeeping practices, building renovation history, and current building appearance (particularly the interior). The observations made during these walk-through evaluations were then used to complete the building inspection checklists.

Both colleges had central air-conditioning with ventilation systems of a similar design; neither reported significant indoor environmental quality health complaints within the previous five years. (The faculty of the Science Building at York College, which was closed for mold remediation at the time of the study, is not part of York College faculty and staff and is not included in the study.) Both colleges were well-maintained and clean. The single major

environmental difference between the colleges was that the Academic Core Building at York College had evidence of some chronic but minor water leakage around several of the perimeter classroom windows.

These results indicate that both colleges are environmentally similar and, based solely on observed environmental risk factors, would not be expected to have a significant difference in occupant reporting of the most common building-related health symptoms.

The Questionnaire

The purpose of the questionnaire was to obtain information for evaluating the prevalence of symptoms (mental health and physical) among the staff of the two colleges. The questionnaire was self-administered and included questions about work duties and location, symptoms occurring after September 11th, and whether those physical symptoms had improved or gotten worse since then. We asked selected information on past medical history and activities related to events on September 11th. We also asked about mental health symptoms associated with depression and post traumatic stress disorder (PTSD). It is important to note that the questions we used to assess the symptoms of physical and mental health problems are screening instruments designed for epidemiologic purposes, and are not used to individually diagnose any specific medical disorder. Only a competent health care professional who has completed a thorough clinical evaluation can make a reliable clinical diagnosis.

Definition of physical symptom

The physical symptoms included on the questionnaire (irritation symptoms, upper and lower respiratory symptoms, mucous membrane symptoms, gastrointestinal symptoms) were chosen based on prior NIOSH surveys and on information gathered during informal meetings with workers employed around the WTC site. An affirmative response to 'did you have any of the following symptoms after the WTC disaster on 9/11/01' was defined as having 'symptoms.' 'Persistent symptoms' were defined as either of the following: 1) those with symptoms that existed before 9/11/01 but had worsened since 9/11/01, or 2) those with new onset symptoms since 9/11/01 that had not improved.

Definition of mental health symptom

The questionnaire also included questions to assess symptoms of depression and post-traumatic stress disorder (PTSD). The questions related to depression were from the 20-question Center for Epidemiologic Studies Depression Scale (CES-D)¹. The Center for Epidemiologic Studies of the National Institute of Mental Health developed this short self-reported scale to assess symptoms of depression in the general population. Because of the nature of the WTC disaster, and the likelihood that respondents would be experiencing common acute symptoms that are found on the depression scale, we chose to narrow our focus to those having major depressive symptoms, which are defined as those scoring 22 or higher out of a possible 60 points.

Participants were also asked to respond to questions about having persistent intrusive thoughts, dreams, and vivid reminders about the WTC disaster and whether they were feeling emotionally numb, distant or cut off from friends. These symptoms and others were used to determine

whether respondents were experiencing symptoms that are characteristic of a PTSD. The questions related to PTSD were from the Veterans Administration PTSD Checklist². We used the officially accepted criteria for a diagnosis of PTSD as developed by the American Psychiatric Association in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IVTM) to define those individuals with symptoms consistent with PTSD.

Administration of the Questionnaire

A room at each college was designated as the location where staff could complete the questionnaire. NIOSH staff was available from 8 AM until 7 PM on two consecutive weekdays in order to accommodate faculty who did not have scheduled classes every day of the week. In both schools, notices were widely disseminated by the unions and the administration encouraging staff to come to the room and complete the questionnaire. The non-instructional staff was permitted to complete the questionnaire during their normal work shift. The instructional staff was encouraged to come during non-teaching hours; at BMCC part of the scheduled time fell during the monthly time slot reserved for departmental meetings when no classes are scheduled. Following the two scheduled days, those instructional staff at both colleges who had not participated had questionnaires placed in their college mail boxes with a postage-paid envelope for returning the form to NIOSH. All of the questionnaires were self-administered with NIOSH personnel available to answer questions. A few questionnaires were completed via a translator because of English literacy barriers. The questionnaire was administered on March 13th and 14th at BMCC and on March 18th and 19th at York.

Data Analysis

For this preliminary report we are providing a comparison of rates between the two colleges of reported symptoms, medical conditions newly diagnosed by a physician since September 11th and reported time off work. Future reports, which combine data from all of the work groups studied by NIOSH, will explore the relationship between the rates of these symptoms and various other factors measured in the survey such as exposures to the dust cloud, seeing the collapse and knowing a victim personally. The comparison was done by assessing the prevalence ratio (PR). The PR represents the prevalence rate of the symptom in the BMCC staff relative to the prevalence in the York staff. A PR of 1.0 means there is no difference in symptom prevalence between the schools. A PR of greater than 1.0 indicates the prevalence is greater at BMCC. For example, a PR of 2.0 would mean that the respondents at BMCC were two times more likely to have reported the symptom than respondents at York. Because all prevalence estimates have some uncertainty, we also calculate the 95% confidence interval. If the lower number in the 95% CI is greater than 1.0 then the evidence for the increase in symptoms in BMCC compared to York is especially convincing. The term "statistically significant" is used in designating the prevalence ratios that meet these criteria.

Although both part-time and full-time employees were invited to complete the questionnaire, we found that few part-time employees chose to participate. Although part-time employees constitute the majority of employees at both campuses, slightly less than 20% of respondents were part-timers. Therefore, we decided to restrict our statistical analyses to the full-time employee respondents.

Most of the respondents worked in the main building on each campus. Of the BMCC full-time faculty and staff participants only 13 (4%) reported working in one of the mobile classrooms and 24 (7%) reported being in Fiterman Hall on September 11th. At York College only 6 workers (3%) reported spending most of their time in the Science Building during the previous year while most (87%) reported spending their time in the Academic Core Building. Therefore, although they were included in our main analyses, we did not attempt to assess the additional impact of assignments to these other buildings or classrooms.

Results

At BMCC, 374 of the 600-650 full-time employees completed the questionnaire and at York, 204 of the 400-450 full-time employees completed the questionnaire. There were no statistical differences between the two colleges with regard to job category, sex, number of years working at CUNY or smoking status. Approximately 60% of respondents in both colleges were either faculty or other instructional staff (higher education officers and laboratory technicians). Participation rates for instructional and non-instructional staff did not differ substantially between the schools. At both colleges, approximately half the respondents were female and had worked an average of 14 years for CUNY. Thirteen percent of respondents in both colleges were current smokers.

According to the questionnaire, 37% of both the York staff and the BMCC staff personally knew someone injured or killed at the WTC collapse. Although the crash occurred before 9 A.M., when many college staff may not yet have arrived at work, two thirds of the BMCC staff reported being in lower Manhattan at the time. Not surprisingly, at BMCC the staff was five times more likely to report having witnessed the planes crashing into the WTC and 15 times more likely to report seeing individuals falling or jumping from windows compared to the York staff.

Reports of physical symptoms since September 11th

Table 1 shows the list of symptoms included in the questionnaire. Most of the symptoms can be broadly grouped as follows: 1) symptoms of irritation of the nose, throat, eyes and skin, 2) respiratory problems such as cough, wheezing, shortness of breath and chest tightness, and 3) gastrointestinal problems such as indigestions, nausea and diarrhea. Table 1 shows the number and percent of respondents who reported experiencing each symptom after September 11th and then the prevalence ratio and 95% confidence interval. This table shows that BMCC workers had higher rates of symptoms than the York workers, and rates of nose, throat and eye irritation, all of the respiratory symptoms, and nausea and headaches were statistically higher in BMCC workers compared to York workers.

Reports of persistent symptoms since September 11th

In addition to reports of any symptoms after September 11th, we were interested in determining the rates of persistent symptoms that had not improved by March when the clean up was almost complete. Table 2 shows the rates of these persistent symptoms. By comparing Table 1 and Table 2, you can see that 50% or more of those reporting any symptoms since September 11th reported that the symptom had improved by March 2002. However, 10-30% of the BMCC employees were still reporting eye, nose, throat and skin irritation, and respiratory complaints such as cough, shortness of breath, wheezing and chest tightness. The prevalence ratios show that

the rates of persistent symptoms were higher in BMCC than York and most differences were statistically significant.

Reports of lost work days

The questionnaire asked whether the workers had lost time from work because of any of the symptoms listed in Tables 1 and 2. At BMCC 27% of the respondents reported losing time from work, while at York 16% reported losing time from work. The difference between these two percentages was statistically significant.

Reports of symptoms consistent with depression and PTSD

Table 3 provides the rates for those reporting symptoms consistent with major depression and PTSD. This table shows that 24% of BMCC workers and 17% of York workers had symptoms meeting criteria for symptoms of major depression. The rates of symptoms consistent with PTSD were 15% at BMCC and 8% at York. The rate for PTSD was statistically higher at BMCC compared to York.

Reports of conditions newly diagnosed by a physician

We asked workers whether they had been told by a physician that they had specific medical conditions and whether those conditions had been diagnosed before or after September 11th. Table 4 shows the rates of respondents who were told by a physician *since* September 11th that they had asthma, allergies, depression or PTSD. These rates were calculated based on those workers who had no previous diagnosis of the condition before September 11th. This table shows that rates of all four diagnoses were higher in BMCC than in York but only the difference for PTSD was statistically significant.

Conclusions

The survey carried out in March 2002 at BMCC and York Colleges has shown that the rates of symptoms related to nose, throat and eye irritation as well as respiratory symptoms and some gastrointestinal symptoms were higher at BMCC compared to York. Although half of those reporting any symptom since September 11th also reported some improvement, at BMCC between 6 and 31% reported persistent symptoms still present in March 2002. These symptoms may have been due to exposure to complex environmental contaminants (e.g., smoke, respirable airborne particles, fine dust, and fire combustion products) from the collapse of the towers and ensuing fires. An understandable limitation at the time of the collapse of the WTC was the lack of initial environmental exposure assessment, thus we do not know the scope or extent of exposure at that time. Sampling by NIOSH, between September 18th and October 4th, to evaluate exposures for those working in the rescue and recovery operation found that few of the measured substances exceeded occupational standards³. However, little is known about the health effects from complex exposures such as occurred as a result of the WTC collapse and subsequent on-going fires. Studies such as this and others involving more in depth evaluations of rescue and recovery workers may be helpful in clarifying some of these associations.

Symptom surveys and interpretations based on frequency data have limitations. Responses to extraordinary traumatic events may provoke a range of reactions, and symptoms alone are not adequate to fully diagnose medical conditions. Following a traumatic event, symptoms that would once be overlooked, may be perceived as more serious and reported as such. Those who continue to experience persistent or recurrent symptoms should be evaluated by a health care professional so that a complete assessment can be made. Further systematic investigations using full clinical diagnostic assessment, though labor and resource intensive, would be useful in sorting out the breadth and scope of illness in those with persistent symptoms.

We found that 24% of BMCC staff and 17% of York staff had symptoms consistent with major depression and 15% of BMCC staff and 8% of York staff had symptoms consistent with PTSD. Although the rates of symptoms of depression in both colleges are higher than national studies that have used the same set of questions (CES-D)⁴, those populations had not recently experienced a major disaster and may be of limited utility as a comparison. Other studies of the WTC and previous disasters have shown similar results. A study which evaluated survivors six months after the bombing of the Federal Building in Oklahoma City found that 34% met the diagnostic criteria for PTSD⁵. Various studies of New York City residents conducted since September 11th have identified elevated rates of symptoms of depression and PTSD and, although they have used a variety of assessment methods, the rates are consistent with what we found in the colleges^{6,7,8}. One large national study found that all New York City respondents had higher rates of symptoms of PTSD compared to other respondents, and those in the WTC or a surrounding building on September 11th had higher rates compared to other New Yorkers⁶.

It is difficult to predict the long term effect from this disaster on mental health. Many of the symptoms which the college staff is experiencing may be normal and reversible reactions to a traumatic event. Researchers evaluating the Oklahoma City bombing found that most individuals directly involved did not develop diagnosable psychiatric illness, but the majority reported experiences such as sleep disturbance, feeling emotionally upset afterwards and loss of concentration⁹. However, it is important to encourage the members of the college staff who continue to experience symptoms to seek professional help.

For questionnaire studies such as this, we aim for a participation rate of over 80% of the staff to assure that the results are representative of all employees. The participation rate in this study was 50-60%. The college environment posed certain challenges in obtaining an adequate participation rate including the irregular schedule of the faculty, the difficulty of recruiting and locating staff among the thousands of students and the general burden of paperwork that faculty and staff are required to complete. However, the results of the same survey completed by staff of Stuyvesant High School and a comparison High School, where participation rates were over 80%, showed very similar results to the colleges. I have included a copy of these results for your information.

Recommendations

The workplace plays an important role in the health of its workers. One of the ways the workplace can help reduce the burden of illness is by providing a community and a mechanism for social support. Social support from supervisors and coworkers has been shown in repeated studies to buffer the effects of stress¹⁰. Therefore, it is essential that the college administration and labor unions continue to develop a community atmosphere that is supportive and encourages and

assists those who continue to experience symptoms to seek care from a competent health care professional. This is equally important at York where employees were likely to know a victim and, like many other New Yorkers, also expressed symptoms associated with depression. Some of the specific ways that this can be accomplished include:

- Those staff members who continue to experience persistent symptoms should be encouraged to seek competent professional medical assistance. Administration and union officials should seek mechanisms such as hot line numbers, college-based counseling services and posters to inform members of available services.
- Free mental health services have been made available by governmental and nongovernmental agencies. The administration should find methods to advertise these services and seek ways to encourage participation when indicated. Many individuals may avoid accessing mental health services because of the stigma that is associated with mental illness. It is important for the college community to find ways to help minimize this stigma and to encourage participation.
- Training should continue for managers and supervisory personnel at all levels to insure that each group is responding appropriately to health and safety concerns of employees. As part of this training, issues at the organizational level should be evaluated to determine whether improvements can be made to address widespread concern among employees concerning health, safety and security issues. Each college has an existing union/management health and safety committee and these committees are excellent mechanisms to address safety and health concerns as they arise.
- Developing programs to foster social support on campus are important in buffering workplace stress. This may be especially important in the period surrounding the anniversary of September 11th.

Tables 1
Physical Health Symptoms Occurring After September 11th 2001
Borough of Manhattan Community College and York College

Have you had any of the following symptoms since the WTC disaster on 9/11?	BMCC	York	Prevalence Ratio BMCC/ York (95% Confidence Interval)
	Number (%)	Number (%)	
Nose/throat irritation*	219 (62%)	72 (37%)	1.7 (1.4-2.1)
Eye irritation*	224 (62%)	70 (36%)	1.8 (1.4-2.1)
Skin irritation	91 (25%)	37 (19%)	1.4 (1.0-1.9)
Congestion	156 (44%)	78 (39%)	1.1 (0.9-1.4)
Cough, any kind*	216 (60%)	72 (36%)	1.7 [1.4-2.0]
Cough with phlegm*	106 (30%)	42 (21%)	1.4 [1.1-1.9]
Chest tightness*	111 (31%)	24 (12%)	2.5 [1.7-3.8]
SOB*	130 (36%)	31 (16%)	2.3 [1.6-3.3]
Wheeze*	72 (20%)	15 (8%)	2.6 [1.6-4.5]
Indigestion	97 (27%)	42 (21%)	1.3 [1.0-1.8]
Nausea *	60 (17%)	15 (8%)	2.2 [1.3-3.8]
Diarrhea	61 (17%)	30 (15%)	1.1 [0.8-1.7]
Headache*	197 (55%)	86 (43%)	1.3 [1.1-1.5]

* Statistically significant prevalence ratio

Table 2
Persistent Physical Health Symptoms Occurring After September 11th 2001
Borough of Manhattan Community College and York College

Persistent Symptoms after the WTC disaster on 9/11?¹	BMCC	York	Prevalence Ratio BMCC/ York (95% Confidence Interval)
	Number (%)	Number (%)	
Nose/throat irritation*	102 (29%)	19 (10%)	3.0 (1.9-4.7)
Eye irritation*	112 (31%)	20 (10%)	3.1 (2.0-4.8)
Skin irritation*	46 (13%)	9 (5%)	2.8 (1.4-5.7)
Congestion*	74 (21%)	18 (9%)	2.3 (1.4-3.8)
Cough, any kind*	101 (28%)	25 (13%)	2.2 [1.5-3.3]
Cough with phlegm*	45 (13%)	12 (6%)	2.1 [1.1-3.9]
Chest tightness*	49 (14%)	5 (3%)	5.4 [2.2-13.3]
SOB*	65 (18%)	9 (5%)	4.0 [2.0-7.8]
Wheeze*	37 (10%)	5 (3%)	4.1 [1.6-10.1]
Indigestion *	44 (12%)	6 (3%)	4.2 [1.8-9.6]
Nausea	19 (5%)	4 (2%)	2.6 [0.9-7.6]
Diarrhea	20 (6%)	7 (4%)	1.6 [0.7-3.7]
Headache*	100 (28%)	28 (14%)	2.0 [1.4-2.9]

* Statistically significant prevalence ratio

¹ Symptoms that existed before 9/11/01 but had worsened since 9/11 or new onset symptoms that had not improved

Table 3
Mental Health Symptoms
Borough of Manhattan Community College and York College

Symptoms consistent with:	BMCC Number (%)	York Number (%)	Prevalence Ratio BMCC/York (95% Confidence Interval)
Depression ¹	85 (24%)	34 (17%)	1.4 (1.0-2.0)
PTSD ² *	53 (15%)	17 (8%)	1.7 (1.04-2.9)

¹Depressive symptoms were defined as a score of 22 or more using the CES-D scale.

²Post traumatic stress syndrome was defined using the Veteran's Administration Checklist and applying the DSM-IV criteria.

* Statistically significant prevalence ratio

Table 4
Reported Newly Diagnosed Medical Conditions
Borough of Manhattan Community College and York College

Has a physician told you that you have:	Physician told me after September 11 ¹ BMCC Number (%)	York Number (%)	Prevalence Ratio BMCC/York (95% CI)
Allergies	16 (7%)	3 (2%)	2.9 (0.8-10.1)
Asthma	10 (3%)	1 (1%)	5.8 (0.7-46.0)
Depression or Mood Disorder	14 (4%)	3 (2%)	2.5 (0.7-8.9)
Post Traumatic Stress Disorder*	18 (5%)	2 (1%)	5.1 (1.2-22.1)

¹ Rate is based only on those who did not have a diagnosis of the condition before 9/11

* Statistically significant prevalence ratio

Appendix 1
Building Inspection Checklist

HETA No.: _____ Date: _____

Name of Inspector(s): _____

Building Name: _____

Building Address: _____

Lower Manhattan Building ☐ ☐ Comparison Building

Building Design and Maintenance

Work Areas Appear Overcrowded Y N

Comments: _____

Suspended Ceiling Panels are Present Y N

Comments: _____

Cloth Partitions are Present Y N

Comments: _____

Surface Dusting is Performed Daily Y N

Comments: _____

Evidence of Moisture: Y Estimated Area (ft2) _____ N

Comments: _____

Renovation Was Performed Within the Last 6 Months Y N

Comments: _____

Heating, Ventilating, and Air-Conditioning (HVAC) System(s)

HVAC Design and Maintenance

HVAC System(s) Provide Air Conditioning Y N

HVAC System(s) have Scheduled Inspections Y N

HVAC System(s) have Scheduled Maintenance Y N

HVAC Outdoor Air Intake(s) Y N

Location: Roof ☐ Ground Level ☐ Below Grade ☐ Exterior Wall ☐

Other (specify) _____

Cleanliness: Clean 5 4 3 2 1 Dirty

Describe _____

Within 25 Feet of the Outdoor Air Intake(s) There Are:

Sanitary Vents ☐ Exhaust Vents ☐ Vehicle Traffic ☐ Standing Water ☐

Trash Dumpster ☐

Comments _____

HVAC Air Filters

Filter Cleanliness: Clean 5 4 3 2 1 Dirty

Filters Fit Securely in Frame without Leakage Y N

Scheduled Filter Replacement Y N

Comments _____

HVAC Moisture

Condensate Drain Pan(s) Drains Properly Y N

Sound Liner is moist Y N

Comments _____

HVAC Cleanliness

Comments _____

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DEPARTMENT OF HEALTH & HUMAN SERVICES

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June 5, 2002
HETA 2002-0096

Mr. Stan Teitel
Principal
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345 Chambers Street
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NYCOSH
New York Committee for Occupational Safety and Health
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Dear Mr. Teitel:

This is an interim letter concerning the investigation that the Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (CDC/NIOSH) is conducting at several work sites in Manhattan involving physical and mental health symptoms of employees related to the World Trade Center (WTC) disaster on September 11, 2001. This letter reports the preliminary analyses on the January 29, 2002, questionnaire survey at Stuyvesant High School and La Guardia High School. The survey included questions about work duties and location, symptoms since September 11, 2001, selected information on past medical history, and questions on activities directly or indirectly related to the WTC attack.

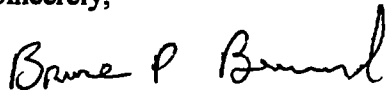
Two hundred twenty-four of the staff at Stuyvesant High School and 155 of the La Guardia High School staff completed the questionnaire, resulting in a participation rate of over 80%. Since September 11, a significantly greater number of Stuyvesant staff reported symptoms of eye irritation, upper and lower respiratory symptoms (nose and throat irritation, congestion, cough, shortness of breath) and indigestion than did La Guardia staff. The rates of those with symptoms who sought medical care or missed work days did not differ between sites. Forty-one percent of Stuyvesant and 33% of La Guardia staff reported that they had seen a doctor because of symptoms associated with the WTC.

Stuyvesant staff were twice as likely as La Guardia staff to experience major depressive symptoms and four times as likely to experience post traumatic stress disorder symptoms. About one third of the Stuyvesant staff and 18% of the La Guardia staff had major depressive symptoms. Twenty-two percent of the Stuyvesant staff and 5 % of the La Guardia staff had post traumatic stress disorder symptoms. Preliminary data analysis suggest that witnessing the terrorist event, the loss of a loved one or friend, and a lack of social support were associated with symptoms of depression and post traumatic stress.

Recommendations are provided in this report to assist the United Federation of teachers, the American Federation of State, Municipal, and County Employees (AFSMCE), the Stuyvesant and La Guardia staff, and the New York City Board of Education address employee symptoms and concerns. This investigation is part of a larger study of workplaces that is attempting to measure the impact of the WTC disaster on workers in New York. Further recommendations will be made upon completion of the analysis of the data from other work sites involved in this investigation. A final composite report will be issued after these additional site evaluations are completed.

If you have any questions or concerns about the information in this letter, please contact me at 513-841-4589, or Sherry Baron, M.D., M.P.H. at 513-458-7159.

Sincerely,

A handwritten signature in cursive script that reads "Bruce P. Bernard".

Bruce P. Bernard, M.D., M.P.H.
Medical Section Chief
Hazard Evaluations and Technical Assistance Branch
National Institute for Occupational Safety and Health (NIOSH)
Centers for Disease Control and Prevention (CDC)

Introduction

On January 1, 2002, the National Institute for Occupational Safety and Health (NIOSH) received a Health Hazard Evaluation (HHE) request from the United Federation of Teachers (UFT) and the American Federation of State, Municipal, and County Employees (AFSMCE) asking for assistance in documenting the extent of physical and mental health problems subsequent to the attack on the World Trade Center (WTC) on September 11, 2001, among the staff at Stuyvesant High School. This request was one of four requests NIOSH received from employee representatives at different work sites in the vicinity of the WTC site, including a City College, New York City (NYC) office buildings, and the Metropolitan Transit Authority (MTA) New York City Transit. To document these concerns at the sites around the WTC, NIOSH investigators administered a questionnaire survey at these sites, as well as comparison sites not proximal to the WTC. La Guardia High School, six miles north of the WTC disaster site, was chosen for the comparison site to Stuyvesant High School.

A NIOSH team of medical and social epidemiologists and an industrial hygienist visited Stuyvesant High School on January 17, 2001, and La Guardia High School on January 28, 2001. During the site visits, we held opening conferences with school administrators, New York City School Board representatives, faculty members, facility maintenance personnel, cafeteria managers, security officers, and union representatives from the UFT and AFSMCE to discuss the HHE request and NIOSH policy and procedures. Information was obtained relating to the buildings, relevant events that took place at the time of and after the WTC attack, history of concerns involving indoor environmental quality (IEQ), and other health-related concerns. Following the opening conferences, NIOSH investigators conducted walk-through evaluations of the buildings. On January 29, 2002, NIOSH investigators returned to conduct a questionnaire survey among the High School staff.

Methods

Selection of Sites for the HHE

Stuyvesant High School was included in the original HHE request, and is located one and a half blocks away from the WTC site. La Guardia High School was selected as a referent school because it is located six miles from the WTC site, and had similar building characteristics to Stuyvesant, including central air conditioning and a lack of significant IEQ problems which required major changes or consultation within the previous five years.

Stuyvesant High School

Stuyvesant High School is a specialized school for mathematics, physical and biological science, and technology and is part of the New York City Public School System. It is a nationally known coeducational college preparatory school. Stuyvesant High School is located approximately one and a half blocks north of the WTC site at West and Chambers Streets. Approximately 300 staff work in the

Stuyvesant building in teaching, administration, support services, and building services. Student enrollment is around 3040 students. Stuyvesant High School is a single, multi-level building that was completed and occupied in 1992.

On the morning of September 11, 2001, Stuyvesant High School was beginning a normal teaching day. At 8:46 A.M., a plane hit the WTC Tower 2, the South Tower. During the interval from the first plane crashing into the WTC tower to the time of the initiation of the school's evacuation (about 10:15 A.M.), instructions and information about unfolding events were communicated over the intercom system by Stuyvesant administrators. The staff and students were filing out of the building when the North WTC Tower came down at 10:28 A.M. Several of the Stuyvesant staff accompanied the students to Chelsea Pier, where teachers organized students into groups for transportation home. Other staff walked students across the Brooklyn Bridge, or accompanied them up the East Side, still others the West Side. Public transportation was not available in the area around the school. Several of the maintenance and cafeteria staff remained in the building after the evacuation of the students and teaching staff. After the events of September 11, 2001, Stuyvesant High School was closed to students and faculty until October 20. Teaching staff and students were moved to Brooklyn Technical High School. Stuyvesant was used as a respite facility and Command Center for rescue workers for several weeks after September 11, 2001.

Following the initial search and rescue mission at the WTC, a barge loading operation for the transport of debris from the WTC disaster site was located adjacent to the north side of the Stuyvesant building. Trucks carrying debris from the rubble pile have been offloaded by a stationary overhead crane system, with the loose debris picked up and deposited into barges. The continuous barge operation was visible at all times from the enormous glass windows at the north end of the Stuyvesant hallways until May 2002, when it was dismantled.

La Guardia High School

La Guardia High School is a specialized school for the arts and is part of the New York City Public School System. It is a nationally known coeducational school for music, art, and performing arts. Located approximately six miles north of the WTC site, it is proximal to Lincoln Center for the Performing Arts, between 64th and 65th Streets at 100 Amsterdam Avenue. Approximately 225 staff work in the La Guardia building in teaching, administration, support services, and building services. The school currently has a student enrollment of around 2240 students. It is a single, multi-level building that was completed and occupied in 1984.

On September 11, 2001, La Guardia held a normal teaching day for its students. Because of the distance from the WTC, the La Guardia staff was not initially aware that the terrorist attacks had occurred. However, within the hour of the first plane crash, many of the staff became aware of the events at the WTC because students' parents began arriving at La Guardia to take them away from the school, concerned about their safety. In the late morning, an announcement of the attack was made over the intercom, but school remained in session. Staff and students were asked to continue their routine tasks and schedules. School was not dismissed early. Upon dismissal, several of the teaching staff stayed at the school for several hours assisting students with transportation and other needs.

Environmental Characterization for Identification of Comparison School

To help in selecting a comparison high school, a walk-through evaluation of Stuyvesant High School was performed on January 17, 2002. A variety of environmental factors were noted during this walk-through evaluation including the building's architectural style, physical structural characteristics, construction methods and materials, interior room orientation and uses, ventilation systems design and performance, preventive maintenance practices, housekeeping practices, building renovation history, and current building appearance (particularly the interior).

To adequately characterize the schools, a building inspection checklist (Appendix A) was developed using the knowledge of environmental risk factors gained from previous NIOSH indoor environmental quality research.¹ The building inspection checklist included selected environmental risk factors previously associated with occupant reporting of the most common building-related health symptoms.

Based on the walk-through evaluation of Stuyvesant High School, two environmental factors were determined to disqualify a high school building for the purpose of comparison: (1) the lack of central air-conditioning; and (2) the presence of significant indoor environmental quality problems which required major changes or consultation within the previous five years. Both buildings (La Guardia and Stuyvesant) have had their share of typical indoor environmental quality problems in the past five years, including histories of water damage and leaks from faulty plumbing. Prior to the NIOSH visit, the UFT and NYC Board of Education had never received specific requests for investigations concerning the indoor environments at either school, although there have been recurring incidents and on ongoing concerns about the indoor air quality among both staffs. These incidents have been handled by the on-site administration and buildings maintenance staff.

The other environmental risk factors on the building inspection checklist were used to obtain the best available match for the comparison high school. After discussions with the Unions, NYC Board of Education, and knowledgeable maintenance and equipment personnel, as well as a site visit, La Guardia High School was selected as the comparison high school.

Questionnaire

On January 28, 2001, NIOSH representatives administered a questionnaire to staff at both high schools during school in-service administrative staff meetings. NIOSH personnel discussed the scope of the study and the voluntary nature of participation and confidentiality issues, and answered specific questions about the survey. Cafeteria and maintenance staff were surveyed separately from the teaching staff to accommodate their schedules.

The primary purpose of the questionnaire survey was to evaluate the prevalence of symptoms (mental health and physical) among the staff of the two High Schools. The questionnaire was self-administered and included questions about work duties and location, physical symptoms occurring after September 11, and whether those physical symptoms had improved or gotten worse since then. We asked selected

information on past medical history, and activities related to events on September 11, and the WTC attack.

The questionnaire also included questions (referred to in this report as mental health symptoms) to assess symptoms associated with depression and symptoms associated with post-traumatic stress disorder (PTSD). The questions related to depression were from the 20-question Center for Epidemiologic Studies Depression Scale (CES-D).² The Center for Epidemiologic Studies of the National Institute of Mental Health developed this short self-reported scale designed to assess symptoms of depression in the general population. It was not originally designed as a scale evaluating people after a terrorist event. Because of the nature of the WTC terrorist event, and the likelihood that respondents would be experiencing common acute symptoms that are similar to those found on the depression scale, we chose to narrow our focus to those having major depressive symptoms, and used a cut-off score of 22

Participants were also asked to respond to questions about having persistent intrusive thoughts, dreams, and vivid reminders about the WTC disaster and whether they were feeling emotionally numb, distant or cut off from friends. These symptoms and others were used to determine whether respondents were experiencing symptoms that are characteristic of a PTSD. The questions related to PTSD were from the Veterans Administration PTSD Checklist.

It is important to note that the questions we used to assess the symptoms of depression and PTSD are screening instruments, and are not used to individually diagnose any specific medical disorder. Only a competent mental-health professional can make a reliable clinical diagnosis of depression or PTSD.

Data Analysis

For these preliminary analyses, we will provide information on prevalence rates of the physical symptoms and mental health disorders, as well as certain significant relationships. Further analyses will be completed when data from the other selected sites around the WTC have been collected.

Persons who provided an affirmative response to the question 'did you have any of the following symptoms after the WTC disaster on 9/11/01' were defined as having 'symptoms.' We completed analyses of a subset of symptoms, including comparisons of those with and without symptoms prior to September 11, by high school, those with persistent symptoms, and those whose symptoms had improved. Persistent symptoms were defined as either of the following: 1) those with symptoms that existed before 9/11/01 but have gotten worse since 9/11/01 or 2) those with new onset of symptoms since 9/11/01 that have not gotten better.

Criteria used previously in the interpretation of the CES Depression Scale include a score of 22 or more (out of a total possible score of 56) as a measure of depression.³ Possible responses included 'rarely' (0), 'sometimes' (1); 'often' (2), and 'always' (3). Persons who provided an affirmative response (defined as an answer of 'moderately,' 'quite a bit,' or 'extremely') to those questions defining PTSD from the VA PTSD scale according to Diagnostic and Statistical Manual (DSM)-IV criteria³ were defined as exhibiting 'PTSD symptoms.'

The prevalences of reported symptoms (including irritation symptoms, upper and lower respiratory symptoms, mucous membrane symptoms, gastrointestinal symptoms – referred to in this report as physical symptoms) were compared between the Stuyvesant staff and the La Guardia staff. The comparison was done by assessing the prevalence ratio (PR). The PR represents the prevalence of the symptom in the Stuyvesant staff relative to the prevalence in the La Guardia staff. A PR of 1.0 means there is no difference in symptom/illness prevalence between the schools. A PR of greater than one indicates prevalence is greater at Stuyvesant High School. For example, a PR of 2.0 would mean that a person in the Stuyvesant group is two times more likely to have reported the symptom than a person in the La Guardia group. A 95% confidence interval (95% CI) which excluded one, was considered to indicate a statistically significant finding.

Results

Walk-through Characterization

Walk-through evaluations were conducted at both high schools to complete the building inspection checklists for each at approximately the same time as the health symptom survey of the workers was performed. The walk-through evaluations of La Guardia and Stuyvesant High Schools were conducted on January 28 and 29, 2002, respectively. During these evaluations, a variety of environmental factors were noted as previously described in the Methods Section of this report.

Both high school buildings had central air-conditioning with ventilation systems of a similar design, and neither had been involved in significant IEQ health investigations within the previous five years. Both high school buildings were well-maintained and clean. The two major environmental differences were (1) La Guardia High School had evidence of some chronic but minor water leakage around several of the perimeter classroom windows, and (2) the interiors of the central ventilation systems serving La Guardia High School were slightly dirtier than those serving Stuyvesant High School. This latter finding can be attributed to the difference in the age of the two schools (18 years for La Guardia High School and 10 years for Stuyvesant High School).

Questionnaire

Two hundred twenty-four Stuyvesant High School employees completed the questionnaire (83% of the 271 employees present on the day of the survey); 155 La Guardia High School employees completed the questionnaire (82% of the 191 present on the day of the survey). Because the La Guardia cafeteria and security staff were not surveyed until March 19, 2002 (89% of 19 participated), their results have not been included in this report. Their results will be included in the overall report of the health hazard evaluations at the work-sites around the WTC site.

Participants by school and job category are noted in Table 1. At both Stuyvesant and La Guardia, teachers and maintenance personnel were the two largest groups of participants. Other characteristics of the two

groups of participants are presented in Table 2. Of note, the groups were similar in terms of age, gender, race, education, and current cigarette smoking.

To evaluate the potential role of workplace exposure versus residential proximity, the survey included a question concerning zip code of residence. Among the Stuyvesant staff, 16 persons (7% of the 224) reported living in lower Manhattan (defined by a northern boundary of zip codes 10013 and 10002 – approximately corresponding to Charlton St. and Broome St.); 5 (3%) of the La Guardia staff reported living in lower Manhattan. Because of the low numbers of survey participants living in lower Manhattan, further analysis of the data based on location of residence was not performed.

Medical History

Information on past medical history (Table 3) indicated that prevalence of asthma and other respiratory conditions prior to September 11, was similar among the two High School staffs. Twelve (6%) Stuyvesant employees and three (2%) La Guardia employees were diagnosed with depression or mood disorder by a physician and 14 (7%) of the Stuyvesant and two (1%) of the La Guardia employees were diagnosed with PTSD by a physician after September 11, both of which were statistically significantly different. There were three new cases of asthma, six cases of bronchitis, and 9 cases of allergies among the Stuyvesant participants; one case of asthma, 1 case of bronchitis, and 1 case of allergy at La Guardia. There were no significant differences between the rates of Stuyvesant and La Guardia employees in the proportion of persons seeing a physician or being prescribed medications or having lost work days since September 11.

Physical Symptoms after September 11

Table 4 shows the prevalence rates for those reporting symptoms since September 11, and the prevalence rate ratios for symptoms after September 11, comparing Stuyvesant to La Guardia staff. It also includes prevalence for those reporting new symptoms since September 11. For the Stuyvesant staff, nose/throat irritation, cough, eye irritation, and headache were the symptoms reported most frequently. Headache, congestion, nose/throat irritation, cough, and eye irritation were the symptoms most frequently reported by La Guardia participants (38-45%). The majority of the participants had no history of symptoms prior to September 11.

Persistent symptoms [(either of the following: 1) those with symptoms that existed before 9/11 but have gotten worse since 9/11; or 2) those with new onset of symptoms since 9/11 that have not gotten better)] are listed in Table 5. About a fourth of the Stuyvesant Staff and less than a fifth of the La Guardia staff continues to have headache, nose/throat irritation, congestion, cough and eye irritation. Table 6 shows that 30 to 45% of those who experienced symptoms after September 11, had improved at the time of our survey. We have found that the majority of them reported improving within days or a few weeks.

Events Associated with September 11, 2001

The majority of the Stuyvesant staff (69%) reported being in the school building when both Tower II, the South Tower (Table 7) and Tower I, the North Tower, (Table 8) collapsed. Over 15% of the Stuyvesant staff reported that they were in the streets when the towers collapsed. Eighty-four percent of the La Guardia staff were in the school building during the time of collapse, 8% were at home and 3% were in the streets. One hundred sixty five (93%) of the Stuyvesant staff reported that they left the High School building between 10:00 and 11:00 A.M. Five people left between 9:00 and 10:00 A.M.. Six of the staff reported that they never left the workplace on September 11.

Among Stuyvesant staff, 89 (40%) reported personally witnessing the plane(s) crashing into the building. One hundred eleven (50%) reported witnessing the collapse of the WTC; 76 (34%) witnessed individuals falling or jumping from the burning towers, 10 (4%) saw human remains, and 25 (11%) reported seeing pieces of the plane. Several staff (59 [26%]) reported witnessing other activities associated with the WTC disaster, mainly observing the clouds of dust, people fleeing the area, and the smoke and fire from the burning buildings. Sixty-seven of the 214 (31%) Stuyvesant staff members reported knowing someone who was injured or killed during the attack; 59 of the 143 (41%) La Guardia staff members reported knowing a victim. Thirty-two (14%) persons reported participating in rescue/recovery efforts after the WTC attack from Stuyvesant, and five persons (3%) from La Guardia participated.

Dust Cloud from the Collapse of the Towers

Ten (5%) of the Stuyvesant staff and none of the La Guardia staff members reported that they were in the dust cloud (generated from the collapse of the towers) so thick that they could not see in front of them. Twenty-nine (14%) Stuyvesant employees and 3 (2%) of the La Guardia staff members reported that they were in the dust cloud but it did not prevent them from seeing where they were going. Eighty-eight (41%) of the Stuyvesant staff members and 19 (13%) of the La Guardia staff members could see the dust cloud but they were not directly in it.

Odors

Among Stuyvesant staff members, 182 (81%) reported smelling odors from the burning rubble pile. Stuyvesant staff members were more likely than La Guardia staff members to report smelling this burning odor while at work (PR=4.8, 95% CI [3.4 -6.9]). La Guardia staff members, on the other hand, were more likely to report other odors at the workplace, such as chemicals, Freon, and anti-freeze (PR= 5.0, 95% [CI 2.38 - 5.88]).

Mental Health Symptoms

Seventy (33%) of the Stuyvesant staff and 26 (18%) of the La Guardia staff had major depressive symptoms; forty-nine (23%) of the Stuyvesant staff and 9 (6%) of the La Guardia staff had symptoms consistent with PTSD. Forty-five (46%) of those participants who fulfilled the criteria for major depressive symptoms also fulfilled our criteria for PTSD symptoms. Table 10 presents the number and percentage of participants from Stuyvesant and La Guardia meeting our definitions of major depression or PTSD symptoms within the week prior to the survey. Stuyvesant staff were more likely than La Guardia staff to experience major depression symptoms (PR 1.9, 95% CI [1.3 - 2.8]) and PTSD symptoms (PR 3.8, 95% CI [1.9 - 7.5]). Neither gender, race/ethnicity (white versus non-white or Hispanic versus non-Hispanic), nor education level (high school education or less versus at least some college) was significantly associated with depression and PTSD symptoms (Table 11).

In the questionnaire, participants were asked to describe perceived levels of social support from their fellow workers, relatives, and co-workers. The responses from these three categories were combined into one overall measure of social support, which considers whether a person has someone that s/he can talk with about problems, someone who does things to help them, or someone they can go to when things get tough. Stuyvesant staff members who reported high social support were less likely to report symptoms consistent with major depression. Conversely, Stuyvesant staff members who reported lower social support were nearly twice as likely to report symptoms consistent with major depression (PR=2.3, 95% CI [1.6, 3.4]) and PTSD symptoms (2.19 [1.2-3.6]) (Table 11).

Discussion

We found that physical symptoms (including eye, nose, and throat irritation, cough, and shortness of breath) and mental health symptoms (depression and PTSD) were more prevalent among Stuyvesant High School staff than the La Guardia High School Staff.

Physical Symptoms

Stuyvesant staff had a significantly higher prevalence of symptoms related to irritation of the eye, and upper and lower respiratory tracts occurring in the four weeks prior to and after September 11, compared to the staff at La Guardia. These symptoms were reported by more than 40% of participants at Stuyvesant. Additionally, 10-30% of the Stuyvesant staff reported that those symptoms persisted after September 11. Five to eighteen percent of the La Guardia staff reported the persistence of similar symptoms during this time period.

Our questionnaire also assessed physician visits and prescribed medications as measures of symptom severity. Neither of these measures differed between Stuyvesant and La Guardia staff. However after September 11, a large percentage of staff from both schools sought medical care with a physician, 41% from Stuyvesant and 33% from La Guardia.

Other investigations carried out around the WTC site may be useful in examining the breadth of symptoms that study groups experienced. In the study carried out in October 2001, by the New York City Department of Health (NYCDOH) HealthWorks Department⁴, approximately 50% of those surveyed at the end of October 2001, continued to experience physical symptoms, especially eye and upper airway irritation. The NYCDOH study was a door-to-door survey of 414 individuals and focus groups of residents from apartments in lower Manhattan who had occupied their homes following the WTC disaster.

Mental Health Symptoms

Seventy (33%) of the Stuyvesant staff and 26 (18%) of the La Guardia staff had symptoms of major depression. Forty-eight (22%) of the Stuyvesant staff and 8 (5%) of the La Guardia staff had symptoms of PTSD. Forty-five of these had both major depression and PTSD symptoms.

The NIOSH survey was conducted ten weeks after the September 11, attacks. Results showed the prevalence of depression among the Stuyvesant staff (33%) to be twice as high as that found in the survey conducted five to eight weeks after the WTC disaster of adults living below Canal Street (16.8%).⁵ The authors of that study used a structured clinical interview from DSMIV³ to diagnose depressive episode, whereas we used the CES-D² scale for a symptom case definition of depression prevalence. Although our preliminary analysis has not controlled for potential confounding factors (e.g. age, previous mental health history), our results show that predictors of depression are lower social support, knowing someone who was seriously injured or loss of friends or a loved one, and witnessing the terrorist events (Table 11). These factors have been found in other studies.^{6,7}

The rates for PTSD symptoms among the Stuyvesant staff (22%) were similar to those found by Galea et al⁷ in adults living below Canal Street (20%) who were present right after September 11, – using similar case definitions. In the NYCDOH HealthWorks study⁵ of residents of lower Manhattan in October 2001, nearly 50% had symptoms at that time suggestive of PTSD. With univariate analysis, our preliminary results found that the prevalence of PTSD was higher among persons who were directly exposed to the attacks or their consequences (those who were closest to the attacks, having a friend or relative killed, and having low social support). This is consistent with other studies, which have found predictors of PTSD to include being closer to an attack site, being injured, or knowing someone who was killed or injured.⁴

No statistical difference was found between men or women in the frequency of symptoms of depression or PTSD at either Stuyvesant or La Guardia, a finding that is not consistent with the results of most studies looking at gender and depression and PTSD.^{5,6,8} In the analysis of the combined data from these schools and the additional site evaluations, we will explore this further. We will defer discussion of gender and mental health symptoms until the final report.

Counseling

Of those who scored high on the depression and PTSD scales, about 40% reported they would not benefit from additional supportive counseling, suggesting that some individuals at the two High Schools who have experienced significant mental health symptoms do not recognize their need for counseling. As time passes, it is likely that these individuals will be even less likely to consider counseling at a time when it may be beneficial. Individuals may have the impression that they should be able to cope alone because time has put some distance between themselves and the tragic events.

Drs. Edna Foa and Jeffrey Staab, University of Pennsylvania,⁹ addressing the traumatic events at the WTC, believe that the mechanisms of natural recovery from traumatic events are strong, and that the psychological outcome of the New York City community as a whole will be resilience, not psychopathology. For most, they note that "fear, anxiety, re-experiencing, urges to avoid, and hyperarousal symptoms, if present, will gradually decrease over time." We agree that people should be encouraged to use natural supports and to talk with those they are comfortable with - friends, family, co-workers. However, because we also found that low social support was an important risk factor for PTSD and depression symptoms, we think that it would be valuable to evaluate and provide opportunities at work for social support of the school staff.

Our interviews with the psychologist at Stuyvesant High School and the UFT representatives revealed that beginning two weeks after September 11, counseling services were offered to Stuyvesant School staff. Staff members were offered individual sessions or group sessions both upon request and on a drop-in basis. A psychologist was available at Stuyvesant for students and staff several times a week. A partnership with the Jewish Board of Children and Family Services and Stuyvesant High School was developed, through a grant from the NYC Board of Education. This partnership, offered training sessions for the staff to identify trauma and at-risk behavior in students and staff at work, so that they could be directed to counseling services. It is essential for the high school staff dealing with mental health issues to recognize problems, to respond sensitively, to know what resources exist, and to make proper referrals and/or to address problems effectively themselves. Alternative therapy sessions were also offered at Stuyvesant, consisting of relaxation techniques, yoga, massage, poetry, and music therapy. Initially, counseling services were sought out by the staff, however, there has been much less use of counseling services as time has passed according to the school psychologist.

General Indoor Environmental Quality

Our evaluation of the two high school buildings indicated that both high schools were environmentally quite similar and would not be expected to have a significant difference in occupant reporting of the most common building-related health symptoms. However, during our visit to La Guardia, there were concerns voiced to us regarding the general IEQ in the La Guardia high school building that were unrelated to events of September 11. Table 12 compares the La Guardia and Stuyvesant Staff's symptom prevalence in the four weeks prior to the survey to results obtained during a 1996 NIOSH IEQ Symptom Survey in School Buildings.¹⁰ All of the symptom prevalences from La Guardia are within the ranges found in the general IEQ Symptom Survey in School Buildings. These were schools that had requested that NIOSH evaluate conditions because of health concerns similar to those voiced during our visit to La Guardia.

Published studies from NIOSH investigators and others have reported on issues related to occupational exposures and symptoms of employees in office buildings.^{11,12,13,14,15} Scientists investigating indoor environmental problems believe that multiple factors may contribute to building-related occupant complaints.^{16,17} Among these factors are imprecisely defined characteristics of heating, ventilation and air conditioning (HVAC) systems, cumulative effects of exposure to low concentrations of multiple chemical pollutants, odors, elevated concentrations of particulate matter, microbiological contamination, and physical factors such as thermal comfort, lighting, and noise.^{18,19,20,21,18} Design, maintenance, and operation of HVAC systems are critical to their proper functioning and provision of healthy and thermally comfortable indoor environments.

Occupant perceptions of the indoor environment often are more closely related to the occurrence of symptoms than the measurement of any indoor contaminant or condition.¹⁹ Some studies have shown that besides the issues mentioned above, relationships between the psychological, social, and organizational factors in the workplace may also impact the occurrence of symptoms and comfort complaints.^{20,21}

Conclusions

At four and a half months after the September 11, terrorist attacks, we found a substantial burden of symptoms of depression and PTSD, as well as physical symptoms of eye irritation, upper airway irritation, and indigestion among the staff at Stuyvesant High School. We observed that both physical and mental health symptoms were more prevalent among the Stuyvesant Staff compared to the La Guardia staff.

The persistence of symptoms in certain individuals over the four-month period may be due to several factors, including differences in the initial exposure, individual susceptibility, existing medical conditions, and factors related to social support, and stress. It is also known that certain environmental contaminants (including visible dust and noticeable odors present in lower Manhattan after the WTC attacks) were present in the areas around Stuyvesant High School after the September 11, attacks, which can exacerbate symptoms as well. The odors from the WTC fires were also noticeable over much of Manhattan until after December 19, 2001, when the fires at the WTC were extinguished.

The potential for long-term health effects among residents and workers in lower Manhattan related to exposure to environmental contaminants from the WTC attacks is unknown. At the time of NIOSH air sampling, which occurred during September 18, through October 4, 2001, directly at the WTC rubble pile, the ambient air did not appear to be contaminated with toxic substances from the buildings or their contents or with combustion products to an extent that posed an occupational health hazard.²² Since that time, the site has been cleaned up, and the substances which may possibly be related to the reported physical symptoms have decreased in concentration over time in the area around the site.

We found that there was a substantial percentage of high school staff with PTSD and depression symptoms four months after September 11. Interventions addressing these reactions may help prevent the development of long-lasting psychological sequelae.

Recommendations

Data from the additional site evaluations may enable additional recommendations to be made. A final composite report, with additional recommendations will be issued after these additional site evaluations are completed.

1. The information in this report is not a substitute for direct medical or psychological care. While this report contains descriptions of physical and mental health symptom findings, this information is not be used as a diagnosis of individual mental health or physical problems. Diagnosis must be done with consulting a qualified health care/mental health provider. Participants are advised to consult their health care/mental health providers about their personal questions or concerns for on-going treatment.
2. The NYC Board of Education, the Unions (UFT and AFSCME), and the school management of both high schools should continue efforts to address employee concerns resulting from events of the September 11, disaster at the WTC. Specific actions recommended are as follows:
 - a. Employees with work-related health concerns should be encouraged to see the appropriate health care providers, who should maintain a log of symptoms, but insure the privacy of those reported. This log should be used for surveillance of injuries and illnesses and reviewed to identify group trends over time;
 - b. The adequacy of current counseling services should be assessed, and the availability of an adequate level of counseling for employees should be maintained;
 - c. Counseling services should continue to seek out those who are vulnerable to depression and PTSD, i.e., those who have lost a loved one or friend, those who do not have a social network that one can confide in, and those who witnessed the attacks;
 - d. Training should continue for managers and supervisory personnel at all levels to insure that each group (within the Board of Education, Unions, and school management) is responding appropriately to health and safety concerns of employees. As part of this training, issues at the organizational level should be evaluated to determine whether improvements can be made to address widespread concern among employees concerning health, safety and security issues;
 - e. Public and private agencies have an obligation to facilitate the use of counseling services. The UFT, AFSCME, the School Board, and the High Schools involved should meet to discuss counseling services available to the complete staff at the schools.
3. Communication between the NYC School Board, the Unions, and employees should be improved to facilitate the exchange of concerns about environmental conditions and security issues in the buildings. A health and safety committee with employee staff and managers should be used to facilitate these communication efforts. We would like to recognize the efforts at Stuyvesant and the on-site staff and management in keeping the staff informed and aware of activities related to the WTC disaster response.
4. It would be valuable to evaluate and provide more opportunities at work for social support of the school staff.
5. The information provided on general IEQ with this report should be used to address work environment issues as they arise. This information should be provided to the maintenance staff responsible for maintaining the building and any person responsible for the health and safety at the high school buildings.

References regarding a written program to deal with IEQ issues include the "Tools for Schools²³" and the "Building Air Quality Action Plan²⁴". These documents contain some of the best practical advice available regarding the prevention, evaluation, and correction of IEQ problems.

Table 1
Job Titles of Survey Participants
HETA 2002-00096
Stuyvesant and La Guardia High Schools

Job Title	Stuyvesant High School	La Guardia High School
Teacher	142	101
Maintenance and Equipment	21	18
Civil service (health aide, nurse, dietician, cafeteria staff)	17	1*
Administrator (Principal, Asst. Principal)	12	8
School Secretary	9	6
School Aide	9	11
Counselor	6	6
School Safety Officer	4	0
Other	2	1
Missing	2	3
Total	224	155

* La Guardia staff who participated March 19 are not analyzed in this preliminary report

Table 2
Description of Survey Participants
HETA 2002-00096
Stuyvesant and La Guardia High Schools

Location	Number	Female (Number and Percent)	Mean Age (Years)	Graduate Degrees (Number and Percent)	Race (Number and Percent)				Current Smokers (Number and Percent)
					White	Asian	Black	Hispanic	
Stuyvesant	224	107 (49%)	48	142 (65%)	151 (71%)	11 (5%)	25 (12%)	28 (13%)	27 (13%)
La Guardia	155	88 (58%)	47	109 (73%)	101 (71%)	5 (4%)	15 (11%)	13 (9%)	16 (11%)

Table 3
Pre-Existing and New Medical Diagnoses
HETA 2002-00096
Stuyvesant and La Guardia High Schools

Medical Conditions	Stuyvesant		La Guardia	
	With Medical Conditions Prior to 9/11/01 (Number and Percent)	New Diagnoses After 9/11/01 (Number and Percent)	With Medical Conditions Prior to 9/11/01 (Number and Percent)	New Diagnoses After 9/11/01 (Number and Percent)
Allergies	83 (39%)	9 (4%)	59 (39%)	1 (1%)
Asthma	18 (8%)	3 (1%)	15 (10%)	1 (1%)
Chronic Obstructive Pulmonary Disease	3 (1%)	0 (0%)	1 (7%)	0 (0%)
Emphysema	2 (1%)	1 (1%)	0 (0%)	0 (0%)
Chronic Bronchitis	5 (2%)	6 (3%)	8 (5%)	1 (1%)
Heart Disease	14 (7%)	0 (0%)	3 (2%)	0 (0%)
Gastroesophageal Reflux Disorder or Hiatal Hernia	23 (11%)	8 (4%)	13 (9%)	1 (1%)
Depression or Mood Disorder	18 (8%)	12 (6%)	13 (9%)	3 (2%)
Anxiety Disorder	16 (8%)	8 (4%)	10 (7%)	1 (1%)
Post Traumatic Stress Disorder	3 (1%)	14 (7%)	4 (3%)	2 (1%)
Multiple Chemical Sensitivity Disorder	2 (1%)	6 (3%)	3 (2%)	1 (1%)

Table 4
Physical Symptoms After WTC Disaster on 9/11/01
HETA 2002-00096
Stuyvesant and La Guardia High Schools

Symptom	Stuyvesant		La Guardia		Prevalence Ratio and [95% Confidence Interval] of Symptoms after 9/11/01 (Stuyvesant/La Guardia)
	Symptoms after 9/11/01 (Number and Percent)	Symptoms after 9/11/01 and no History of Symptoms Prior to 9/11/01 (Number and Percent)	Symptoms after 9/11/01 (Number and Percent)	Symptoms after 9/11/01 and no History of Symptoms Prior to 9/11/01 (Number and Percent)	
Nose/throat irritation*	136 (65%)	106 (50%)	57 (39%)	33 (23%)	1.6 [1.3 - 2.1]
Congestion	98 (47%)	57 (27%)	60 (41%)	21 (14%)	1.2 [0.9-1.5]
Cough- any kind*	138 (63 %)	101 (46%)	57 (38%)	32 (21%)	1.7 [1.3-2.1]
Eye irritation *	128 (59%)	96 (44%)	57 (38%)	27 (18%)	1.6 [1.2 - 2.0]
Headache	119 (56%)	72 (34%)	67 (45%)	35 (24%)	1.2 [0.99 - 1.5]
Shortness of breath*	75 (35%)	54 (25%)	31 (21%)	18 (12%)	1.7 [1.2 - 2.4]
Chest tightness	59 (28%)	48 (23%)	28 (19%)	16 (11%)	1.5 [0.9 - 2.2]
Indigestion	65 (30%)	29 (13%)	32 (22%)	7 (5%)	1.4 [0.9- 2.0]
Wheeze	42 (20%)	32 (15%)	21 (14%)	10 (7%)	1.4 [0.9 - 2.3]
Skin irritation	50 (23%)	35 (16%)	27 (18%)	13 (9%)	1.3 [0.8 - 1.9]
Cough with Phlegm *	77 (36%)	57 (27%)	33 (22%)	20 (13%)	1.6 [1.1-2.3]
Nausea	40 (19%)	31 (14%)	16 (11%)	13 (9%)	1.7 [0.99- 2.9]
Diarrhea	45 (21%)	27 (13%)	19 (13%)	7 (5%)	1.6 [0.9 - 2.7]

* Statistically significant difference between Stuyvesant and La Guardia

Table 5
Stuyvesant and La Guardia High School Staff
Persistent Physical Symptoms[†] After WTC Disaster on 9/11/01
HETA 2002-00096

Symptom	Stuyvesant	La Guardia	Prevalence Ratio Stuyvesant/ La Guardia
	Persistent Symptoms since 9/11/01 [†]	Persistent Symptoms since 9/11/01 [†]	
Nose/throat irritation*	65 (31%)	25 (17%)	1.8 [1.2-2.7]
Congestion*	55 (26%)	23 (16%)	1.7 [1.1-2.6]
Cough, any kind*	59 (27%)	15 (10%)	2.7 [1.6-4.6]
Eye irritation*	62 (22%)	22 (15%)	1.95 [1.3-3.0]
Headache	57 (27%)	27 (18%)	1.5 [0.9-2.2]
SOB*	40 (19%)	10 (7%)	2.8 [1.4-5.4]
Chest tightness*	30 (14%)	6 (4%)	3.5 [1.5-8.1]
Indigestion	27 (13%)	10 (7%)	1.8 [0.9-3.7]
Wheeze*	24 (11%)	4 (3%)	4.2 [1.5-11.9]
Skin irritation	21 (10%)	11 (7%)	1.3 [0.7-2.6]
Cough with phlegm*	38 (18%)	11 (7%)	2.4 [1.3-4.5]
Nausea	17 (8%)	6 (4%)	1.9 [0.7-4.8]
Diarrhea	10 (5%)	11 (7%)	0.6 [0.2-1.4]

* Statistically significant difference

[†] Those reporting "yes" to symptoms after 9/11/01 and "yes" to either symptom before 9/11/01 with worsening, or new onset of symptoms with no change or worsening. Excludes those with pre-existing symptoms who reported "no change" since 9/11/01.

Table 6
Stuyvesant High School Staff
Improvement of Physical Symptoms after WTC Disaster on 9/11/01
HETA 2002-00096

Stuyvesant	
Physical Symptom	Symptoms Improved since 9/11/01 (Number and Percent)
Nose/throat irritation	55 (45%)
Congestion	23 (26%)
Cough	57 (44%)
Eye irritation	42 (38%)
Headache	30 (29%)
SOB	23 (33%)
Chest tightness	19 (35%)
Indigestion	13 (23%)
Wheeze	14 (36%)
Skin irritation	16 (34%)
Cough with phlegm	31 (41%)
Nausea	16 (44%)
Diarrhea	22 (54%)

Table 7
Location when the WTC Tower 2 (South Tower) Collapsed on 9/11/01
HETA 2002-00096
Stuyvesant and La Guardia High Schools

Location when Tower 2 Collapsed	Stuyvesant	La Guardia
My Building	152 (69%)	126 (85%)
Other Building	2 (1%)	1 (1%)
Streets	42 (19%)	3 (2%)
Car, Bus, Train, Ferry	2 (1%)	2 (1%)
Home	13 (6%)	12 (8%)
Other	8 (4%)	5 (3%)

Table 8
Location when the WTC Tower 1 (North Tower) Collapsed on 9/11/01
HETA 2002-00096
Stuyvesant and La Guardia High Schools

Location when Tower 1 Collapsed	Stuyvesant	La Guardia
My Building	159 (72%)	127 (84%)
Other Building	1 (0.5%)	1 (1%)
Streets	32 (15%)	4 (3%)
Car, Bus, Train, Ferry	4 (2%)	2 (1%)
Home	15 (7%)	12 (8%)
Other	9 (4%)	5 (3%)

Table 9
Depression Symptoms by High School
HETA 2002-00096
Stuyvesant and La Guardia High Schools

Stuyvesant	La Guardia	
Depression Symptoms*	Depression Symptoms*	Prevalence Ratio [95% CI]
72 (34)	26 (18)	1.9 [1.3 - 2.8]

* 'Depressive symptoms' were defined as a score of 22 or more in the questionnaire taken from the modified CES-D scale.

Table 10
Mental Health Symptoms by High School
HETA 2002-00096
Stuyvesant and La Guardia High Schools

Stuyvesant	La Guardia	
Stuyvesant Staff with Post Traumatic Stress Disorder Symptoms*	La Guardia Staff with Post Traumatic Stress Disorder Symptoms*	Prevalence Ratio [95% CI]
49 (23)	9 (6)	3.8 [1.9 - 7.5]

* A participant with 'post traumatic stress syndrome defined as a person who provided an affirmative response (defined as an answer of 'moderately,' 'quite a bit,' or 'extremely') to those questions defining PTSD according to DSM-IV criteria.

Table 11
Prevalence of Mental Health Symptoms Among Stuyvesant
Participants by Selected Characteristics
HETA 2002-00096
Stuyvesant and La Guardia High Schools

Stuyvesant				
Variable	Depressive Symptoms* (Number and Percent)	Prevalence Ratio (95% CI)	Post Traumatic Stress Disorder Symptoms† (Number and Percent)	Prevalence Ratio (95% CI)
Gender	Female	1.0 (0.7 - 1.4)	25 (23%)	1.1 (0.6 - 1.7)
	Male		24 (22%)	
Race: White	Yes	1.2 (0.8 - 1.8)	29 (20%)	1.5 (0.9 - 2.5)
	No		18 (30%)	
Race: Hispanic	Yes	1.1 (0.7 - 1.9)	7 (26%)	1.1 (0.6 - 2.3)
	No		41 (23%)	
Know Victim‡	Yes	1.7 (1.2 - 2.4)	23 (34%)	2.0 (1.2 - 3.3)
	No		25 (17%)	
Social Support§	Low	2.3 (1.6-3.4)	25 (36%)	2.19 (1.3-3.6)
	High		22 (16%)	

* 'Depressive symptoms' were defined as a score of 22 or more (out of a total possible score of 56) for the 19 questions in the questionnaire taken from the modified CES-D scale.

† A participant with 'post traumatic stress symptoms' was defined as a person who provided an affirmative response (defined as an answer of 'moderately,' 'quite a bit,' or 'extremely') to those questions defining PTSD according to DSM-IV criteria.

‡ A response to the question "Did you know anyone who was seriously injured or killed during the attack."

§ An overall measure of social support combining three categories of support from friends, relatives, and co-workers

Table 12
Physical Symptoms Experienced in Prior 4 Weeks
Compared to Physical Symptom Prevalence in School Buildings
from NIOSH Indoor Air Quality Symptom Survey, 1996
HETA 2002-00096, Stuyvesant and La Guardia High Schools

Symptom	Stuyvesant	La Guardia	NIOSH IEQ Symptom Survey in School Buildings, 1996
	Symptoms 1-3 days per week in last 4 weeks, or every or almost every workday (Number and Percent)	Symptoms 1-3 days per week in last 4 weeks, or every or almost every workday (Number and Percent)	Symptoms 1-3 days per week in last 4 weeks, or every or almost every workday (Prevalence and range)
Nose/throat irritation	109 (51%)	41 (28%)	24 % (6-43 %)
Congestion	100 (47%)	49 (33%)	41 % (28-56 %)
Cough	76 (36%)	25 (17%)	20 % (10-38 %)
Eye irritation	87 (41%)	37 (25%)	36 % (15-54 %)
Headache	60 (28%)	37 (25%)	32 % (12-54 %)
SOB	46 (22%)	18 (12%)	7 % (0-26 %)
Chest tightness	38 (19%)	18 (12%)	9 % (0-30 %)
Indigestion	35 (17%)	13 (9%)	--
Wheeze	33 (16%)	17 (11%)	7 % (0-16 %)
Skin irritation	29 (14%)	15 (10%)	25 % (6 -41%)
Phlegm	13 (7%)	10 (7%)	--
Nausea	20 (10%)	8(5%)	10 % (0-23 %)

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DEPARTMENT OF HEALTH & HUMAN SERVICES

United States Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational
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October 23, 2002
HETA 2002-0101

Dear Union and Management Representatives:

Enclosed please find the interim report of the National Institute for Occupational Safety and Health (NIOSH) evaluation of the New York State office workers at the Office of the Attorney General (OAG) 120 Broadway, Manhattan. We are providing to you the comparison of rates of eye, ear, nose, throat and skin irritation, respiratory symptoms and gastrointestinal symptoms as well as symptoms of depression and post traumatic stress disorder between workers at the OAG and City office workers at the Department of Environmental Protection [DEP], located at the Lefrak building in Queens. The evaluation of OAG and DEP workers is part of a larger evaluation we are doing of workers employed near the World Trade Center (WTC) site. We will be doing further analyses of the collected information but with a combined dataset that includes all of the sites around the WTC that are included in the evaluation. When these further analyses are complete, we will be sending you a final report.

We would like to take this opportunity to thank all of you for your assistance with this project. We hope that the information provided in this report will answer some of the questions that have been raised since September 11th. We would be happy to answer any questions you have about this report and make a formal presentation to you if you feel that it is indicated. Those individuals who participated in our survey and provided contact information on their questionnaire will receive a personal letter informing them of the results and recommending medical follow up when indicated.

NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
(212) 627-3900 www.nycosh.org

Please feel free to contact me at (513) 841-4386 in the event you have any questions about this report.

Signed:

A handwritten signature in black ink, appearing to read "Richard J. Driscoll". The signature is fluid and cursive, with the first name "Richard" being more prominent.

Richard J. Driscoll, Ph.D., M.P.H.
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An Evaluation of Physical and Mental Health Symptoms Following the World Trade Center (WTC) Disaster: State of New York Workers at 120 Broadway (OAG), Manhattan, and City DEP Workers, Queens

Background

In December 2001, a number of labor unions representing workers employed in the vicinity of the WTC contacted the National Institute for Occupational Safety and Health (NIOSH) to request an evaluation of health complaints, including cough and nose or throat irritation as well as mental health concerns, among their members working near the WTC site. Among these unions representing office workers were District Council 37 of the American Federation of State, County and Municipal Employees (AFSCME), Public Employees Federation (PEF), and the Communications Workers of America (CWA).

In response to these requests, NIOSH investigators met with labor and management representatives and determined that further evaluation was warranted. To address these concerns, NIOSH investigators designed a survey to assess whether employees who work near the WTC site were experiencing more physical and mental health symptoms compared to similar workers employed in New York City, but outside of the WTC site area. Due to the nature of the terrorist attack, residents all over the New York metropolitan area were affected by the WTC collapse. Thus, by choosing a comparison population from within New York City, we wanted to evaluate the additional effect caused by working near the WTC site. Four worker groups were selected for the study, Stuyvesant High School employees, Borough of Manhattan Community College employees, government office workers from a New York City government office building at 40 Rector Street, the State Attorney General's offices at 120 Broadway, and Metropolitan Transportation Authority New York City Transit workers employed in the stations, trains and buses that serve lower Manhattan and the WTC area. For each work group a comparison population was chosen that had the same or similar employer but was not near the WTC site area. New York City Department of Environmental Protection workers at the Lefrak building in Queens were selected as the comparison population for office workers at 40 Rector Street and State employees at 120 Broadway. This letter will provide interim results of the survey at the office buildings. Further analyses will be conducted during the next few months and these results will be reported at a later date.

The office building at 120 Broadway is located approximately two blocks east of the WTC site. This 40-story building houses a variety of businesses, governmental offices, and programs. The Manhattan offices of the New York State Office of the Attorney General (OAG) occupied eight floors of this building on September 11, 2001. The OAG occupied nine floors of the 120 Broadway Building when the questionnaire was administered in June 2002.

The comparison site, the Lefrak Building in Queens, is located approximately 20 miles from the WTC site and is one of the main office buildings for the New York City Department of Environmental Protection. This comparison site was selected because it is 1) a similar office structure, 2) the range jobs and tasks are comparable to those at 40 Rector Street, and 3) the building and its occupants were not involved in the direct attack at the WTC.

On September 11, 2001, State workers at the Office of the Attorney General became aware of the attack on the WTC by various means; many of the workers on upper floors of the building had direct views of the Trade Center towers from their offices and conference rooms. Debris from the WTC was scattered about the streets surrounding 120 Broadway. Employees were asked to evacuate the building at 9:15 A.M., others reported that they did not leave the building until after 4:00 PM that day. Escape routes were limited; public transportation was disrupted and streets were blocked by emergency personnel. Options available for evacuation were south and east where workers could board the Staten Island Ferry or walk across the Brooklyn Bridge or walk North and East away from the WTC site.

The building remained closed from September 11 until September 20, 2001, when employees were asked to return to work on a voluntary basis. All employees were required to report back to work on October 4, 2001.

Workers at the comparison office building were not evacuated from their worksite and workers left for home at various times throughout the day. Work resumed at DEP the following day.

The Questionnaire

The purpose of the questionnaire was to obtain information for evaluating the prevalence of symptoms (mental health and physical) among office workers at both work sites. The questionnaire was self-administered and included questions about work duties and location, symptoms occurring after September 11th, and whether those physical symptoms had improved or gotten worse since then. We asked selected information on past medical history and activities related to events on September 11th. We also asked about mental health symptoms associated with depression and post-traumatic stress disorder (PTSD). It is important to note that the questions we used to assess the symptoms of physical and mental health problems are screening instruments designed for epidemiologic purposes, and are not used to individually diagnose any specific medical disorder. Only a competent health care professional who has completed a thorough clinical evaluation can make a reliable clinical diagnosis.

Definition of physical symptom

The physical symptoms included on the questionnaire (irritation symptoms, upper and lower respiratory symptoms, mucous membrane symptoms, gastrointestinal symptoms) were chosen based on prior NIOSH surveys and on information gathered during informal meetings with workers employed around the WTC site. An affirmative response to 'did you have any of the following symptoms after the WTC disaster on 9/11/01' was defined as having 'symptoms.' 'Persistent symptoms' were defined as either of the following: 1) those with symptoms that existed before 9/11/01 but had worsened since 9/11/01, or 2) those with new onset symptoms since 9/11/01 that had not improved.

Definition of mental health symptom

The questionnaire also included questions to assess symptoms of depression and post-traumatic stress disorder (PTSD). The questions related to depression were from the 20-question Center for Epidemiologic Studies Depression Scale (CES-D)¹. The Center for Epidemiologic Studies of the National Institute of Mental Health developed this short self-reported scale to assess symptoms of depression in the general population. Because of the nature of the WTC disaster, and the likelihood that respondents would be experiencing common acute symptoms that are found on the depression scale, we chose to narrow our focus to those having major depressive symptoms, which are defined as those scoring 22 or higher out of a possible 60 points.

Participants were also asked to respond to questions about having persistent intrusive thoughts, dreams, and vivid reminders about the WTC disaster and whether they were feeling emotionally numb, distant or cut off from friends. These symptoms and others were used to determine whether respondents were experiencing symptoms that are characteristic of a PTSD. The questions related to PTSD were from the Veterans Administration PTSD Checklist². We used the officially accepted criteria for a diagnosis of PTSD as developed by the American Psychiatric Association in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IVTM) to define those individuals with symptoms consistent with PTSD.

Administration of the Questionnaire

The Attorney General's office employs approximately 1000 workers on 9 floors at 120 Broadway, in Manhattan. Because of the number of employees at this site, the Assistant Attorney General in charge of Operations asked that we sample the workforce rather than survey the entire group. We developed a simplified sampling plan that required each floor to be divided into quadrants. We then randomly selected (without replacement) one quadrant for each floor. This sampling plan ensured that each quadrant was equally represented when completed.

Once quadrants were selected, managers were asked to assemble their personnel so that we could seek their participation in the symptom survey. NIOSH staff members explained the purpose of the survey, the time required to complete the questionnaire, and informed each employee that he or she had the right to refrain from answering any or all of the questions. We then distributed questionnaires to each employee present at the meetings. We asked those who did not wish to participate to write 'do not wish to participate' across the top sheet of the questionnaire and return it in a sealed envelope to the central collection where we collected all questionnaires.

Participants had the option to complete the questionnaire in the meeting room or return to their desks.

Data Analysis

For this preliminary report we are providing a comparison of symptom rates between office workers at 120 Broadway and at the DEP's Lefrak building in Queens. This report describes reported symptoms, medical conditions diagnosed by a physician since September 11, 2001, and reported time off work. Future reports will combine data from all of the work groups studied by NIOSH and we will explore the relationship between the rates of these symptoms and various other factors measured in the survey such as exposures to the dust cloud, seeing the collapse and knowing a victim personally.

The prevalence ratio (PR) is defined as the prevalence of symptoms in the study population divided by the prevalence of symptoms in the comparison population. If we find that 50% of the employees at 120 Broadway have chronic cough and 25% of the employees at DEP have chronic cough, then our PR would be 2.0 ($50/25=2$), and we would say that the study group has twice the symptom prevalence as the comparison population. Conversely, if the PR is less than 1 then the prevalence of symptoms or disease is less in the study population than that found in the comparison population. Lastly, a prevalence ratio of 1 indicates that there is no difference in the symptom or disease prevalence between the study and comparison groups. Because all prevalence estimates have some uncertainty, we also calculate the 95% confidence interval. If the lower number in the 95% CI is greater than 1.0 then the evidence for the increase in symptoms in OAG employees compared to DEP employees is especially convincing. The term "statistically significant" is used in designating the prevalence ratios that meet these criteria.

Results

One hundred and sixty six (166) employees at 120 Broadway completed the questionnaire for a participation rate of approximately 37%. Seventy-nine (79) DEP employees at three locations in the Lefrak building completed the questionnaire for a participation of 76%.

We examine a number of characteristics such as sex, age, years employed at the job, etc. to determine the similarity between the study population and the comparison population. Ideally, the distribution of these descriptive characteristics should be similar in each, thereby leaving the exposure potential as the only distinguishing characteristic of the study population. Our comparison of key characteristics of age, job tenure, and sex shows that OAG and DEP participants were similar with regard to age and sex distribution. OAG participants had worked for the State an average of 10 years compared to 15 years for DEP workers. In addition, 71% of the OAG participants reported their race as white compared to 44% of DEP workers.

Results indicate 54% of the OAG participants and 38% of the DEP participants knew someone who was injured or killed at the WTC collapse. 120 Broadway workers were 3 times more likely to have witnessed one or more of the planes crashing into the WTC, and 7 times more likely to have seen persons falling or jumping from the WTC than were DEP participants.

Reports of physical symptoms since September 11th

Table 1 shows the list of symptoms included in the questionnaire. Most of the symptoms can be broadly grouped as follows: 1) symptoms of irritation of the nose, throat, eyes and skin, 2)

respiratory problems such as cough, wheezing, shortness of breath and chest tightness, and 3) gastrointestinal problems such as indigestions, nausea and diarrhea. Table 1 shows the frequency of respondents who reported experiencing each symptom after September 11th and then the prevalence ratio and 95% confidence interval. This table shows that OAG workers had higher rates of symptoms than DEP workers, and rates of nose, throat and eye irritation, all of the respiratory symptoms (except cough with phlegm), eye irritation, and nose/throat irritation were statistically higher in OAG workers compared to DEP workers.

Reports of persistent symptoms since September 11th

In addition to reports of any symptoms after September 11th, we were interested in determining the rates of persistent symptoms that had not improved by March when the clean up was almost complete. Table 2 shows the rates of these persistent symptoms. By comparing Table 1 and Table 2, you can see that 50% or more of those reporting any symptoms since September 11th reported that the symptom had improved by June 2002. However, OAG employees were still reporting higher prevalence rates of shortness of breath (PR 5.2, 95% CI 1.2- 21.5), cough with phlegm (PR 4.5, 95% CI = 1.1-19.0), nose/throat irritation (PR 2.1, 95% CI 1.1-4.1) and eye irritation (PR 2.1, 95% CI 1.1-4.1).

Reports of lost workdays

The questionnaire asked whether the workers had lost time from work because of any of the symptoms listed in Tables 1 and 2. Workers at the OAG reported a slightly higher percentage of employees losing time from work (33%) compared to workers at DEP (28%); however, this difference was not statistically significant.

Reports of symptoms consistent with depression and PTSD

Table 3 provides the rates for symptoms consistent with major depression and PTSD. This table shows that 15% of OAG workers and 19% of DEP workers had symptoms meeting criteria for symptoms of major depression. The rates of symptoms consistent with PTSD were 9% at OAG and 10% at DEP. There was no statistical difference in the rates of major depression symptoms or symptoms consistent with PTSD at either building.

Reports of conditions newly diagnosed by a physician

We asked workers whether a physician had told them they had specific medical conditions and whether those conditions had been diagnosed before or after September 11th. Table 4 shows the rates of respondents who were told by a physician *since* September 11th that they had asthma, allergies, depression or PTSD. These rates were calculated based on those workers who had no previous diagnosis of the condition before September 11th. This table shows that rates for physician newly diagnosed allergies, asthma, and PTSD were higher among OAG participants than among DEP participants. Rates for physician diagnosed depression or mood disorder were the same in each building (1.3%).

Conclusions

Conclusions and recommendations based upon a survey where only 37% of available employees participated must be viewed with considerable caution. Ideally, we would like to see greater than 80% of the workforce participating in a symptom survey. With a high participation rate we can be reasonably certain that those who participated accurately reflected the experiences and condition of the entire study population. When response rates are low, we must be concerned that participants may be different in important ways from non-participants. If the small percentage of participants in this study also had some of the most severe symptoms, then the results from this study might over-estimate health problems. Conversely, if those with the most severe symptoms were not at work or were too sick to participate, we would have an uncharacteristically healthy participating group and we might underestimate the magnitude of the problem. Nonetheless, the results reported are consistent with the results and recommendations that have been found and presented in the companion studies of workers in and around ground zero, where participation rates ranged from 70 to 90%. The recommendations made are in part based upon the data collected as well as current general recommendations that are applicable to workers who continue to experience health problems that may be related to the WTC disaster.

The survey carried out on June 6, 2002 at the Office of the Attorney General, 120 Broadway, Manhattan, has shown that the rates of upper respiratory irritation, indicated by nose/throat irritation, cough, and shortness of breath were significantly higher among OAG participants than among DEP participants. These symptoms persisted in some individuals for at least nine months after the attack on the WTC and may have been due to exposure to complex environmental contaminants (e.g., smoke, respirable airborne particles, fine dust, and fire combustion products) from the collapse of the towers and ensuing fires. An understandable limitation at the time of the collapse of the WTC was the lack of initial environmental exposure assessment, thus, we do not know the scope or extent of exposure at that time. Sampling by NIOSH, between September 18th and October 4th, to evaluate exposures for those working in the rescue and recovery operation found few of the measured substances that exceeded occupational standards³. However, little is known about the health effects from complex exposures such as occurred as a result of the WTC collapse and subsequent on-going fires. Studies such as this and others involving more in depth evaluations of rescue and recovery workers may be helpful in clarifying some of these associations.

Conversely, rates of symptoms consistent with major depression or PTSD at 120 Broadway were indistinguishable from those at the comparison building and lower than those found among City office workers surveyed in April at 40 Rector Street.

Symptom surveys and interpretations based on frequency data have limitations. Responses to extraordinary traumatic events may provoke a range of reactions, and symptoms alone are not adequate to fully diagnose medical conditions. Following a traumatic event, symptoms that would once be overlooked, may be perceived as more serious and reported as such. Those who continue to experience persistent or recurrent symptoms should be evaluated by a health care professional so that a complete assessment can be made. Further systematic investigations using full clinical diagnostic assessment, though labor and resource intensive, would be useful in sorting out the breadth and scope of illness in those with persistent symptoms.

We found that 15% of the OAG participants and 19% of the DEP participants had symptoms consistent with major depression. In addition, 9% of OAG participants and 10% of DEP staff had symptoms consistent with PTSD. Although the rates of symptoms of depression in both office buildings are higher than national studies that have used the same set of questions (CES-D)⁴, those populations had not recently experienced a major disaster and may be of limited utility as a comparison. Other studies of the WTC and previous disasters have shown results similar to our findings. A study that evaluated survivors six months after the bombing of the Federal Building in Oklahoma City found that 34% met the diagnostic criteria for PTSD⁵. Various studies of New York City residents conducted since September 11th have identified elevated rates of symptoms of depression and PTSD and, although they have used a variety of assessment methods, the rates are consistent but slightly higher than we found in these office buildings.^{6,7,8} One large national study found that all New York City respondents had higher rates of symptoms of PTSD compared to other respondents, and those in the WTC or a surrounding building on September 11th had higher rates compared to other New Yorkers⁶.

It is difficult to predict the long-term effect from this disaster on mental health. Many of the symptoms that the office staff is experiencing may be a normal and reversible reaction to a traumatic event. Researchers evaluating the Oklahoma City bombing found that most individuals directly involved did not develop diagnosable psychiatric illness, but the majority reported experiences such as sleep disturbance, feeling emotionally upset afterwards and loss of concentration⁹. However, it is important to encourage workers who continue to experience symptoms to seek professional help.

Recommendations

The workplace plays an important role in the health of its workers. One of the ways the workplace can help reduce the burden of illness is by providing a community and a mechanism for social support. Social support from supervisors and coworkers has been shown in repeated studies to buffer the effects of stress¹⁰. Therefore, it is essential that management and labor unions continue to develop a community atmosphere that is supportive and encourages and assists those who continue to experience symptoms to seek care from a competent health care professional. This is equally important at the DEP where employees were likely to know a victim and, like many other New Yorkers, also expressed symptoms associated with depression. Some of the specific ways that this can be accomplished include:

- Those staff members who continue to experience persistent symptoms should be encouraged to seek competent professional medical assistance. Management and union officials should seek mechanisms such as hot line numbers, counseling services and posters to inform members of available services.
- Free mental health services have been made available by governmental and nongovernmental agencies. Managers should find methods to advertise these services and seek ways to encourage participation when indicated. Many individuals may avoid accessing mental health services because of the stigma that is associated with mental

illness; therefore, every effort should be made to minimize this stigma and to encourage participation.

- Training should continue for managers and supervisory personnel at all levels to insure that each group is responding appropriately to health and safety concerns of employees. As part of this training, issues at the organizational level should be evaluated to determine whether improvements can be made to address widespread concern among employees concerning health, safety and security issues.
- Developing programs to foster social support on campus are important in buffering workplace stress. This may be especially important in the period surrounding the anniversary of September 11th.

Tables 1
Physical Health Symptoms Occurring After September 11th 2001
120 Broadway, Manhattan, and DEP Lefrak Building, Queens

Have you had any of the following symptoms since the WTC disaster on 9/11?	120 Broadway	DEP Lefrak Bldg	Prevalence Ratio 120 Broadway/ Lefrak (95% CI)
	Number and Percent	Number and Percent	
Nose/throat irritation *	110 (67%)	28 (37%)	1.8 (1.3-2.4)*
Eye irritation*	114 (69%)	34 (44%)	1.6 (1.2-2.1)*
Skin irritation	32 (18%)	13 (17%)	1.1 (0.6-2.1)
Congestion	72 (45%)	34 (44%)	1.1 (0.8-1.4)
Cough, any kind*	110 (66%)	23 (30%)	2.2 (1.5-3.2)*
Cough with phlegm	54 (34%)	16 (21%)	1.6 (0.9-2.6)
Chest tightness*	42 (26%)	6 (8%)	3.3 (1.5-7.5)*
Short of Breath*	58 (35%)	11 (14%)	2.5 (1.3-4.4)*
Wheeze*	34 (21%)	7 (9%)	2.2 (1.1-4.8)*
Indigestion	43 (27%)	13 (17%)	1.6 (0.9-2.8)
Nausea	17 (11%)	6 (8%)	1.3 (0.6-3.3)
Diarrhea	34 (21%)	9 (12%)	1.8 (0.9-3.5)
Headache	79 (48%)	35 (45%)	1.1 (0.8-1.4)

* Statistically significant Prevalence Ratio

Table 2
Persistent Physical Health Symptoms Occurring After September 11th 2001
120 Broadway, Manhattan, and DEP Lefrak Building, Queens

Persistent Symptoms after the WTC disaster on 9/11?*	120 Broadway	DEP Lefrak Bldg	Prevalence Ratio 120 Broadway/ Lefrak (95% CI)
	Number and Percent	Number and Percent	
Nose/throat irritation *	40 (24%)	9 (12%)	2.1 (1.1-4.1)
Eye irritation *	40 (24%)	9 (12%)	2.1 (1.1-4.1)
Skin irritation	13 (8%)	4 (5%)	1.5 (0.5-4.5)
Congestion	29 (18%)	8 (10%)	1.7 (0.8-3.6)
Cough, any kind*	37 (22%)	7 (9%)	2.5 (1.2-5.3)
Cough with phlegm *	19 (12%)	2 (3%)	4.5 (1.1-19.0)
Chest tightness	15 (9%)	1 (1%)	7.1 (0.9-53.0)
Shortness of Breath *	22 (13%)	2 (3%)	5.2 (1.2-21.5)
Wheeze	9 (5%)	1 (1.3%)	4.1 (0.5-32.1)
Indigestion *	15 (9%)	0 (0%)	—
Nausea	6 (4%)	1 (1%)	2.8 (0.3-23.3)
Diarrhea	7 (4%)	1 (1%)	3.3 (0.4-26.1)
Headache	30 (18%)	7 (9%)	2.0 (0.9-4.4)

* Statistically significant Prevalence Ratio

** Symptoms that existed before 9/11/01 but had worsened since 9/11 or new onset symptoms that had not improved

Table 3
Mental Health Symptoms
120 Broadway, Manhattan, and DEP Lefrak Building, Queens

Symptom consistent with:	120 Broadway Number (%)	Lefrak Bldg Number (%)	Prevalence Ratio (95% CI)
Depression ^A	25 (15%)	14 (19%)	0.8 (0.5-1.5)
PTSD ^B	15 (9%)	8 (10%)	0.9 (0.4-2.0)

^A 'Depressive symptoms' were defined as a score of 22 or more using the CES-D scale.

^B Post traumatic stress syndrome' defined using the Veteran's Administration Checklist and applying the DSM-IV criteria.

*** Statistically significant prevalence ratio

Table 4
Reported New Physician-Diagnosed Medical Conditions
120 Broadway, Manhattan, and DEP Lefrak Building, Queens

Has a physician told you that you have:	Physician told me after September 11* 120 Broadway Lefrak		Prevalence Ratio (95% CI)
Allergies	8 (9%)	0 (0%)	-----
Asthma	4 (3%)	0 (0%)	-----
Depression or Mood Disorder	2 (1.3%)	1 (1.3%)	0.9 (0.8-11.0)
Post Traumatic Stress Disorder	6 (3.7%)	1 (1.3%)	2.9 (0.3-23.2)

* Rate is based only on those who did not have a diagnosis of the condition before 9/11

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DEPARTMENT OF HEALTH & HUMAN SERVICES

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October 23, 2002
HETA 2002-101

Dear Union and Management Representatives:

Enclosed is the interim report of the National Institute for Occupational Safety and Health (NIOSH) evaluation of the New York City office workers at the 40 Rector Street Building, Manhattan. We are providing a comparison of rates of eye, ear, nose, throat and skin irritation, respiratory symptoms and gastrointestinal symptoms as well as symptoms of depression and post traumatic stress disorder between workers at 40 Rector Street and office workers at the Department of Environmental Protection [DEP] at the LeFrak building in Queens. The evaluation of 40 Rector Street workers and DEP workers is part of a larger evaluation we are doing of workers employed near the World Trade Center (WTC) site. We will be doing further analyses of the collected information but with a combined dataset that includes all of the sites around the WTC that are included in the evaluation. When these further analyses are complete, we will be sending you a final report.

We would like to take this opportunity to thank all of you for your assistance with this project. We hope that the information provided in this report will answer some of the questions that have been raised since September 11th. We would be happy to answer any questions you have about this report and make a formal presentation to you and your staff if you feel that it is indicated. Those individuals who participated in our survey and provided contact information on their questionnaire will receive a personal letter informing them of the results and recommending medical follow up when indicated.

NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
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Please feel free to contact me at (513) 841-4386 if you have any question about this report.

Richard J. Driscoll, Ph.D., M.P.H.
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An Evaluation of Physical and Mental Health Symptoms Following the World Trade Center (WTC) Disaster: City Workers at 40 Rector Street, Manhattan and State DEP Workers, Queens

Background

In December 2001, a number of labor unions representing workers employed in the vicinity of the WTC contacted the National Institute for Occupational Safety and Health (NIOSH) to request an evaluation of health complaints, including cough and nose or throat irritation as well as mental health concerns, among their members working near the WTC site. Among these unions representing office workers were District Council 37 of the American Federation of State, County and Municipal Employees (AFSCME), Public Employees Federation (PEF), and the Communications Workers of America (CWA).

In response to these requests, NIOSH investigators met with labor and management representatives and determined that further evaluation was warranted. To address these concerns, NIOSH investigators designed a survey to assess whether employees who work near the WTC site were experiencing more physical and mental health symptoms compared to similar workers employed in New York City, but outside of the WTC site area. Due to the nature of the terrorist attack, residents all over the New York metropolitan area were affected by the WTC collapse. Thus, by choosing a comparison population from within New York City, we wanted to evaluate the additional effect caused by working near the WTC site. Four employee groups were selected for the study, Stuyvesant High School employees, Borough of Manhattan Community College employees, government office workers from a New York City government office building at 40 Rector Street and the State Attorney General's building at 120 Broadway and Metropolitan Transportation Authority New York City Transit workers employed in the stations, trains and buses that serve lower Manhattan and the WTC area. For each work group a comparison population was chosen that had the same or similar employer but was not near the WTC site area. New York City Department of Environmental Protection workers at the LeFrak building in Queens were selected as the comparison population for office workers at 40 Rector Street and employees at 120 Broadway. This letter will provide interim results of the survey at the office buildings. Further analyses will be conducted during the next few months and these results will be reported at a later date.

The office building at 40 Rector Street is located approximately three blocks south of the WTC site. This 19-story building houses a variety of private businesses and offices for the City of New York. Employees at four New York City programs participated in this study and include, the Civilian Complaint Review Board (CCRB), Taxi and Limousine Commission (TLC), Office of Administrative Trials and Hearings (OATH), and the Campaign Finance Board (CFB). These programs were selected to represent office workers in the WTC area and include a variety of clerical, administrative, and managerial workers.

The comparison site, the LeFrak Building in Queens, is located approximately 20 miles from the WTC site and is one of the main office buildings for the New York City Department of Environmental Quality. This comparison site was selected because it is 1) a similar office structure, 2) the range jobs and tasks are comparable to those at 40 Rector Street, and 3) the

building and its occupants were not involved in the direct attack at the WTC. On September 11th, word of the attack spread through the offices at 40 Rector Street. Most employees could not see the WTC from their offices but they could hear and feel the explosions as they occurred. Several offices had indirect views of the WTC but workers had direct views of the debris from the buildings, of an airplane wheel and body parts from victims that were scattered about the streets surrounding the building. Employees began to evacuate the building at approximately 9:05 AM. Escape routes were limited; travel to the north was blocked by the fires and falling debris from the WTC. The only options available for evacuation were south and east where workers could board the Staten Island Ferry or walk across the Brooklyn Bridge. Many workers were able to walk east and then finally north, out of Lower Manhattan.

The building remained closed from September 11 until October 25, 2001 when employees were asked to return to work. Not all offices resumed operation at the same time, but most were back at work by the beginning of November 2001.

Workers at the comparison office building were not evacuated from their worksite on September 11, and workers left for home at various times throughout the day. Work resumed at DEP the following day.

The Questionnaire

The purpose of the questionnaire was to obtain information for evaluating the prevalence of symptoms (mental health and physical) among office workers at both work sites. The questionnaire was self-administered and included questions about work duties and location, symptoms occurring after September 11th, and whether those physical symptoms had improved or gotten worse since then. We asked selected information on past medical history and activities related to events on September 11th. We also asked about mental health symptoms associated with depression and post-traumatic stress disorder (PTSD). It is important to note that the questions we used to assess the symptoms of physical and mental health problems are screening instruments designed for epidemiologic purposes, and are not used to individually diagnose any specific medical disorder. Only a competent health care professional who has completed a thorough clinical evaluation can make a reliable clinical diagnosis.

Definition of physical symptom

The physical symptoms included on the questionnaire (irritation symptoms, upper and lower respiratory symptoms, mucous membrane symptoms, gastrointestinal symptoms) were chosen based on information gathered during informal meetings with workers employed around the WTC site. An affirmative response to 'did you have any of the following symptoms after the WTC disaster on 9/11/01' was defined as having 'symptoms.' 'Persistent symptoms' were defined as either of the following: 1) those with symptoms that existed before 9/11/01 but had worsened since 9/11/01, or 2) those with new onset symptoms since 9/11/01 that had not improved.

Definition of mental health symptom

The questionnaire also included questions to assess symptoms of depression and post-traumatic stress disorder (PTSD). The questions related to depression were from the 20-question Center for Epidemiologic Studies Depression Scale (CES-D)¹. The Center for Epidemiologic Studies of the National Institute of Mental Health developed this short self-reported scale to assess symptoms of depression in the general population. Because of the nature of the WTC disaster, and the likelihood that respondents would be experiencing common acute symptoms that are found on the depression scale, we chose to narrow our focus to those having major depressive symptoms, which are defined as those scoring 22 or higher out of a possible 60 points.

Participants were also asked to respond to questions about having persistent intrusive thoughts, dreams, and vivid reminders about the WTC disaster and whether they were feeling emotionally numb, distant, or cut off from friends. These symptoms and others were used to determine whether respondents were experiencing symptoms that are characteristic of a PTSD. The questions related to PTSD were from the Veterans Administration PTSD Checklist². We used the officially accepted criteria for a diagnosis of PTSD as developed by the American Psychiatric Association in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV™) to define those individuals with symptoms consistent with PTSD.

Administration of the Questionnaire

On April 8, 2002, Program managers were asked to assemble personnel so that we could seek their voluntary participation in the symptom survey. NIOSH staff members explained the purpose of the survey, the time required to complete the questionnaire, and informed each employee that he or she had the right to refrain from answering any or all of the questions. We then distributed questionnaires to each employee present at the meetings. We asked those who did not wish to participate to write 'do not wish to participate' across the top sheet of the questionnaire and return it in a sealed envelope to the central collection site where we collected all questionnaires.

Participants had the option to complete the questionnaire in the meeting room or return to their desks.

Data Analysis

For this preliminary report we are providing a comparison of symptom rates between office workers at 40 Rector Street and DEP office workers at the LeFrak building in Queens. This report describes reported symptoms, medical conditions diagnosed by a physician since September 11th, and reported time off work. Future reports will combine data from all of the work groups studied by NIOSH and we will explore the relationship between the rates of these symptoms and various other factors measured in the survey such as exposures to the dust cloud, seeing the collapse and knowing a victim personally.

The prevalence ratio (PR) is defined as the prevalence of symptoms in the study population divided by the prevalence of symptoms in the comparison population. If we find that 50% of the employees at 40 Rector Street have a symptom such as congestion, and 25% of the employees at DEP have congestion, then our PR would be 2.0 ($50/25=2$), and we would say that the study group has twice the symptom prevalence as the comparison population. Conversely, if the PR is less than 1 then the prevalence of symptoms or disease is less in the study population than that found in the comparison population. Lastly, a prevalence ratio of 1 indicates that there is no difference in the symptom or disease prevalence between the study and comparison groups. Because all prevalence estimates have some uncertainty, we also calculate the 95% confidence interval. If the lower number in the 95% CI is greater than 1.0 then the evidence for the increase in symptoms in 40 Rector Street employees compared to DEP employees is especially convincing. The term “statistically significant” is used in designating the prevalence ratios that meet these criteria.

Results

Three hundred thirty (330) employees at 40 Rector Street completed the questionnaire. These 330 participants were from the Civilian Complaint Review Board [CCRB](121), Taxi and Limousine Commission [TLC] (56), Campaign Finance Board [CFB] (54), and the Office of Administrative Trials and Hearings [OATH] (20) resulting in an overall participation of 82%. Seventy-nine DEP employees at three locations in the LeFrak building completed the questionnaire for a participation of 76%.

We examine a number of characteristics such as sex, age, years employed at the job, etc. to determine the similarity between the study population and the comparison population. Ideally, the distribution of these descriptive characteristics should be similar in each, thereby leaving the exposure potential as the only distinguishing characteristic of the study population. Our comparison of key characteristics of age, job tenure, and sex shows that DEP participants tended to be older than 40 Rector Street participants, have worked longer, and were more likely to be male than participants at 40 Rector Street. The mean age of DEP participants was 46 years, while the age of 40 Rector Street participants was 37 years. DEP participants have worked at their job longer than 40 Rector Street participants (11 yrs. vs. 5 yrs.) and DEP participants were predominately male (62%) while 40 Rector Street participants tended to be female (60%).

Results indicate 49% of the 40 Rector Street participants and 38% of the DEP participants knew someone who was injured or killed at the WTC collapse. 40 Rector street workers were 3 times more likely to have witnessed one or more of the planes crashing into the WTC, and 7 times more likely to have seen persons falling or jumping from the WTC than were DEP participants.

Reports of physical symptoms since September 11th

Table 1 shows the list of symptoms included in the questionnaire. Most of the symptoms can be broadly grouped as follows: 1) symptoms of irritation of the nose, throat, eyes and skin, 2) respiratory problems such as cough, wheezing, shortness of breath and chest tightness, and 3)

gastrointestinal problems such as indigestion, nausea and diarrhea. Table 1 shows the frequency of respondents who reported experiencing each symptom after September 11th and then the prevalence ratio and 95% confidence interval. This table shows that 40 Rector Street workers had higher rates of symptoms than DEP workers, and rates of nose, throat and eye irritation, all of the respiratory symptoms (except wheezing), and nausea, diarrhea, and headaches were statistically higher among 40 Rector Street workers than DEP workers.

Table 2 lists symptoms by individual department or program at 40 Rector Street. Symptom prevalences were generally elevated compared to the rates found at the DEP; however, not all of the increased prevalences were statistically significant. The highest prevalence rates were found for respiratory symptoms including cough, chest tightness, shortness of breath, and wheezing (PR ranged 2.1 to 4.5). Additionally, the prevalence of nausea and diarrhea was higher among CCRB and TLC participants than among DEP personnel (PR ranged 1.5 to 3.1). Results are not shown in instances where there are fewer than 5 respondents.

Reports of persistent symptoms since September 11th

In addition to reports of any symptoms after September 11th, we were interested in determining the rates of persistent symptoms that had not improved by March when the clean up was almost complete. Table 3 shows the rates of these persistent symptoms. By comparing Table 1 and Table 3, you can see that 50% or more of those reporting any symptoms since September 11th reported that the symptom had improved by March 2002. However, 8-26% of 40 Rector Street employees were still reporting eye, nose, throat and skin irritation, and respiratory complaints such as cough, shortness of breath, wheezing and chest tightness. In addition, 40 Rector Street employees were 9 times more likely than DEP workers to report chest tightness (PR=9.0, 95% CI 1.2-64), 5 times more likely to report being short of breath (PR=5.0, 95% CI, 1.3-20.5), and 3 times more likely to report a persistent headache (PR=3.2, 95% CI, 1.5-6.6).

Analysis of persistent symptoms by department was not done because the numbers were too small to produce meaningful results.

Reports of lost work days

We asked workers whether they had lost time from work because of any of the symptoms listed in Tables 1 and 3. Thirty six percent of 40 Rector Street employees and 27% of DEP participants reported losing time from work. The percentages of employees reporting lost time from work at 40 Rector Street and DEP were not statistically significant (p=0.18).

Reports of symptoms consistent with depression and PTSD

Table 4 provides the rates for those reporting symptoms consistent with major depression and PTSD. This table shows that 21% of 40 Rector Street workers and 19% of DEP workers had symptoms meeting criteria for symptoms of major depression. The rates of symptoms consistent with PTSD were 14% at 40 Rector Street and 10% at DEP. The differences in reported symptoms for major depression and PTSD were not statistically significant.

Table 5 lists the individual department rates for those reporting symptoms consistent with major depression. Point estimates for symptoms consistent with major depression were elevated for CCRB and TLC compared to DEP and lower for OATH and CFB, however, these results were not statistically significant.

Table 6 shows the individual departmental rates for symptoms consistent with PTSD. Employee participants at CCRB and TLC had elevated point estimates for symptoms consistent with PTSD; however, these were not statistically significant. Employees at OATH and CFB were less likely than DEP participants to report symptoms consistent with PTSD, but again, these estimates were not statistically significant.

Reports of conditions newly diagnosed by a physician

We asked workers whether a physician had told them that they had specific medical conditions and whether those conditions had been diagnosed before or after September 11th. Table 7 shows the rates of respondents who were told by a physician *since* September 11th that they had asthma, allergies, depression or PTSD. These rates were calculated based on those workers who had no previous diagnosis of the condition before September 11th. This table shows that rates of all four diagnoses were higher among 40 Rector Street participants than DEP participants; however, only the difference for allergies and asthma were statistically significant.

Conclusions

The survey carried out in April 2002 at 40 Rector Street and the DEP program offices at the LeFrak Building has shown that the rates of symptoms related to nose, throat and eye irritation as well as respiratory symptoms and some gastrointestinal symptoms were higher at 40 Rector Street compared to the DEP. Although half of those reporting any symptom since September 11th also reported some improvement, between 8 and 26% reported persistent symptoms still present in April 2002. These symptoms may have been due to exposure to complex environmental contaminants (e.g., smoke, respirable airborne particles, fine dust, and fire combustion products) from the collapse of the towers and ensuing fires. An understandable limitation at the time of the collapse of the WTC was the lack of initial environmental exposure assessment, thus we do not know the scope or extent of exposure at that time. Sampling by NIOSH, between September 18th and October 4th, to evaluate exposures for those working in the rescue and recovery operation found few of the measured substances that exceeded occupational standards³. However, little is known about the health effects from complex exposures such as occurred as a result of the WTC collapse and subsequent on-going fires. Studies such as this and others involving more in depth evaluations of rescue and recovery workers may be helpful in clarifying some of these associations.

Symptom surveys and interpretations based on frequency data have limitations. Responses to extraordinary traumatic events may provoke a range of reactions, and symptoms alone are not adequate to fully diagnose medical conditions. Following a traumatic event, symptoms that

would once be overlooked, may be perceived as more serious and reported as such. Those who continue to experience persistent or recurrent symptoms should be evaluated by a health care professional so that a complete assessment can be made. Further systematic investigations using full clinical diagnostic assessment, though labor and resource intensive, would be useful in sorting out the breadth and scope of illness in those with persistent symptoms.

We found that 21% of 40 Rector Street staff and 19% of DEP staff had symptoms consistent with major depression and 14% of 40 Rector staff and 8% of DEP staff had symptoms consistent with PTSD. Although the rates of symptoms of depression at both office locations are higher than national studies that have used the same set of questions (CES-D)⁴, those populations had not recently experienced a major disaster and may be of limited utility as a comparison. Other studies of the WTC and previous disasters have shown results that are similar to our findings. A study that evaluated survivors six months after the bombing of the Federal Building in Oklahoma City found that 34% met the diagnostic criteria for PTSD⁵. Various studies of New York City residents conducted since September 11th have identified elevated rates of symptoms of depression and PTSD and, although they have used a variety of assessment methods, the rates are consistent with what we found in the office populations^{6,7,8}. One large national study found that all New York City respondents had higher rates of symptoms of PTSD compared to other respondents, and those in the WTC or a surrounding building on September 11th had higher rates compared to other New Yorkers⁶.

It is difficult to predict the long-term effect from this disaster on mental health. Many of the symptoms that the workers in these buildings are experiencing may be normal and reversible reactions to traumatic events. Researchers evaluating the Oklahoma City bombing found that most individuals directly involved did not develop diagnosable psychiatric illness, but the majority reported experiences such as sleep disturbance, feeling emotionally upset afterwards and loss of concentration⁹. However, it is important to encourage workers who continue to experience symptoms to seek professional help.

For questionnaire studies such as this, we aim for a participation rate of over 80% of the staff to assure that the results are representative of all employees. The participation rate in this study was 82%, and the results of the same survey completed by High School personnel and Community College personnel showed similar results to those found in the office workers. I have included a copy of these results for your information.

Recommendations

The workplace plays an important role in the health of its workers. One of the ways the workplace can help reduce the burden of illness is by providing a community and a mechanism for social support. Social support from supervisors and coworkers has been shown in repeated studies to buffer the effects of stress¹⁰. Therefore, it is essential that City Administrators and labor unions continue to develop a community atmosphere that is supportive and encourages and assists those who continue to experience symptoms to seek care from a competent health care professional. This is equally important at DEP where employees were likely to know a victim

and, like many other New Yorkers, also expressed symptoms associated with depression. Some of the specific ways that this can be accomplished include:

- Those staff members who continue to experience persistent symptoms should be encouraged to seek competent professional medical assistance. Administration and union officials should seek mechanisms such as hot line numbers, counseling services and posters to inform members of available services.
- Free mental health services have been made available by governmental and nongovernmental agencies. Managers should find methods to advertise these services and seek ways to encourage participation when indicated. Managers should be aware that many individuals may avoid accessing mental health services because of the stigma that is associated with mental illness. It is important to find ways to help minimize this stigma and to encourage participation.
- Training should continue for managers and supervisory personnel at all levels to insure that each group is responding appropriately to health and safety concerns of employees. As part of this training, issues at the organizational level should be evaluated to determine whether improvements could be made to address widespread concern among employees concerning health, safety and security issues. Each program has an existing union/management health and safety committee and these committees are excellent mechanisms to address safety and health concerns as they arise.
- Developing programs to foster social support on campus are important in buffering workplace stress. This may be especially important in the period surrounding the anniversary of September 11th.

Table 1
Physical Health Symptoms Occurring After September 11th 2001
40 Rector Street, Manhattan, and DEP Lefrak Building, Queens

Have you had any of the following symptoms since the WTC disaster on 9/11?	40 Rector Street	Lefrak Bldg	Prevalence Ratio 40 Rector Street/ LeFrak (95% CI)
	Number and Percent	Number and Percent	
Nose/throat irritation*	148 (60%)	28 (37%)	1.6 (1.2-2.2)*
Eye irritation*	139 (57%)	34 (44%)	1.3 (1.0-1.7)*
Skin irritation	55 (23%)	13 (17%)	1.4 (0.8-2.3)
Congestion	117 (49%)	34 (44%)	1.1 (0.8-1.5)
Cough, any kind*	163 (66%)	23 (30%)	2.2 (1.5-3.2)*
Cough with phlegm*	86 (36%)	16 (21%)	1.7 (1.1-2.8)*
Chest tightness*	69 (29%)	6 (8%)	3.6 (1.6-8.1)*
Short of Breath*	78 (33%)	11 (14%)	2.3 (1.3-4.1)*
Wheeze	42 (18%)	7 (9%)	1.9 (0.8-4.0)
Indigestion	55 (23%)	13 (17%)	1.4 (0.8-2.4)
Nausea*	43 (18%)	6 (8%)	2.3 (1.1-5.2)*
Diarrhea*	56 (24%)	9 (12%)	2.0 (1.1-3.8)*
Headache*	164 (67%)	35 (45%)	1.5 (1.1-1.9)*

* Statistically significant Prevalence Ratio

Table 2

40 Rector Street Prevalence Rates by Department

Number (Percent) and Prevalence Rates (PR) of Symptoms by Department at 40 Rector Street compared to DEP LeFrak Building					
Symptoms	Departments/Programs				
	CCRB n=121 Number (%) PR 95% CI	CFB n=54 Number (%) PR 95% CI	OATH n=20 Number (%) PR 95% CI	TLC n= 56 Number (%) PR 95% CI	DEP n=79 Number (%) PR 95% CI
Nose/Throat Irritation	72 (61%) PR=1.7 95% CI= (1.2-2.3)*	32 (60%) PR=1.6 CI= (1.8-2.4)*	10 (50%) PR=1.4 95% CI= (1.8-2.3)*	34 (63%) PR=1.7 95% CI= (1.2-2.3)*	28 (37%) PR=1.0 Referent
Eye Irritation	65 (56%) PR=1.2 95% CI= (0.9-1.7)	32 (63%) PR=1.4 95% CI= (1.2-2.0)	14 (70%) PR=1.6 95% CI= (1.1-2.4)	28 (28%) PR=1.2 95% CI= (0.8-1.7)	34 (44%) PR=1.0 Referent
Skin Irritation	26 (22%) PR=1.3 95% CI= (0.7-2.4)	11 (22%) PR=1.3 95% CI= (0.6-2.1)	<5	15 (28%) PR=1.7 95% CI= (0.8-3.2)	13 (17%) PR=1.0 Referent
Congestion	57 (28%) PR=1.1 95% CI= (0.8-1.5)	27 (52%) PR=1.2 95% CI= (0.8-1.7)	9 (45%) PR=1.1 95% CI= (0.6-1.8)	24 (46%) PR=1.1 95% CI= (0.7-1.5)	34 (44%) PR=1.0 Referent
Cough Any Kind	78 (65%) PR=2.2 95% CI= (1.5-3.2)	33 (64%) PR=2.1 95% CI= (1.4-3.2)	12 (60%) PR=2.0 95% CI= (1.2-3.3)	40 (71%) PR=2.4 95% CI= (1.6-3.5)	23 (30%) PR=1.0 Referent
Cough With Phlegm	42 (36%) PR=1.7 95% CI= (1.1-2.8)	21 (42%) PR=1.2 95% CI= (1.2-3.5)	< 5	20 (37%) PR=1.8 95% CI= (1.1-3.2)	16 (63%) PR=1.0 Referent

Table 2 (Continued)

40 Rector Street Prevalence Rates by Department

Number (Percent) and Prevalence Rates of Symptoms by Department at 40 Rector Street compared to DEP LeFrak Building					
Symptoms	Departments/Programs				
	CCRB n=121 Number (%) PR 95% CI	CFB n=54 Number (%) PR 95% CI	OATH n=20 Number (%) PR 95% CI	TLC n=56 Number (%) PR 95% CI	DEP n=79 Number (%) PR 95% CI
Chest Tightness	42 (35%) PR=4.5 95% CI= (2.0-10.0)	6 (12%) PR=1.6 95% CI= (0.5-4.5)	5 (25%) PR=3.2 95% CI= (1.1-9.3)	16 (31%) PR=4.0 95% CI= (1.6-9.3)	6 (8%) PR=1.0 Referent
Short of Breath	39 (33%) PR=2.3 95% CI= (1.3-4.3)	11 (22%) PR=1.5 95% CI= (0.7-3.3)	<5	24 (61%) PR=3.2 95% CI= (1.7-6.0)	11 (14%) PR=1.0 Referent
Wheeze	13 (11%) PR=1.2 95% CI= (0.5-2.8)	9 (18%) PR=1.9 95% CI= (0.8-4.8)	<5	16 (30%) PR=3.2 95% CI= (1.4-7.2)	7 (9%) PR=1.0 Referent
Indigestion	24 (21%) PR=1.2 95% CI= (0.7-2.3)	11 (22%) PR=1.3 95% CI= (0.6-2.7)	6 (30%) PR=1.8 95% CI= (0.8-4.1)	14 (27%) PR=1.6 95% CI= (0.8-3.2)	13 (17%) PR=1.0 Referent
Nausea	28 (23%) PR=3.1 95% CI= (1.3-7.1)	8 (16%) PR=2.1 95% CI= (0.8-5.63)	<5	6 (12%) PR=1.5 95% CI= (0.5-4.4)	6 (8%) PR=1.0 Referent
Diarrhea	85 (26%) PR=2.2 95% CI= (1.1-4.4)	10 (19%) PR=1.7 95% CI= (0.7-3.8)	<5	12 (24%) PR=2.0 95% CI= (0.9-4.4)	9(12%) PR=1.0 Referent
Headache	85 (71%) PR=1.6 95% CI= (1.2-2.1)	30 (58%) PR=1.3 95% CI= (0.9-1.8)	14 (70%) PR=1.5 95% CI= (1.1-2.3)	35 (63%) PR=1.4 95% CI= (1.0-1.9)	35 (45%) PR=1.0 Referent

Table 3
Persistent Physical Health Symptoms Occurring After September 11th 2001
40 Rector Street, Manhattan, and LeFrak Building, Queens

Persistent Symptoms after the WTC disaster on 9/11?*	40 Rector Street	LeFrak Bldg	Prevalence Ratio 40 Rector Street/ LeFrak (95% CI)
	Number and Percent	Number and Percent	
Nose/throat irritation	53 (22%)	9 (12%)	1.8 (0.9-3.5)
Eye irritation *	62 (26%)	9 (12%)	2.2 (1.2-4.2)
Skin irritation	20 (8%)	4 (5%)	1.6 (0.5-4.5)
Congestion	46 (19%)	8 (10%)	1.8 (0.9-3.7)
Cough, any kind	45 (18%)	7 (9%)	2.0 (0.9-4.3)
Cough with phlegm	25 (11%)	2 (3%)	4.0 (1.0-19.0)
Chest tightness*	28 (12%)	1 (1%)	9.0 (1.2-64.0)
Shortness of Breath *	31 (13%)	2 (3%)	5.0 (1.3-20.5)
Wheeze	15 (6%)	1 (1.3%)	4.6 (0.6-35.0)
Indigestion *	26 (11%)	0 (0%)	—
Nausea	11 (5%)	1 (1%)	3.6 (0.5-27.1)
Diarrhea	17 (7%)	1 (1%)	5.5 (0.7-40.3)
Headache*	71 (29%)	7 (9%)	3.2 (1.5-6.6)

* Statistically significant Prevalence Ratio

** Symptoms that existed before 9/11/01 but had worsened since 9/11 or new onset symptoms that had not improved

Table 4
Mental Health Symptoms
40 Rector Street, Manhattan, and Lefrak Building, Queens

Symptom consistent with:	40 Rector Street Number (%)	DEP LeFrak Bldg Number (%)	Prevalence Ratio (95% CI)
Depression ^A	50 (21%)	14 (19%)	1.1 (0.7-1.9)
PTSD ^B	35 (14%)	8 (10%)	1.4 (0.7-2.8)

^A 'Depressive symptoms' were defined as a score of 22 or more using the CES-D scale.

^B Post traumatic stress syndrome' defined using the Veteran's Administration Checklist and applying the DSM-IV criteria.

*** Statistically significant prevalence ratio

Table 5
40 Rector Street: Symptoms Consistent with Major Depression by Department

40 Rector Street Department	40 Rector Street Number and Percent	Prevalence Ratio 40 Rector Street/ DEP-LeFrak (95% CI)
CCRB	32 (27%)	1.43 (0.8 - 3.0)
TLC	10 (20%)	1.1 (0.5 - 2.0)
OATH	25 (15%)	0.8 (0.5, 1.5)
CFB	5 (10%)	0.5 (0.2, 1.4)
DEP Comparison Site	14 (19%)	1.0 (Referent)

Table 6

40 Rector Street: Symptoms Consistent with Post-Traumatic Stress Syndrome by Department

40 Rector Street Department	40 Rector Street	Prevalence Ratio 40 Rector Street/ DEP- LeFrak (95% CI)
	Number and Percent	
CCRB	22 (19%)	1.8 (0.9, 3.9)
TLC	9 (17%)	1.6 (0.7, 4.0)
OATH	0 (0%)	-----
CFB	<5	---
DEP Comparison Site	8 (10%)	1.0 (Referent)

Table 7
Reported New Physician-Diagnosed Medical Conditions
40 Rector Street, Manhattan, and Lefrak Building, Queens

Has a physician told you that you have:	Physician told me after September 11*		Prevalence Ratio (95% CI)
	40 Rector	LeFrak	
Allergies	7 (2%)	0 (0%)	-----
Asthma	5 (2%)	0 (0%)	-----
Depression or Mood Disorder	8 (4%)	1 (1.3%)	2.3 (0.8-11.0)
Post Traumatic Stress Disorder	14 (6%)	1 (1.3%)	4.6 (0.3-23.2)

* Rate is based only on those who did not have a diagnosis of the condition before 9/11

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Assessing the Health of Immigrant Workers Near Ground Zero: Preliminary Results of the World Trade Center Day Laborer Medical Monitoring Project

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INTRODUCTION

During the first 6 months following the destruction of the World Trade Center, surprisingly little systematic data were available concerning its health impact on workers at and near Ground Zero. Most public debate relevant to occupational and environmental health during this period centered on *air quality* and long-term hazards to community residents rather than short-term health consequences, which were increasingly evident among site workers. By November 2001, initial information about the nature and magnitude of respiratory health problems among fire fighters became available, based on medical screening undertaken by the New York City Fire Department. No other group of Ground Zero workers was receiving a standardized, comprehensive medical screening program at that time, although Federal funding was being sought to support a screening program for the rescue and recovery workers.

In January 2002, the Center for the Biology of Natural Systems (CBNS) of Queens College initiated a free medical screening program for building clean-up workers who did not work at Ground Zero, but who were responsible for cleaning

contaminated office and residential buildings adjacent to Ground Zero. The project was conducted in collaboration with the New York Committee for Occupational Health and Safety (NYCOSH) and a community-based immigrant support organization, the Latin-American Workers' Project. Many of the building clean-up workers were day laborers who were hired off street corners on a daily or weekly basis. This was largely a Hispanic population, many of whom did not speak English, did not have health insurance, and did not have training in working with hazardous materials.

METHODS

With a grant from the September 11th Fund, the World Trade Center Day Laborer Medical Monitoring Project established a medical screening unit in a rented mobile van located on the street at the corner of Barclay and Broadway, one block from Ground Zero. From January 15 through February 28, 2002, we examined 418 building clean-up workers. Outreach workers from NYCOSH and the Latin American Workers' Project informed the target community about the program through media, personal contacts, and flyer distribution. All day laborers who worked in indoor cleaning operations around the Ground Zero for at least 1 week were eligible for the program. The participation was entirely voluntary, and each participant signed an informed consent that had been approved by the Institutional Review Board of Queens College. We performed work histories, medical interviews, physical examinations, spirometry, blood and urine tests (including blood lead and zinc protoporphyrin and urine mercury), and respirator fit testing. We also provided participants with double cartridge respirators.

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Contract grant sponsor: The September 11th Fund.

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Following the examination, the workers attended a brief educational session about potential work hazards and safety practices. All parts of the program were free of charge for the participants.

PRELIMINARY RESULTS

Nearly all participants were Hispanic immigrants, mostly from Colombia and Ecuador. They ranged in age from 25 to 45 years, with occasional persons in other age groups. Virtually none of the workers had health insurance or a personal physician. Participants were generally not provided with respirators or any personal protective equipment and were not informed about the contents or any environmental sample test results on the dust and debris that they removed from offices and apartments. Most participants had worked performing indoor building clean up adjacent to Ground Zero for 6–12 weeks and had stopped such work 4–8 weeks prior to examination.

Nearly all of the examined building clean-up workers reported current health symptoms that had first appeared or worsened after September 11th. Their symptoms fell into two broad categories: irritation of the airways (cough, sore throat, nasal congestion, and chest tightness), and systemic symptoms (headaches, fatigue, dizziness, sleep disturbances). Most participants who complained of symptoms reported no or little improvement of symptoms despite cessation of work and associated dust exposure for 4–8 weeks prior to examination. Results of pulmonary function testing, and blood and urine tests will be reported separately.

DISCUSSION

Irritant respiratory symptoms among workers and residents at or near Ground Zero have been very common. They appear to have multiple potential causes, including exposures to fiberglass, crushed glass, alkaline concrete dust, and other pulverized construction material. The origin of observed systemic symptoms is more obscure.

Typically, following removal from occupational exposures, most symptomatic workers recover quickly, and a relatively small proportion demonstrate residual symptoms and illness. While we did not have access to the entire population, or a representative sample, of building clean-up workers, our results indicate that a sizable number of building clean-up workers remain symptomatic even after 1–2 months following cessation of exposure. The future course of symptoms in this group is difficult to predict.

Despite the enormous concern expressed about the safety of working at Ground Zero, we found that among the hundreds of building clean-up workers that we examined, very few were educated about the potential health hazards

of the World Trade Center dust exposures and proper health and safety procedures. Few of the program participants were provided with personal protective equipment, particularly respirators, and cartridges. The minority of clean-up workers who had their own respirators were not provided with sufficient disposable filters for proper protection. Indeed, some workers reported that they were forbidden to wear their own respirators in order to avoid alarming co-workers.

LESSONS LEARNED

1. Respiratory illness among fire fighters demonstrated that some Ground Zero workers have become ill as a result of exposures at the site. Our findings of respiratory and systemic symptoms among building clean-up workers who never worked at Ground Zero indicate that exposures that are presumably less severe than those found at some distance from ongoing fire activity also cause illness among exposed workers.
2. Systematic and appropriate occupational medical screenings for workers at or near Ground Zero has not occurred in a timely and coordinated fashion. There is no mechanism in occupational health for a rapid clinical response to a catastrophic event of large magnitude, including securing needed funds; identifying and supplying needed occupational health personnel; coordinating activities among medical centers, government agencies, employers, and unions; and communicating appropriate and helpful medical information. Workers such as day laborers are especially likely to escape proper occupational medical attention.
3. Humane occupational safety practices are not universally engrained in American industry. Providing properly fitted appropriate respirators to building clean-up workers would have reduced exposures and decreased the likelihood of illness. The failure by multiple employers to have taken this simple inexpensive step is difficult to explain and may reflect the underdevelopment of health and safety culture and practice in the United States.
4. Immigrant occupational health problems are generally considered among the most difficult to address, much less to resolve, in occupational health. Through the use of a highly accessible mobile medical unit providing concrete, free occupational health services to immigrant workers, we demonstrated the feasibility of a method to reach such workers. This model is likely to be useful as a means to identify and to address occupational health problems among immigrant workers in general.

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WORLD TRADE CENTER WORKER AND VOLUNTEER MEDICAL SCREENING PROGRAM

**REPORT OF INITIAL FINDINGS TO THE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
OF THE CENTERS FOR DISEASE CONTROL AND PREVENTION (NIOSH/CDC)**

January 24, 2003

**Robin Herbert, MD & Stephen Levin, MD
Co-Directors**

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Department of Community and Preventive Medicine
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WORLD TRADE CENTER WORKER AND VOLUNTEER MEDICAL SCREENING PROGRAM

SYMPTOMS, PHYSICAL EXAMINATION FINDINGS AND HAZARDOUS EXPOSURES EXPERIENCED BY AN INITIAL GROUP OF 250 PARTICIPANTS

In order to assess the prevalence and severity of health problems and hazardous exposures experienced by workers and volunteers participating in the World Trade Center Worker and Volunteer Medical Screening Program, participants' medical charts were reviewed. This interim report summarizes data on a random sample of 250 of the first 500 patients examined under the auspices of the Program during the period July 16-August 29, 2002. This report presents preliminary descriptive statistics focusing on a limited number of symptoms and examination findings on this subset of examinees. No attempt has been made to establish case definitions or to use clinical diagnoses for this analysis. Additionally, we have not conducted statistical analyses controlling for factors such as smoking status, gender, or age, which will be done in future analyses. Therefore, these findings should be viewed as preliminary. As of January 23, 2003, a total of 3,513 individuals have been seen as a part of this Program. On-going analysis is being conducted on data collected from all participants in the Program.

Program Background

In the months following the September 11, 2001 attacks on the World Trade Center (WTC), there became a growing concern about injuries and illnesses related to the disaster sustained by the many thousands of individuals who worked or volunteered at or near "Ground Zero." Workers at or near the WTC site had potentially sustained exposures to: 1) a range of environmental toxins, including cement and glass dust, asbestos, fiberglass, respirable and larger particulate matter - much of it highly alkaline - as well as lead and other heavy metals, PCBs, dibenzofurans, volatile organic compounds and other products of combustion; 2) psychological trauma; and 3) physical hazards including fire, collapsing buildings, falling debris, noise and extremes of temperature. There was mounting evidence of a high prevalence of respiratory illnesses among New York City firefighters and among ironworkers who were at Ground Zero. At the same time, it became clear that there were numerous other groups who were at or near the site during and after the WTC disaster who were also suffering from a variety of WTC-related health problems.

The Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine (COEM) of the Department of Community and Preventive Medicine of the Mount Sinai School of Medicine in New York City, with the support of the Centers for Disease Control and Prevention (CDC), established a comprehensive medical screening program in July 2002 to provide free medical assessments, diagnostic referrals and occupational health education for workers and volunteers exposed to hazards of the World Trade Center site and/or Staten Island landfill in New York City in the aftermath of September 11, 2001. The program, based at the Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine, will examine approximately 9,000 workers, about 2,500 of whom will receive examinations at other facilities in the greater New York/New Jersey metropolitan area, and nationally, under the auspices of the Association of Occupational and Environmental Clinics (AOEC).

The goals of the Program are:

- To identify individuals who sustained exposures at or near "Ground Zero" of the WTC site during rescue and recovery activities.
- To provide clinical assessments for exposed individuals to identify those with persistent WTC-related medical conditions.
- To coordinate referral for follow-up clinical care for affected individuals.
- To educate individuals about their exposures and the associated risks to their health, and to advise them about available benefit and entitlement programs.
- To establish "baseline" clinical status for individuals exposed at or near "Ground Zero" for purposes of comparison with future clinical assessments for diseases with chronicity or longer latency.

Participants have been recruited through a series of outreach efforts directed mainly to unions and other organizations whose members performed the rescue, recovery and clean-up work. Program staff have worked with the building trades unions, workers from telecommunications, transportation, the New York City morgue and the public sector, as well as police and non-New York City firefighters to inform members about the availability of the medical screening examinations. Program staff also worked with volunteer organizations including Red Cross, Salvation Army, Cross Cultural Solutions and various church and religious groups.

Each medical screening examination includes:

- 1) Comprehensive self-administered and nurse-administered medical questionnaires
- 2) Physical examination by a physician
- 3) Pulmonary function tests (spirometry) with bronchodilator administration
- 4) Standard blood tests and urinalysis
- 5) Chest x-rays
- 6) Psychological screening questionnaires, with on-site referral to mental health professionals
- 7) Interviewer-administered exposure assessment questionnaires

Each examinee is sent a final letter describing the results of his/her examination and also receives a packet of occupational health information related to the screening program, WTC-related health effects, and benefit programs.

Eligibility criteria

During the initial period, beginning July 16, 2002, workers were eligible to participate in the program if they:

- 1) Worked and/or volunteered within (a) the site perimeter bounded by Chambers Street, Broadway, Rector Street and the Hudson River, or (b) the Staten Island Landfill, or (c) barge loading piers, and;
- 2) Were present on-site for at least 24 hours between 9/11 and 9/14 inclusive, and with a minimum of a total of 10 days on-site in September, and;
- 3) Performed rescue, recovery, debris cleanup and related support services.

These criteria were revised effective August 15, 2002 to allow participation by workers present on-site for at least 24 hours between 9/11 and 9/14 inclusive, or with a minimum of a total of 80

hours on-site in September.

Federal employees, New York City Firefighters, and New York State employees are covered by other medical screening programs and therefore were not eligible for this program.

PRELIMINARY FINDINGS

Sample demographics

The 250 participants were predominantly male (96%) and Caucasian (69%), with a median age of 40 (range 24-63). The gender distribution of these initial 250 participants is significantly different than the entire group of eligible participants. To date, newer screening participants include a larger proportion of women (see Table 1).

The largest occupational groups represented among the 250 participants were telecommunications field technicians and police officers (60% of the total sample). However, many other occupations were represented, including construction, transportation, sanitation, park and emergency medical workers (see Table 2). Since this initial sample includes a large proportion of workers (e.g., telecommunications employees) who were working near but not directly on the rubble pile, these data may underestimate the prevalence of symptoms experienced by all program participants.

Exposures

The majority of participants (76%) were working at the WTC site or the landfill either on September 11, 2001 or the following day. Twenty four percent were still working at the site/landfill at the time of the examination. The remaining 76%, whose site/landfill work ended before the examination, worked a median of 94 days (range 3-324 days), or about 3 full months, on site (Table 3). Among those present in lower Manhattan on September 11, 2001 at any time of day, half were directly in the cloud of dust created by the collapse of the WTC buildings and another 31% were exposed to significant amounts of dust (see Table 4).

Symptoms - mental health

About half of the sample reported symptoms on a screening questionnaire consistent with diagnosable mental health problems and/or significant problems with psychosocial functioning such as problems with a spouse/partner, children, work, or social or home life. (See Appendix 1 for a list of questions used in mental health questionnaires.) About half of the sample (52%) was referred for further evaluation by a trained psychiatric provider based on their questionnaire responses and, in a few cases, due to a clinician's judgment. About 1 in 5 participants reported symptoms on the screening questionnaire consistent with posttraumatic stress disorder (PTSD) (22%). Nearly 2 in 5 (37%) reported symptoms of anxiety, insomnia and depression (using the General Health Questionnaire), which triggered further evaluation (see Table 5).

PTSD rates, as assessed more than 10 months after the WTC disaster by the PTSD Symptom Checklist (see Appendix 1), are comparable in prevalence to other recent studies of workers in

the vicinity of the World Trade Center after the attacks. Of 191 Federal employees working near the WTC site, 25% reported symptoms consistent with PTSD 8 weeks after September 11th (1). Six months after September 11th, PTSD symptom prevalence among 374 employees at the Borough of Manhattan Community College was 15% (2). In control groups in these studies, PTSD prevalence was much lower, 4% among Dallas Federal employees, and 8% among York College employees (in New York City but not near the WTC site). The high prevalence of PTSD among our participants more than 10 months after the WTC disaster is indicative of persistent serious mental health problems (see Table 5).

Symptoms – upper and lower respiratory

A large proportion of the sample reported respiratory symptoms which first developed while working at the WTC site or landfill. Additional participants reported that symptoms which had existed before September 11, 2001, had worsened while working at the site/landfill. We considered a worker to have a WTC-related symptom if the symptom either first developed after exposure at the WTC or worsened following exposure at the WTC. At least one WTC-related pulmonary symptom was reported by 78% of the sample, and at least one WTC-related ear, nose or throat (ENT) symptom was reported by 88% of the sample. In addition, about half of the sample was still experiencing at least one pulmonary symptom (46%) or ENT symptom (52%) in the month before the screening examination. Respiratory symptoms which first developed while working at the WTC site or landfill included throat irritation (44%), dry cough (38%), blowing nose more often (35%), chest tightness (28%), head or sinus congestion (26%), and shortness of breath (25%) (see Table 6). (See Appendix 2 for a list of questions about upper and lower respiratory symptoms.)

Physical examination and pulmonary function test findings

Nasal mucosal inflammation was observed in 49% of the sample and swollen nasal turbinates were observed in 36% (see Table 7). Pulmonary function tests (PFTs) demonstrated a high prevalence of respiratory abnormalities. Twenty five percent of the 250 examinees had restriction, obstruction or mixed abnormalities. This high prevalence is not likely to be due to smoking, since 58% of this sample had never smoked. The proportion of examinees with significant bronchodilator response was comparable among those with restriction only, obstruction only, and combined (mixed) abnormalities, about 1/3 of each of those groups (see Table 8).

Evidence of disease by questionnaire and by physical examination and pulmonary function test

We expected to find that persons with ENT or pulmonary symptoms (WTC-related symptoms in the past month) would be more likely to show abnormal findings on physical examination. This expectation was confirmed in data shown in Appendix 3. Participants with ENT symptoms were significantly more likely to have abnormal nasal physical examination findings, and participants with pulmonary symptoms were significantly more likely to have a bronchodilator response (Table 4 in Appendix 3) and slightly (although not significantly) more abnormal pulmonary function test results (Table 5 in Appendix 3).

We did not expect all workers with WTC-related ENT or pulmonary symptoms in the previous

month to have abnormalities on physical exam. This can occur for several reason, including: 1) Symptoms can change over the course of a month, and participants with symptoms, for example, two weeks before the screening exam, may not have symptoms the day of the exam; 2) Not all individuals with symptoms will show evidence of abnormal results on these tests. More sensitive tests (i.e. methacholine challenge) can detect pulmonary abnormalities in people who are symptomatic but whose PFTs and bronchodilator response are normal.

What is most striking is that a large proportion of this sample showed evidence (either symptoms or abnormal test results) of respiratory disease more than 10 months after September 11, 2001. Seventy-three percent of the sample had either ENT symptoms or abnormal physical examination findings or both (Table 3 in Appendix 3). Similarly, 57% of the sample had either pulmonary symptoms or an abnormal pulmonary function test or both (Table 4 in Appendix 3).

Diagnoses prior to participation in the screening program

Despite the high rates of abnormalities detected in these examinations, only 38% of the sample had sought and received any medical care for WTC-related health problems before participating in the screening program and even fewer had received a diagnosis of an illness. Sinusitis and/or nasal inflammation were the conditions that had been most commonly diagnosed (see Tables 9 and 10).

Lost work time and workers' compensation

While 38% of the sample had previously received or were receiving medical care for WTC-related health problems at time of exam and 21% had missed workday(s) because of WTC-related health problem(s), and despite the high prevalence of symptoms and abnormal physical examination findings, only 8% of this group had filed for workers' compensation for a WTC-related injury or illness (see Table 10).

CONCLUSIONS

The major findings of this preliminary analysis were that:

- Seventy-eight percent of the sample reported at least one WTC-related pulmonary symptom (first developed or worsened after exposure at the WTC site); 46% of the sample was still experiencing at least one pulmonary symptom in the month before the screening examination.
- Eighty-eight percent of the sample reported at least one WTC-related ear, nose or throat (ENT) symptom; 52% of the sample was still experiencing at least one ENT symptom in the month before the screening examination.
- Fifty-two percent of the sample reported mental health symptoms requiring further mental health evaluation and about 1 in 5 reported symptoms consistent with post-traumatic stress disorder (PTSD).

This preliminary analysis is consistent with earlier case reports that a high proportion of workers at the WTC site have been experiencing persistent WTC-related symptoms, particularly upper and lower respiratory and mental health symptoms. The high prevalence of upper respiratory symptoms is corroborated by a high prevalence of abnormalities observed upon physical

examination. Only about one-third of the participants had received any prior medical care for these symptoms and conditions, thus emphasizing the need for this screening program. Further follow-up of these workers is clearly indicated in order to monitor the chronicity and severity of these health problems and to assure that proper treatment is received.

REFERENCES

1. Trout D, Nimgade A, Mueller C, Hall R, Earnest GS. Health effects and occupational exposures among office workers near the World Trade Center disaster site. *Journal of Occupational and Environmental Medicine*. 2002;44(7):601-5.
2. NIOSH. Evaluation of Physical and Mental Health Symptoms Following the World Trade Center (WTC) Disaster: Borough of Manhattan Community College and York College. HETA # 2002-0096. Cincinnati, OH: NIOSH, 2002.

TABLES

Table 1. Demographics

		Number	(%)
Gender	Male	239	(96)
	Female	11	(4)
Ethnicity	African-American	42	(17)
	Caucasian	173	(69)
	Hispanic	27	(11)
	Asian	5	(2)
	Other	3	(1)
		Median	
Age at exam		250	40
		Range	
		24-63	

Table 2. Current Job/Industry

	Number	(%)
Field technician/Telecommunications	110	(44)
Police officer, detective, sergeant/Law enforcement	40	(16)
Supervisor, captain, electrician/Sanitation	9	(4)
Project manager, laborer/Construction	8	(3)
Heavy equipment operator, highway repair/Transportation	8	(3)
Officer, cleanup worker/Parks service	6	(2)
Engineer, Supervisor/Environmental protection	2	(1)
Paramedic/Emergency medical service	3	(1)
Custodian, maintenance workers/Education	6	(2)
Auto mechanic	4	(2)
Iron worker	4	(2)
Engineer, cameraman, photographer/News media	4	(2)
Carpenter	3	(1)
Asbestos worker	2	(1)
Laborer	2	(1)
Security officer, captain, electrician/Airforce, Army Nat'l Guard, US Coast Guard	4	(2)
Operating engineer	2	(1)
Other ¹	27	(11)
Not reported	6	(2)

¹Other jobs: Union supervisor; Electrician; Gas attendant; Electrical construction supervisor; Engineer and tech services; Operate machinery, heavy equipment; Range coach, US navy shooting range, gas customer service/electrician tech; Automotive electrician; Lighting - film; Video-audio engineer; FDNY dispatcher; Sheet metal worker - foreman; Empire city subway - construction equipment operator; Land surveyor; Traffic enforcement officer; Expediting consultant for architectural firm; Supervisor machinist; Director of Material Science; Director of S&H; Elevator repairman; Manager, depository trust; Heavy equip mechanic; Veterans canteen services; Office of Medical Examiner; Field worker/Con Edison; Retail; Welder.

Table 3. Exposure

		Number	(%)
Present in lower Manhattan (south of Canal Street) on 9/11/01 at any time of day		143	(57)
First day worked/volunteered on WTC site (or landfill)	9/11/01	116	(46)
	9/12/01	76	(30)
	9/13/01	37	(15)
	9/14/01	9	(4)
	9/15-17/01	12	(5)
Still working/volunteering at time of screening examination		60	(24)
			Median
Length of time at site/landfill among those not still present at time of screening examination (days)		188	94
			Range
			3-324

Table 4. Worst exposure to dust while in lower Manhattan at any time of day on 9/11/01

	Number	(%) ¹
Not exposed to dust and not in cloud of dust from collapse of WTC buildings	5	(4)
Exposed to some dust but not in cloud of dust from collapse of WTC buildings	20	(14)
Exposed to significant amounts of dust but not directly in cloud of dust from collapse of WTC buildings	44	(31)
Directly in the cloud of dust from collapse of WTC buildings	71	(51)

¹ (%) based on 140 participants with complete data.

Table 5. Mental Health Screening

	Number	(%)
Received mental health referral	130	(52)
Possible reason(s) for referral:		
Somatic symptoms, anxiety and insomnia, social dysfunction, or severe depression ¹	92	(37)
Post Traumatic Stress Disorder (PTSD) ²	54	(22)
Panic symptoms ³	5	(2)
General anxiety ³	15	(6)
Major depression ³	17	(7)

¹ From General Health Questionnaire.² From PTSD Symptom Checklist.³ From Patient Health Questionnaire.**Table 6. Upper and lower respiratory symptoms**

	First developed at WTC site		Previous history and worsened at WTC site		WTC-related ⁴ & still existing in month before screening	
	Number	(%)	Number	(%)	Number	(%)
Any pulmonary symptom below:	151	(61) ¹	43	(17) ³	113	(46) ²
Dry cough ¹	95	(38)	11	(4)	53	(21)
Chest tightness ¹	69	(28)	9	(4)	54	(22)
Shortness of breath	62	(25)	20	(8)	67	(27)
Wheezing without a cold ¹	44	(18)	20	(8)	29	(12)
Awakened by shortness of breath	27	(11)	7	(3)	23	(9)
Any ENT symptom below:	154	(62)	64	(26) ¹	129	(52) ¹
Throat irritation	110	(44)	9	(4)	67	(27)
Blowing nose more than usual ¹	87	(35)	9	(4)	49	(20)
Head or sinus congestion	65	(26)	46	(18)	81	(32)
Postnasal discharge	49	(20)	18	(7)	49	(20)
Nasal irritation	52	(21)	13	(5)	38	(15)
Cough with phlegm	51	(20)	10	(4)	28	(11)
Indigestion ¹	29	(12)	27	(11)	46	(18)

¹(%) based on 249 participants with complete data.²(%) based on 248 participants with complete data.³(%) based on 247 participants with complete data.⁴Symptom first developed after exposure at the WTC site or symptom worsened following exposure at WTC site.

Table 7. Physical examination findings

	Number	(%)
Abnormal turbinates	89	(36)
Nasal mucosal inflammation	123	(49)
Sinus abnormalities	14	(6)
Wheezing	8	(3)
Rhonchi	1	(0.4)

Table 8. Pulmonary function test

(Pre-bronchodilator)	Number	(%)	Significant ⁴ bronchodilator response	
			Number	(%) ⁵
Normal	187	(75)	25	(13)
Obstruction ¹	31	(12)	9	(29)
Restriction ²	29	(12)	11	(38)
Mixed ³	3	(1)	1	(33)
Total	250	(100)	46	(18)

¹FEV₁/FVC < 0.70 and FVC ≥ 80% of predicted, indicating a slowing of air flow rates through narrowed large airways.

²FVC < 80% of predicted and FEV₁/FVC ≥ 0.70, indicating an inability to fully inflate the lung with a deep breath.

³FEV₁/FVC < 0.70 and FVC < 80% of predicted; i.e. combined obstruction and restriction

⁴Bronchodilator response: 200 cc increase in FEV₁ and 12% increase in FEV₁, or 200 cc increase in FVC and 12% increase in FVC.

⁵Significant bronchodilator response within each group.

Table 9. Conditions diagnosed after 9/11/01, but prior to participation in WTC Screening Program

	Number	(%)
Sinusitis	28	(12) ¹
Nasal inflammation	21	(8) ²
Asthma	7	(3) ³
Anxiety	4	(2)
Depression	5	(2)
PTSD	7	(3)
GERD	7	(3) ¹

¹(%) based on 243 participants with complete data.

²(%) based on 249 participants with complete data.

³(%) based on 248 participants with complete data.

Table 10. Medical care, lost work time, & workers' compensation

	Number	(%)
Previously received or currently receiving medical care for WTC-related health problem	94	(38)
Have been hospitalized for a health problem since 9/11/01	19	(8)
Missed workday(s) because of WTC-related health problem(s)	52	(21)
Filed for workers' compensation because of any injury or illness related to 9/11	19	(8) ¹

¹(%) based on 240 participants with complete data.

Appendix 1- Mental Health Questionnaires

General Health Questionnaire (GHQ)

Typical response options on a 4-point scale are: "better than usual" or "not at all" (0), "same as usual" or "no more than usual" (0), "worse than usual" or "rather more than usual" (1), "much worse than usual" or "much more than usual" (1).

A score of 1 point is provided for a self-report of "worse" or "much worse" than usual or "rather more" or "much more" than usual. Participants scoring >4 of the GHQ are referred for a for a more in-depth mental health evaluation.

HAVE YOU RECENTLY:

- A1 - been feeling perfectly well and in good health?
- A2 - been feeling in need of some medicine to pick you up?
- A3 - been feeling run down and out of sorts?
- A4 - felt that you are ill?
- A5 - been getting any pains in your
- A6 - been getting a feeling of tightness or pressure in your head?
- A7 - been having hot or cold spells?

- B1 - lost much sleep over worry?
- B2 - had difficulty in staying asleep?
- B3 - felt constantly under strain?
- B4 - been getting edgy and bad-tempered?
- B5 - been getting scared or panicky for no good reason?
- B6 - found everything getting on top of you?
- B7 - been feeling nervous and uptight all the time?

- C1 - been managing to keep yourself busy and occupied?
- C2 - been taking longer over the things you do?
- C3 - felt on the whole you were doing things well?
- C4 - been satisfied with the way you've carried out your task?
- C5 - felt that you are playing a useful part in things?
- C6 - felt capable of making decisions about things?
- C7 - been able to enjoy your normal day-to-day activities?

- D1 - been thinking of yourself as a worthless person?
- D2 - felt that life is entirely hopeless?
- D3 - felt that life isn't worth living?
- D4 - thought of the possibility that you do away with yourself?
- D5 - found at times you couldn't do anything because your nerves were too bad?
- D6 - found yourself wishing you were dead and away from it all?
- D7 - found that the idea of taking your own life kept coming into your mind?

Reference: Goldberg et al., 1979;9:139-145

Appendix 1- Mental Questionnaires

PTSD Symptom Checklist (PCL)

Response options are "not at all" (1), "a little bit" (2), "moderately" (3), "quite a bit" (4), "extremely" (5)
Participants scoring 44 or higher on the sum of all 17 items on the PCL are referred for a for a more in-depth mental health evaluation.

1. Repeated, disturbing memories, thoughts, or images of the disaster?
2. Repeated, disturbing dreams of the disaster?
3. Suddenly acting or feeling as if the disaster were happening again (as if you were reliving it)?
4. Feeling very upset when something reminded you of the disaster?
5. Having physical reactions (e.g., heart pounding, trouble breathing, sweating) when something reminded you of the disaster?
6. Avoiding thinking about or talking about the disaster or avoiding having feelings related to it?
7. Avoiding activities or situations because they reminded you of the disaster?
8. Trouble remembering important parts of the disaster?
9. Loss of interest in activities that you used to enjoy?
10. Feeling distant or cut off from other people?
11. Feeling emotionally numb or being unable to have loving feelings for those close to you?
12. Feeling as if your future will somehow be cut short?
13. Trouble falling or staying asleep?
14. Feeling irritable or having angry outbursts?
15. Having difficulty concentrating?
16. Being "super-alert" or watchful or on guard?
17. Feeling jumpy or easily startled?

Reference: Blanchard et al. Psychometric properties of the PTSD Checklist (PCL). Behavior Research and Therapy 1996;34(8):669-673.

Appendix 1- Mental Health Questionnaires

Patient Health Questionnaire

Three options for scoring:

- a. Section 1 (Panic Attacks): If patient indicated "YES" on items a-d AND "YES" to at least four of items e-o.
- b. Section 2 (Generalized Anxiety Disorder): If patient answers "More than half the days" to item "a" AND three or more of items b-g
- c. Section 3 (Major Depression): If patient answers "More than half the days" or "nearly every day" to at least five of items a-i, including at least item a or b. Count item i if anything is checked off.

1.

NO YES

a. In the last 4 weeks, have you had an anxiety attack -- suddenly feeling fear or panic?.....

☐ ☐

If you answered, "no," please skip to page 8.

b. Has this ever happened before?.....

☐ ☐

c. Do some of these attacks come suddenly out of the blue -- that is, in situations where you don't expect to be nervous or uncomfortable?.....

☐ ☐

d. Do these attacks bother you a lot or are you worried about having another attack?.....

☐ ☐

Think about your last bad anxiety attack.

NO YES

e. Were you short of breath?.....

☐ ☐

f. Did your heart race, pound, or skip?.....

☐ ☐

g. Did you have chest pain or pressure?.....

☐ ☐

h. Did you

sweat?.....

☐ ☐

i. Did you feel as if you were choking?.....

☐ ☐

j. Did you have hot flashes or

chills?.....

☐ ☐

k. Did you have nausea or an upset stomach, or the feeling that you were going to have diarrhea?.....

☐ ☐

l. Did you feel dizzy, unsteady, or

faint?.....

☐ ☐

m. Did you have tingling or numbness in parts of your body?.....

☐ ☐

n. Did you tremble or

shake?.....

☐ ☐

Appendix 1- Mental Health Questionnaires

o. Were you afraid you were dying?.....

☐ Not at all ☐ Several days ☐ More than half the days

2. Over the last 4 weeks, how often have you been bothered by any of the following problems?

- a. Feeling nervous, anxious, on edge, or worrying a lot about different things.....
- b. Feeling restless so that it is hard to sit still
- c. Getting tired very easily.....
- d. Muscle tension, aches, or soreness.....
- e. Trouble falling asleep or staying asleep.....
- f. Trouble concentrating on things, such as reading a book or watching TV.....
- g. Becoming easily annoyed or irritable.....

☐ Not at all ☐ Several days ☐ More than half the days

If you checked "Not at all", please skip to Page 9

3. Over the last 2 weeks, how often have you been bothered by any of the following problems?

- a. Little interest or pleasure in doing things.....
- b. Feeling down, depressed, or hopeless.....
- c. Trouble falling or staying asleep, or sleeping too much.....
- d. Feeling tired or having little energy.....
- e. Poor appetite or overeating.....
- f. Feeling bad about yourself — or that you are a failure or have let yourself or your family down.....
- g. Trouble concentrating on things, such as reading the newspaper or watching television.....
- h. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual.....
- i. Thoughts that you would be better off dead or of hurting yourself in some way.....

☐ Not at all ☐ Several days ☐ More than half the days ☐ Nearly every day

Reference: Spitzer et al., JAMA. 1999;282:1737-1744.

Appendix 2 – Questions about upper and lower respiratory symptoms

Symptom	Question(s)	Source(s)
Dry cough	<p>A. In the 1 year before 9/11/01 did you usually have a dry cough? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>B. Did you usually have a dry cough while you were working or volunteering at the WTC site? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>C. If yes, to A & B, did this symptom change while you were working or volunteering at the WTC site? <input type="checkbox"/> No change <input type="checkbox"/> Worse <input type="checkbox"/> Better <input type="checkbox"/> NA</p> <p>E. Within the past one month, have you usually had a dry cough? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
Cough w/phlegm	<p>A. In the 1 year before 9/11/01 did you usually have a cough with phlegm? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>B. Did you usually have a cough with phlegm while you were working or volunteering at the WTC site? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>C. If yes, to A & B, did this symptom change while you were working or volunteering at the WTC site? <input type="checkbox"/> No change <input type="checkbox"/> Worse <input type="checkbox"/> Better <input type="checkbox"/> NA</p> <p>E. Within the past one month, have you usually had a cough with phlegm? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	NIOSH Health Hazard Evaluation
Wheezing w/o cold	<p>3b. In the year before 9/11/01, did your chest occasionally sound wheezy apart from colds? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>3c. In the year before 9/11/01, did your chest sound wheezy most days or nights? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>3d. In the year before 9/11/01, did you ever had an attack of wheezing that made you feel short of breath? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>4b. While you were working or volunteering at the WTC site, did your chest</p>	ATS; NHANES III; European Community Respiratory Health Survey; IUTALD

Appendix 2 – Questions about upper and lower respiratory symptoms

	occasionally sound wheezy apart from colds? ___ Yes ___ No 4c. While you were working or volunteering at the WTC site, did your chest sound wheezy most days or nights? ___ Yes ___ No 4d. While you were working or volunteering at the WTC site, did you ever had an attack of wheezing that made you feel short of breath? ___ Yes ___ No 5. If yes to 3 and 4 above, did this symptom change while you were working or volunteering at the WTC site? ___ No change ___ Worse ___ Better ___ NA 7. Has you chest sounded wheezy or whistling in the past 1 month? ___ Yes ___ No	
Shortness of breath	A. Did you have this symptom in the 1 year before 9/11/01? ___ Yes ___ No B. Did you have this symptom while you were working or volunteering at the WTC site? ___ Yes ___ No C. If yes, to A & B, did this symptom change while you were working or volunteering at the WTC site? ___ No change ___ Worse ___ Better ___ NA E. Have you had this symptom in the past one month? ___ Yes ___ No	NIOSH Health Hazard Evaluation
Head or sinus congestion	Same as above	NIOSH Health Hazard Evaluation
Blowing your nose more than usual	Same as above	SNOT-20
Throat irritation	Same as above	NIOSH Health Hazard Evaluation
Postnasal discharge	Same as above	SNOT-20

Appendix 2 – Questions about upper and lower respiratory symptoms

Irritation in nose	Same as above	NIOSH Health Hazard Evaluation
Chest tightness (chest tightness upon awakening or chest tightness at any other time of day)	Same as above	European Community Respiratory Health Survey; NIOSH Health Hazard Evaluation
Being awakened by shortness of breath	Same as above	European Community Respiratory Health Survey; IUTALD
Indigestion or heartburn	Same as above	NIOSH Health Hazard Evaluation
Provocability	<p>When you are/were in a smoky room, in a dusty part of your house, exercising, breathing cold air, or near traffic fumes or other irritants, do/did you ever: a) start to cough; b) start to wheeze; c) feel chest tightness; d) start to feel short of breath 1) in the one year before 9/11/01? 2) while working at Ground Zero? 3) in the past month?</p> <p>&</p> <p>When you are/were near animals (such as cats, dogs or horses), do/did you ever: a) start to cough; b) start to wheeze; c) feel chest tightness; d) start to feel short of breath 1) in the one year before 9/11/01? 2) while working at Ground Zero? 3) in the past month?</p>	European Community Respiratory Health Survey

Appendix 3 – Evidence of Disease by Questionnaire and by Physical Examination

Tables 1-3: Presence of WTC-related ENT symptom(s) (throat irritation, blowing nose more than usual, head or sinus congestion, postnasal discharge, or nasal irritation) still existing in past month of screening by physical examination findings. (Percents based on the total sample.)

Table 1

		Abnormal turbinates				Total
		Yes		No		
		Number	(%) ¹	Number	(%)	
ENT symptom(s)	Yes	56	(22)	73	(29)	129
	No	33	(13)	87	(35)	120
Total		89	(36)	160	(64)	249
chi-square=6.85. df=1. p=0.009						

chi-square=6.85, df=1, p=0.009

¹(%) refers to the percentage of the total, that is, the number divided by 249.

Table 2

		Nasal mucosal inflammation				Total
		Yes		No		
		Number	(%) ¹	Number	(%)	
ENT symptom(s)	Yes	84	(34)	45	(18)	129
	No	39	(16)	81	(33)	120
Total		123	(49)	126	(51)	249

chi-square=26.46. df=1. p<.001

chi-square=26.46, df=1, p<.001

¹(%) refers to the percentage of the total, that is, the number divided by 249.

Table 3

		Either abnormal turbinates or mucosal inflammation				Total
		Yes		No		
		Number	(%) ¹	Number	(%)	
ENT symptom(s)	Yes	92	(37)	37	(15)	129
	No	54	(22)	66	(27)	120
Total		146	(59)	103	(41)	249

chi-square=17.75. df=1. p<.001

chi-square=17.75, df=1, p<.001

¹(%) refers to the percentage of the total, that is, the number divided by 249.

Appendix 3 – Evidence of Disease by Questionnaire and by Physical Examination

Tables 4 & 5: Presence of WTC-related pulmonary symptom(s) (dry cough, chest tightness, shortness of breath, wheezing without a cold, or awakened by shortness of breath) still existing in month before screening by pulmonary function test (PFT) results. (Percents based on the total sample.)

Table 4

		Bronchodilator response ¹				
		Yes		No		
		Number	(%) ²	Number	(%)	Total
Pulmonary symptom(s)	Yes	29	(12)	84	(34)	113
	No	17	(7)	118	(48)	135
Total		46	(19)	202	(82)	248

chi-square value=6.96, df 1, p=.008

¹200 cc increase in FEV₁ and 12% increase in FEV₁ or 200 cc increase in FVC and 12% increase in FVC.

²(%) refers to the percentage of the total, that is, the number divided by 248.

Table 5

		Pulmonary Function Test				
		abnormal ¹		normal		
		Number	(%) ²	Number	(%)	Total
Pulmonary symptom	Yes	33	(13)	80	(32)	113
	No	29	(12)	106	(43)	135
Total		62	(25)	186	(75)	248

chi-square value=1.96, df 1, p=.16

¹Restriction, obstruction, or mixed (restriction and obstruction).

²(%) refers to the percentage of the total, that is, the number divided by 248.

Appendix 4

Activities of the World Trade Center Worker and Volunteer Medical Screening Program as of December 8, 2002

Since its inception on April 8, 2002, the World Trade Center Worker and Volunteer Medical Screening Program has established a comprehensive medical screening program for workers and volunteers who performed rescue and recovery work at the World Trade Center site, the Staten Island landfill and barge loading piers in the aftermath of September 11, 2001.

The following are highlights of the activities related to setting up the WTC Program and conducting the examinations:

- Established an Executive Steering Committee comprised of 25 members representing labor, business, government, and medical and educational institutions. The Executive Steering Committee is the governing body of the WTC Program and has held meetings on June 14, and September 18, 2002, with a third meeting scheduled for January 10, 2003.
- Established four working groups/subcommittees to help with implementing the various facets of the WTC Program. These are the Program Council, Medical/Technical Subcommittee; Exposure Assessment Working Group; and Outreach Working Group:
 - Program Council is a large, inclusive body comprised of union leaders, safety and health professionals, government officials, and representatives of volunteer organizations. The Program Council serves in an advisory capacity to the Executive Steering Committee and meets quarterly. The Council met on June 27 and September 2, 2002 and has meetings scheduled for January 16 and May 9, 2003.
 - Medical/technical subcommittee has representatives from each of the consortium members as well as other health professionals. This subcommittee has guided the development of the clinical protocols for the examinations.
 - Exposure assessment working group is comprised of 15 environmental and occupational health specialists who have direct experience in monitoring and/or researching the human health impacts associated with the collapse of the World Trade Center. This working group has provided technical guidance in developing exposure-based eligibility criteria for the WTC Program.
 - Outreach working group is comprised of representatives from major NYC area unions having members at the WTC site, local and national volunteer organizations and government agencies. This group was convened on July 24 and November 20, 2002 and has helped to shape and implement regional and national outreach activities.
- Established the physical space with the capacity to house the medical and administrative aspects of the local, regional and national programs.
- Employed a staff consisting of physicians, nurses, pulmonary function specialists, patient care assistants, exposure assessors, schedulers, medical records specialists, outreach coordinators, an industrial hygienist, data management specialists and administrative personnel. Every effort was made to hire employees who expressed a sincere desire to play a meaningful role in the WTC Program.
- Developed an information management strategy for patient information.
- Set up a toll free phone number for enrollment and scheduling examination appointments.

Appendix 4

The phone bank is staffed by a group of trained employees with multi-lingual capacities.

- Developed and completed contracts to participate in this medical screening program with: the Clinical Center of the Environmental & Occupational Health Sciences Institute at UMDNJ-Robert Wood Johnson Medical School/New Jersey; Center for the Biology of Natural Systems at Queens College, Queens; Bellevue/NYU Occupational and Environmental Medicine Clinic, NYC and the Association of Occupational and Environmental Clinics, national. Contract negotiations with the SUNY Stony Brook/Long Island Occupational and Environmental Health Clinic are complete and waiting for signature.
- Developed a detailed WTC Program training manual and conducted a full day in-service training program for regional consortium members. The in-service training consisted of an overview of WTC Program and specific training in the standardized approach for each of the elements of the clinical evaluation including: taking the comprehensive clinical history; conducting the physical examination with particular attention to nose, throat, respiratory, musculoskeletal and neurological systems; administering pre- and post-bronchodilator pulmonary function tests; gathering information about exposures at the WTC site and subsequent occupational exposures; defining blood and urine laboratory tests, and outlining the required chest radiography technique. The training also included instruction on WTC Program administrative and reporting procedures.
- Developed a training DVD based on the in-service training for use by national screening exam providers.
- Developed and implemented multi-lingual outreach, intake and examination procedures to assure that language is not a barrier to receiving an examination.
- Established a referral algorithm and are a referral network in the NYC/NJ region for examinees who require follow-up medical care.
- Developed a mental-health referral mechanism for participants.
- Developed and continue to develop worker and volunteer recruitment materials.
- Developed and continue to develop worker and volunteer educational materials, including information on benefits/entitlements.
- Spoke about the WTC Program at union meetings and have acquired and continue to acquire lists of union members potentially eligible for the examinations from several unions, and from private construction firms
- Engaged in more than 25,000 phone calls with individuals who expressed interest in receiving medical examinations and/or were identified as WTC responders by their unions, employers or volunteer organizations
- Maintained on-going contact with officials of over 50 unions, coordinators of national and local volunteer organizations, and managers of government operations and 3 major construction firms, representing an estimated 34,000 individuals who participated in WTC rescue, recovery, cleanup and related operations.
- Working with volunteer organizations to contact members who volunteered at the WTC site. One volunteer organization emailed 5,000 members and another volunteer organization mailed approximately 42,000 letters encouraging their WTC volunteers to contact the WTC Program to establish eligibility and schedule examinations.
- Assisted 6 organizations/unions with mailings to almost 2,000 employees/members informing them about the WTC Program.
- Set up a Health & Safety phone support line to provide guidance and information on prevention of exposures to workplace hazards.

Appendix 4

- Launched nationwide Public Service Announcements (PSAs) and are preparing to launch a second round of national and NYC metropolitan area PSAs in January 2003.
- Created a website providing outreach materials and WTC Program contact information.
- Conducted 2,568 clinical examinations.
- Identified significant health problems in early stages, such as lung masses, and referred individuals for appropriate care.

We gratefully acknowledge the hard work and dedication of the entire staff of the World Trade Center Worker and Volunteer Medical Screening Program:

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SUMMARY REPORT:

CHARACTERIZATION OF PARTICULATE FOUND IN APARTMENTS AFTER DESTRUCTION OF THE WORLD TRADE CENTER

Requested by:

"Ground Zero" Elected Officials Task Force:

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Manhattan Borough President Virginia Fields
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TABLE OF CONTENTS

	<u>Page</u>
Figures	iv
Tables	v
Acknowledgements	vii
1.0 Introduction	1
2.0 Study Design and Sampling Strategy	3
2.1 The Low Exposure Building	3
2.2 The High Exposure Building	3
2.3 Sampling Strategy	5
3.0 PCDDs, PCDFs, and PCBs	7
3.1 Collection	7
3.1.1 Surface Wipe	7
3.1.2 Surface Dust	7
3.1.3 Bulk Dust	7
3.2 Analysis	7
3.2.1 Surface Wipe	7
3.2.2 Surface and Bulk Dust	8
3.3 Results	8
3.3.1 Surface Wipe	8
3.3.2 Surface Dust and Bulk Samples	9
4.0 Inorganic Metals	11
4.1 Collection	11
4.1.1 Surface Wipe	11
4.1.2 Surface Dust	11
4.1.3 Bulk Dust	11
4.2 Analysis	11
4.2.1 Surface Wipe	11
4.2.2 Surface Dust and Bulk Samples	12
4.3 Results of Surface Dust and Bulk Samples	12
5.0 Asbestos Measurements	15
5.1 Asbestos in Passive Air Samples	15
5.1.1 Sample Collection	15
5.1.2 Analysis	15
5.1.3 Results	16

TABLE OF CONTENTS (continued)

	<u>Page</u>
5.2 Dust and Debris Samples Collected from Surfaces in Buildings	30
5.2.1 Sample Collection	30
5.2.2 Sample Analysis	30
5.2.3 Results	31
5.3 Measurements of Asbestos in Exterior Dust and Debris	36
5.3.1 Sample Collection	36
5.3.2 Sample Analysis	36
5.3.3 Results	37
6.0 Conclusions and Recommendations	41

FIGURES

<u>Number</u>		<u>Page</u>
1	Location of High and Low Dust Exposure Apartment Buildings	2
2	Dust Deposited on Furniture in Low and High Exposure Apartment Buildings	4

TABLES

<u>Number</u>	<u>Page</u>
1	Type and Distribution of Samples Collected and Analyzed 6
2	Concentration of 2,3,7,8-TCDD Equivalents (I/TEF-89) and PCB Aroclors in Surface Wipe Samples Obtained From Horizontal Surfaces in Apartments 10
3	Concentration of 2,3,7,8-TCDD Equivalents (I/TEF-89) and PCB Aroclors in Dust Obtained From Apartments 10
4	Concentrations of Metals in Wipe Samples Obtained from Furniture 13
5	Concentrations of Metals in Dust Samples 14
6	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 45 Warren Street, New York City, Second Floor, Structures Greater than 0.5 Micrometer 17
7	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 45 Warren Street, New York City, Second Floor, Fibers and Bundles Longer than 5 Micrometers 18
8	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 45 Warren Street, New York City, Second Floor, PCM-Equivalent Fibers and Bundles 19
9	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 45 Warren Street, New York City, Second Floor, Structures Greater than 0.5 Micrometer 20
10	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 45 Warren Street, New York City, Fifth Floor, Structures Greater than 0.5 Micrometer 21
11	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 45 Warren Street, New York City, Fifth Floor, Fibers and Bundles Longer than 5 Micrometers 22
12	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 45 Warren Street, New York City, Fifth Floor, PCM-Equivalent Fibers and Bundles 23

TABLES

<u>Number</u>		<u>Page</u>
13	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 45 Warren Street, New York City, Fifth Floor, Structures Greater than 0.5 Micrometer	24
14	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 250 South End Avenue, New York City, Tenth Floor, Structures Greater than 0.5 Micrometer - Estimates Based on 1 Grid Opening Only	26
15	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 250 South End Avenue, New York City, Tenth Floor, Fibers and Bundles Longer than 5 Micrometers	27
16	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 250 South End Avenue, New York City, Tenth Floor, PCM-Equivalent Fibers and Bundles	28
17	Summary of Results of Transmission Electron Microscopy Analyses for Airborne Asbestos, 250 South End Avenue, New York City, Tenth Floor, Structures Greater than 0.5 Micrometer	29
18	Summary of Results of Transmission Electron Microscopy Analyses for Asbestos in Dust and Debris, 45 Warren Street, New York City, Structures Greater than 0.5 Micrometer	32
19	Summary of Results of Transmission Electron Microscopy Analyses for Asbestos in Dust and Debris, 45 Warren Street, New York City, Fibers and Bundles Longer than 5 Micrometers	33
20	Summary of Results of Transmission Electron Microscopy Analyses for Asbestos in Dust and Debris, 250 South End Avenue, New York City, Structures Greater than 0.5 Micrometer	34
21	Summary of Results of Transmission Electron Microscopy Analyses for Asbestos in Dust and Debris, 250 South End Avenue, New York City, Fibers and Bundles Longer than 5 Micrometers	35
22	Summary of Results of Gravimetric Analyses for Asbestos in Exterior Dust and Debris, World Trade Center Area, New York City	38

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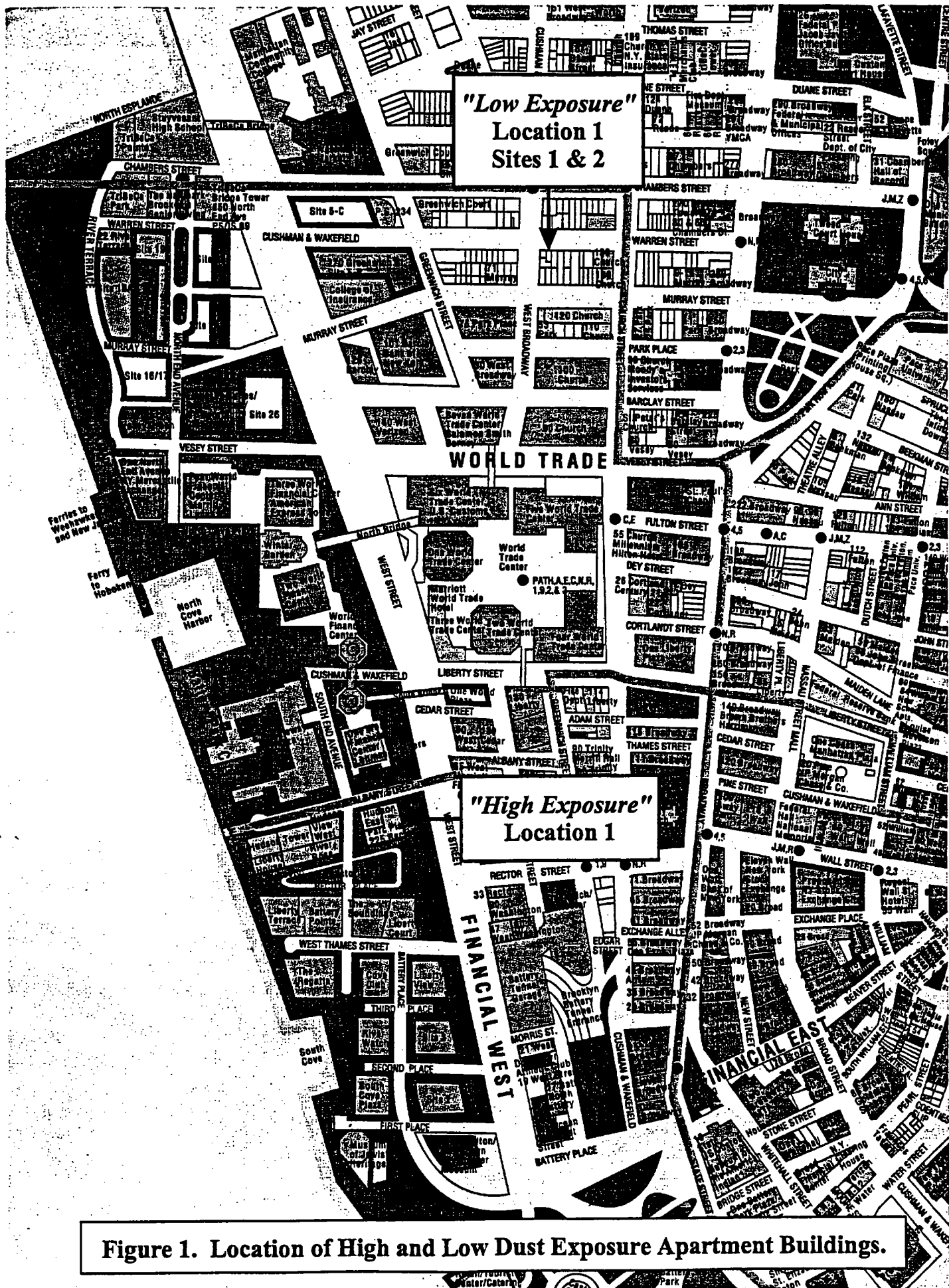
1.0 INTRODUCTION

Immediately following the destruction at the World Trade Center on 11 September 2001, the EPA and OSHA began to monitor the air and soil around the World Trade Center site (Ground Zero) to determine the presence of asbestos, lead, polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and volatile organic compounds.

A lack of information about the environmental safety of their homes soon became of great concern to the 50,000 residents of lower Manhattan surrounding Ground Zero. Residents who were allowed to remain in their homes did not know if they were at risk from contamination in their homes, and residents who had been told to stay out of their homes did not know when it would be safe to return. Schools and businesses shared similar concerns.

A "Ground Zero" Elected Officials Task Force was formed to respond to the concerns of the residents. On 15 September 2001, the Task Force requested that an independent environmental assessment of residences be conducted to provide residents with information and reassurance. A meeting with representatives of the Task Force was held on 17 September 2001 in Lower Manhattan. The Task Force representatives specified areas around Ground Zero that were of greatest concern.

A small-scale monitoring survey of two residential buildings was conducted. One of the buildings was on Warren Street four blocks north of Ground Zero, and the second building was on South End Avenue, close to Ground Zero, to the southwest of the World Trade Center. The Warren Street location was considered to have been exposed to lower concentrations of dust than those at the South End Avenue location. The locations of the two buildings are shown in Figure 1. The purpose of the survey was to determine the levels of PCBs, PCDDs, PCDFs, metals, and asbestos inside the buildings, and whether specialized cleaning techniques would be required prior to re-occupancy. The aim of this report is to present the results of the survey and to make recommendations on the basis of these results.



2.0 STUDY DESIGN AND SAMPLING STRATEGY

The buildings were selected to provide one example of a residential building that had apparently incurred a low exposure to the dust, and one example of a residential building that had obviously incurred a high exposure to the dust. The selection was based on the proximity of the building to Ground Zero, the degree to which the building was shielded from Ground Zero by other buildings, and the external integrity of the building.

2.1 The Low Exposure Building

The low exposure 7-story building had been fully renovated and modernized into spacious luxury apartments, with one apartment per floor. It is located on Warren Street, four blocks north of Ground Zero; numerous low-rise and high-rise buildings are found between this location and Ground Zero. The building showed no signs of external damage. All of the windows are intact, most of which are on the north side facing away from Ground Zero. The 5th Floor penthouse apartment comprises three levels -- the top one being a loft with an exit onto the rooftop. The building superintendent reported that a layer of dust had coated the stairwells and staircase several days before the sampling, but that these areas had already been cleaned. No other part of the building had been cleaned. The apartments on the 2nd and 5th Floors were selected for the study. The building superintendent reported that these apartments were normally cleaned regularly. It was concluded that the visible dust (Figure 2) on table tops near the window and on the inside window sills likely originated from the dust cloud generated by the destruction of the World Trade Center buildings.

2.2 The High Exposure Building

As shown in Figure 1, the high exposure 30-story apartment building is situated on South End Avenue, close to and southwest of Ground Zero. Windows of several apartments on the upper levels had been broken, but the building showed no other signs of external damage. This building was selected for study because it appeared to be the nearest one to Ground Zero that had electrical power available for operation of air sampling pumps. Apartment 10D on the

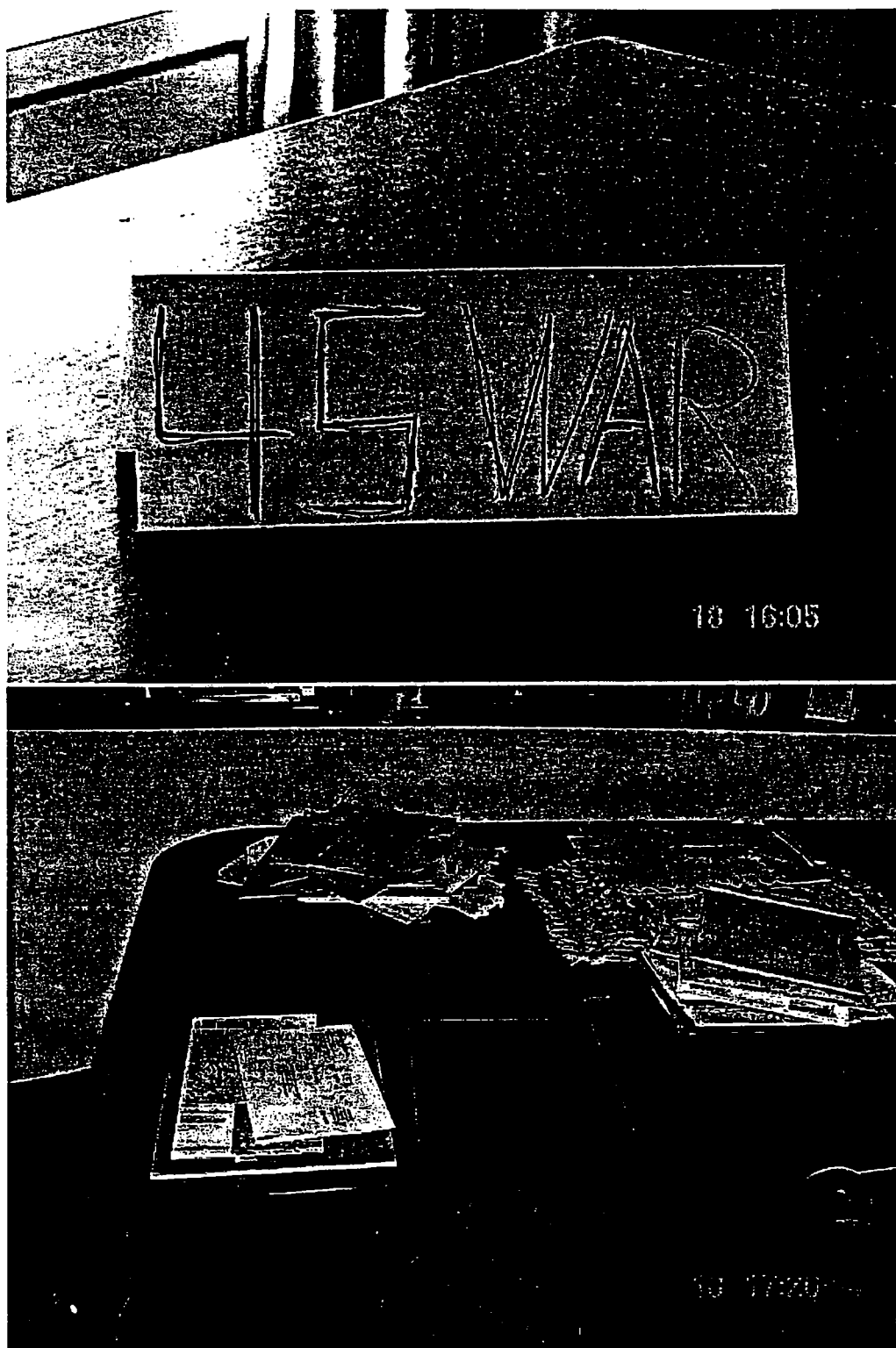


Figure 2. Dust Deposited on Furniture in Low (top) and High (bottom) Exposure Apartment Buildings.

east side of the 10th Floor was selected as representative of an apartment that had sustained window damage, was impacted by the dust cloud, and was in close proximity to the destruction of the World Trade Center Complex. The apartment consisted of a living room, dining room, kitchen, den, two bathrooms, and a master bedroom. One of the windows of the master bedroom had been damaged by a projectile that had passed through the bedroom and penetrated the wall of a clothes closet on the opposite side of the room. The bed and carpets were covered with dust and broken glass. The view of Ground Zero from the window was completely unobstructed. Heavy dust deposits were visible on all horizontal surfaces of tables, cupboards, and counters. Loose dust and debris were piled up to approximately a 45-degree angle on the exterior window ledges of the apartment.

2.3 Sampling Strategy

The overall sampling strategy consisted of collecting air samples, surface dust and debris samples, and exterior dust and debris samples to determine the presence of asbestos, as well as surface wipe and exterior dust and debris samples to determine the presence of inorganic metals, polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and polychlorinated biphenyls (PCBs). Table 1 shows the numbers of samples collected and analyzed.

**TABLE 1. TYPE AND DISTRIBUTION OF SAMPLES COLLECTED
AND ANALYZED**

Location	PCDD/PCDF/PCBs			Inorganic Metals			Asbestos		
	Surface Wipe	Surface Dust	Bulk Dust	Surface Wipe	Surface Dust	Bulk Dust	Air	Surface Dust	Exterior Dust
45 Warren Street 2nd Floor	2	0	0	2	0	0	3	2	0
45 Warren Street 5th Floor	2	0	0	2	0	0	3	2	0
45 Warren Street Roof	0	0	1	0	0	1	1	0	1
Church Street South of Duane Automobile Roof	0	0	0	0	0	0	0	0	1
250 South End Ave. Apartment 10D Interior	1	1	0	0	1	1	5	2	0
250 South End Ave. Apartment 10D Exterior	0	0	0	0	0	0	1	0	0
250 South End Ave. Apartment 11D Exterior Window Sill	0	0	1	0	0	0	0	0	1
250 South End Ave. Ground Level Courtyard	0	0	0	0	0	0	0	0	1
TOTAL^a	5	1	2	4	1	2	13	6	4

^a Excludes quality assurance field blanks.

3.0 PCDDs, PCDFs, AND PCBs

3.1 Collection

3.1.1 *Surface Wipe*

Isopropanol-moistened 3-inch by 3-inch cotton gauze pads were used to collect surface-wipe samples from table tops and other furniture. The gauze pad was held with a gloved hand (non-linear polyethylene-type glove). The surface was wiped using successive swaths first in one direction, then in a second direction perpendicular to the first. Multiple gauze pads were used as necessary depending on the surface dust loading. The gauze pad sample was then placed in a clean glass sample container equipped with a Teflon-lined lid. The sample area was measured and recorded.

3.1.2 *Surface Dust*

A new stiff bristle toothbrush was used to collect dust samples from furniture such as table tops and other furniture with a hard surface. The dust was swept into a pile and collected using a scoop constructed of paper. The dust was then placed in a clean 50-ml polyethylene centrifuge tube with a screw-cap lid. The sample area was measured and recorded.

3.1.3 *Bulk Dust*

Bulk dust samples were collected from exterior surfaces (including a window ledge and a roof top) with heavy deposits of dust. The dust was placed in either a clean zip-lock plastic bag or 50-ml plastic centrifuge tube.

3.2 Analysis

3.2.1 *Surface Wipe*

The samples were prepared and analyzed to determine the presence of tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans and the respective 2,3,7,8-substituted isomers using high-resolution gas chromatography/high-resolution mass spectroscopy

(HRGC/HRMS) in accordance with EPA SW-846 Method 8290. The samples for PCBs as Aroclors (PCB-1016, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, and PCB-1260) were prepared and analyzed using gas chromatography with electron capture detection in accordance with EPA SW-846 Method 8082.

3.2.2 Surface and Bulk Dust

The samples were prepared and analyzed to determine the presence of PCDDs, PCDFs, and PCBs as described in Section 3.2.1.

3.3 Results

3.3.1 Surface Wipe

Table 2 presents concentrations of PCDDs/PCDFs (expressed as 2,3,7,8-Tetrachlorobenzo-p-dioxin Equivalents¹) and PCBs. The concentrations of 2,3,7,8-TCDD Equivalents ranged from 0.0012 to 0.088 ng/m². By comparison, the concentrations are numerically lower than the background concentrations (0.05-0.29 ng/m²) measured in commercial office buildings in the United States (Kominsky and Kwoka, 1989). The concentrations are also significantly less than the guideline (25 ng/m² 2,3,7,8-TCDD Equivalents) recommended by the National Academy of Sciences, Subcommittee on Dioxin (NAS 1988). All PCB concentrations were below the analytical limit of detection (<0.10 µg/m²) and are thus within comparative background levels (Kominsky et. al, 1989).

The PCDDs and PCDFs were likely produced during the combustion of PCB-containing materials and chlorinated compounds such as PVC plastics. Historically, PCBs were used in dielectric fluids in electrical transformers and capacitors (e.g., fluorescent light ballasts and

¹ The potential toxicity of mixtures of PCDDs and PCDFs in environmental samples is estimated by converting the respective concentrations of PCDDs and PCDFs to 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD Equivalents) (EPA 1989). This mathematical conversion represents the estimated amount of 2,3,7,8-tetrachlorodibenzo-p-dioxin (i.e., the 2,3,7,8-TCDD isomer) that would have to be present to exhibit the same toxicity as the measured quantities of each of the various PCDDs and PCDFs that are present in a sample.

video display terminals, hydraulic fluids, and heat transfer fluids) as well as plasticizers in paints, caulking, and adhesives.

3.3.2 *Surface Dust and Bulk Samples*

Table 3 presents the concentrations of PCDDs/PCDFs (expressed as 2,3,7,8-TCDD Equivalents) and PCBs in surface wipe and dust bulk samples, respectively. The concentrations ranged from 33 to 260 ng/kg, which are significantly lower than cleanup guidelines for soil/dust (5,000 to 7,000 ng/kg) recommended by the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC 1984). The mass-to-mass concentration (54 ng/kg) of 2,3,7,8-TCDD Equivalents in the surface dust sample was converted to a mass per area concentration (0.47 ng/m^2) based on a sample area of 0.529 m^2 , which is also similar to the upper limit background (0.29 ng/m^2) and below the NAS guideline (25 ng/m^2).

TABLE 2. CONCENTRATION OF 2,3,7,8-TCDD EQUIVALENTS (I/TEF-89) AND PCB AROCLORS IN SURFACE WIPE SAMPLES OBTAINED FROM HORIZONTAL SURFACES IN APARTMENTS

Sample No.	Sample Location	Sample Description	2378-TCDD Equiv., ng/m ²	PCBs, ^a μg/m ²
250SEA10D-DF1	250 South End Ave, Location 1, Site 1	Top of entertainment center & dining room table (sample area = 1.04 m ²)	0.038	ND (<0.10)
45WAR2-DF1	45 Warren Street, Location 1, Site 1	Top of table (sample area = 1.08 m ²)	0.026	ND (<0.10)
45WAR2-DF2	45 Warren Street, Location 1, Site 1	Bench window ledge (sample area = 0.372 m ²)	0.088	ND (<0.10)
45WAR5-DF2	45 Warren Street, Location 1, Site 2	Top of table (sample area = 0.932 m ²)	0.0012	ND (<0.10)
45WAR5-DF1	45 Warren Street, Location 1, Site 2	Top of table (sample area = 1.022 m ²)	0.012	ND (<0.10)
45WAR2-DF3	45 Warren Street, Location 1, Site 1	Field Blank	0.0	ND (<0.10)

^a Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260 were not present above the reported analytical limit of detection.

TABLE 3. CONCENTRATION OF 2,3,7,8-TCDD EQUIVALENTS (I/TEF-89) AND PCB AROCLORS IN DUST OBTAINED FROM APARTMENTS

Sample No.	Sample Location	Sample Description	2378-TCDD Equiv., ng/kg	PCB- 1260, ^b mg/kg
250SEA10D-DF2	250 South End Ave, Location 1, Site 1	Dust from surface of chest (sample area 0.529 m ²)	54 ^a	0.16 ^c
250SEA-WL-BD1	250 South End Ave, Location 1, Site 1	Dust from exterior window ledge at east elevation	260	0.35
250SEA-R-BD2	45 Warren Street	Dust from rooftop	33	0.23

^a Equivalent to a surface concentration of 0.47 ng/m² based on a sample area of 0.529 m².

^b Aroclors 1016, 1221, 1232, 1242, 1248, and 1254 were not present above the reported analytical limit of detection.

^c Equivalent to a surface concentration of 0.66 μg/m² based on a sample area of 0.529 m².

4.0 INORGANIC METALS

4.1 Collection

4.1.1 *Surface Wipe*

Disposable wipes were used to collect surface wipe samples from furniture with hard surfaces such as table tops. Sampling was conducted in accordance with the procedure specified in Appendix 13.1, "Wipe Sampling for Settled Lead-Contaminated Dust" of the HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (HUD 1995). The sample area was measured and recorded.

4.1.2 *Surface Dust*

A new stiff bristle toothbrush was used to collect surface dust samples from table tops and other furniture with hard surfaces. The dust was swept into a pile and then collected using a scoop constructed of paper. The dust was then placed in a clean 50-ml polyethylene centrifuge tube with a screw-cap lid. The sample area was measured and recorded.

4.1.3 *Bulk Dust*

Bulk dust samples were collected from exterior surfaces (including a window ledge and a roof top) showing heavy deposits of dust. The dust was placed in either a clean zip-lock plastic bag or 50-ml plastic centrifuge tube.

4.2 Analysis

4.2.1 *Surface Wipe*

The samples were prepared in accordance with EPA SW-846 Method 3050 and analyzed to determine the presence of 22 metals (excluding mercury). The samples were analyzed in accordance with EPA SW-846 Method 6010 using inductively coupled plasma atomic absorption spectrometry (ICP-AES). The samples for mercury were prepared and analyzed for mercury in accordance with EPA SW-846 Method 7471.

4.2.2 Surface Dust and Bulk Samples

The samples were prepared and analyzed to determine the presence of mercury and the other 22 metals as described in Section 4.2.1.

4.3 Results of Surface Dust and Bulk Samples

The analyses of 23 metals present in the dust deposited in the “high” and “low” exposure apartment buildings are presented in Tables 4 and 5. These tables present surface wipe and bulk dust sample analyses.

The concentrations of metals with the highest potential chronic toxicity (such as arsenic, beryllium, cadmium, chromium, lead, mercury, and nickel) are relatively low or are not present above the analytical limit of detection. Regarding lead, a dust-lead hazard is defined as a surface in a residential dwelling or child-occupied facility that contains a mass-per-area concentration of lead equal to or exceeding $40 \mu\text{g}/\text{ft}^2$ on floors or $250 \mu\text{g}/\text{ft}^2$ on interior window sills based on wipe samples (Federal Register, Vol. 66, No. 4, January 5, 2001). By comparison, lead concentrations measured in the apartments ranged from 14 to $30 \mu\text{g}/\text{ft}^2$.

Calcium represented approximately 9 to 19 percent ($9.1\text{-}190,000 \mu\text{g}/\text{g}$) of the metals present in the dust. Mineral wool in the Trade Center Towers contained a large percentage of calcium. Mineral wool made up approximately 60 percent of the fireproofing. Calcium oxide (lime) is a primary component of cement, calcium sulfate (gypsum) is the primary component of wallboard (drywall), and calcium is a primary component of mineral wool (fireproofing). Because calcium oxide is alkaline and reacts with moisture to form calcium hydroxide, exposure to the dust can irritate the eyes, mucous membranes, and/or skin.

**TABLE 4. CONCENTRATIONS OF METALS IN WIPE SAMPLES
OBTAINED FROM FURNITURE**

Metal	"Low Dust Building" 45 Warren Street				Field Blank	"High Dust Building" 250 South End Avenue
	45WAR2PB1	45WAR2PB2	45WAR5PB1	45WAR5PB2	45WAR5PB3 ^b	250SEA10DPB1 ^c
	Concentrations - $\mu\text{g}/\text{ft}^2$					
Aluminum	475	777	1,007	30	57	1,745
Antimony	33	35	18	20	120	2
Arsenic	ND	ND	ND	ND	ND	ND
Barium	13	19	16	ND	ND	25
Beryllium	ND ^a	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	1
Calcium	4,754	7,769	874	302	690	22,907
Chromium	3	4	4	ND	ND	12
Cobalt	1	2	1	ND	ND	1
Copper	7	10	10	2	ND	17
Iron	350	551	519	22	ND	1,036
Lead	25	30	14	14	ND	24
Magnesium	676	977	1,185	49	200	1,963
Manganese	23	38	47	1	ND	68
Mercury	9	0.04	0.02	ND	ND	ND
Nickel	2	2	1	1	ND	3
Potassium	108	183	207	36	38	355
Selenium	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND
Sodium	275	426	267	133	590	464
Thallium	ND	ND	ND	ND	ND	ND
Vanadium	1	1	1	ND	ND	2
Zinc	48	75	89	6	ND	183

^a Denotes the concentration was below the analytical limit of detection.

^b Micrograms of metal per sample.

^c Surface dust.

TABLE 5. CONCENTRATIONS OF METALS IN DUST SAMPLES

Metal	"High Dust Building"		"Low Dust Building"
	250 South End Ave., 10 th Floor		45 Warren Street
	Exterior Window Ledge (250SEABD2)	Table Top (250SEA10DPB1)	Roof Top (45WARBD1)
	Concentration - $\mu\text{g/g}$ (ppm)		
Aluminum	22,000	6,900	31,000
Antimony	24	9.0	40
Arsenic	ND ^a	ND	11
Barium	210	100	500
Beryllium	2.1	0.6	3.6
Cadmium	ND	4.0	ND
Calcium	190,000	91,000	170,000
Chromium	75	47	110
Cobalt	5.9	2.7	13
Copper	70	67	140
Iron	8,600	4,100	12,000
Lead	220	96	140
Magnesium	24,000	7,800	40,000
Manganese	810	270	1,600
Mercury	ND	0.38	ND
Nickel	22	13	33
Potassium	2,700	1,400	6,400
Selenium	ND	ND	ND
Silver	ND	1.2	ND
Sodium	3,500	1,800	3,400
Thallium	ND	ND	ND
Vanadium	23	9.7	31
Zinc	820	730	1,600

^a Denotes that the concentration is below the analytical limit of detection.

5.0 ASBESTOS MEASUREMENTS

5.1 Asbestos in Passive Air Samples

5.1.1 *Sample Collection*

Air samples were collected using 25-mm-diameter 3-piece plastic cassettes with short cowls. Each cassette contained a 25-mm-diameter, 0.45- μ m porosity, mixed esters of cellulose (MCE) filter, with a 5.0- μ m MCE back-up filter and a cellulose support pad. Each sampler operated at a flow rate of approximately 9 liters/minute and was calibrated at the start and finish of sampling. All air sampling was conducted under passive conditions, and no air conditioning or ventilation systems were operating at the time of sampling. Considerable amounts of settled dust and debris were present on all horizontal surfaces in each of the apartments where the indoor samples were collected. Disturbance of this surface dust was minimized, personnel were near the air samplers only to monitor their operation, and dust and debris samples were collected with a minimum of disturbance.

At 45 Warren Street, three air samplers were positioned in the 2nd Floor apartment and three in the 5th Floor apartment. An exterior sample was also collected on the roof outside the 5th Floor loft. Each of these samplers operated over a period of time sufficient to collect the particulate material from approximately 1200 liters of air. An open field blank and a closed field blank were included with this set of air samples.

At 250 South End Avenue, five samples were collected in Apartment 10D, and one exterior sample was collected by positioning the cassette outside a sliding window. An open field blank and a closed field blank were included with this set of air samples. The intent was to collect particulate material from approximately 1200 liters of air, but the sample collection had to be terminated prematurely because the filters were becoming overloaded.

5.1.2 *Analysis*

The sample filters from 45 Warren Street were prepared and analyzed by transmission electron microscopy (TEM) using the direct-transfer method ISO10312. An initial attempt to prepare TEM specimens by ISO10312 from the air sample filters from 250 South End Avenue

was unsuccessful because of the high particulate loadings on the filters. Examination of the unsatisfactory TEM specimens prepared from these filters indicated that much of the material on the filters was gypsum and cement dust. It was found that the gypsum and the water-soluble components of the cement dust could be removed from the surfaces of the filters by a water extraction treatment. After this treatment, specimens suitable for TEM analysis for asbestos were obtained by using the preparation procedures of ISO10312. TEM data recorded according to ISO10312 allows for results to be compared with known TEM and phase contrast microscopy (PCM) exposure criteria. The TEM fiber counting data was interpreted to derive the concentrations of asbestos structures greater than 0.5 μm , asbestos fibers and bundles longer than 5 μm , and PCM-equivalent asbestos fibers and bundles (fibers and bundles longer than 5 μm with widths greater than 0.25 μm).

5.1.3 Results

Tables 6 through 13 present the results of the TEM analyses for asbestos in the air samples collected at 45 Warren Street. The maximum concentration of chrysotile structures greater than 0.5 μm observed under the passive conditions of the air sampling indoors was 0.12 structure/mL, with an upper 95% confidence limit of 0.16 structure/mL. The maximum mean airborne concentration of chrysotile fibers longer than 5 μm observed under the passive conditions of the air sampling indoors was 0.018 fiber/mL, with an upper 95% confidence limit of 0.034 fiber/mL. The maximum mean airborne concentration of PCM-equivalent chrysotile fibers observed under the passive conditions of the air sampling indoors was 0.010 fiber/mL, with an upper 95% confidence limit of 0.023 fiber/mL. No amphibole fibers were detected in any of these indoor samples. Only one asbestos fiber was detected in the sample collected outdoors. This fiber was a chrysotile fiber longer than 5 μm (but too narrow to be PCM-equivalent), and corresponded to an upper 95% confidence limit of 0.012 structure/mL. No asbestos fibers of any size were detected on the open field blank, corresponding to an upper 95% confidence limit of 0.007 structure/mL for an assumed air volume of 1200 liters. It must be appreciated that these are the airborne asbestos concentrations measured in samples collected under passive conditions and that airborne asbestos concentrations would become

**TABLE 6. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

45 WARREN STREET, NEW YORK CITY

STRUCTURES GREATER THAN 0.5 MICROMETER

Sample Description	Fiber Type	Structure Concentration, Structures/mL			Structures per Square Millimeter	Volume of Air Sampled Liters	Number of Structures Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 45WAR-2-A1 9/18/01 2nd Floor Living Room	Chrysotile Amphibole Total	0.10	0.075 - 0.14	0.00209	316	1190	49
		ND	0 - 0.007	0.00209	0	1190	0
		0.10	0.075 - 0.14	0.00209	316	1190	49
Sample 45WAR-2-A2 9/18/01 2nd Floor Living Room	Chrysotile Amphibole Total	0.12	0.093 - 0.16	0.00212	376	1176	58
		ND	0 - 0.007	0.00212	0	1176	0
		0.12	0.093 - 0.16	0.00212	376	1176	58
Sample 45WAR-2-A3 9/18/01 2nd Floor Master Bedroom	Chrysotile Amphibole Total	0.085	0.061 - 0.12	0.00197	279	1269	43
		ND	0 - 0.006	0.00197	0	1269	0
		0.085	0.061 - 0.12	0.00197	279	1269	43

- * - No mean value is reported when fewer than 4 countable structures were detected in the portion of sample examined
 ND - No Countable Structures Detected
 NSS - Not Statistically Significant (1 to 3 countable structures detected)

**TABLE 7. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

45 WARREN STREET, NEW YORK CITY

FIBERS AND BUNDLES LONGER THAN 5 MICROMETERS

Sample Description	Fiber Type	Fiber Concentration, Fibers/mL			Fibers per Square Millimeter	Volume of Air Sampled Liters	Number of Fibers Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 45WAR-2-A1 9/18/01 2nd Floor Living Room	Chrysotile	0.010	0.003 - 0.025	0.00210	32.4	1190	5
	Amphibole	ND	0 - 0.007	0.00210	0	1190	0
	Total	0.010	0.003 - 0.025	0.00210	32.4	1190	5
Sample 45WAR-2-A2 9/18/01 2nd Floor Living Room	Chrysotile	0.011	0.003 - 0.025	0.00211	32.2	1176	5
	Amphibole	ND	0 - 0.007	0.00211	0	1176	0
	Total	0.011	0.003 - 0.025	0.00211	32.2	1176	5
Sample 45WAR-2-A3 9/18/01 2nd Floor Master Bedroom	Chrysotile	0.018	0.008 - 0.034	0.00196	58.1	1269	9
	Amphibole	ND	0 - 0.006	0.00196	0	1269	0
	Total	0.018	0.008 - 0.034	0.00196	58.1	1269	9

* - No mean value is reported when fewer than 4 countable fibers were detected in the portion of sample examined
 ND - No Countable Fibers Detected
 NSS - Not Statistically Significant (1 to 3 countable fibers detected)

**TABLE 8. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

45 WARREN STREET, NEW YORK CITY

PCM-EQUIVALENT FIBERS AND BUNDLES

(Length >5 micrometers; Width >0.25 micrometer; Aspect Ratio ≥3:1)

Sample Description	Fiber Type	Fiber Concentration, Fibers/mL			Fibers per Square Millimeter	Volume of Air Sampled Liters	Number of Fibers Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 45WAR-2-A1 9/18/01 2nd Floor Living Room	Chrysotile	NSS	0 - 0.012	0.00210	6.5	1190	1
	Amphibole	ND	0 - 0.007	0.00210	0	1190	0
	Total	NSS	0 - 0.012	0.00210	6.5	1190	1
Sample 45WAR-2-A2 9/18/01 2nd Floor Living Room	Chrysotile	ND	0 - 0.007	0.00211	0	1176	0
	Amphibole	ND	0 - 0.007	0.00211	0	1176	0
	Total	ND	0 - 0.007	0.00211	0	1176	0
Sample 45WAR-2-A3 9/18/01 2nd Floor Master Bedroom	Chrysotile	0.010	0.003 - 0.023	0.00196	32.3	1269	5
	Amphibole	ND	0 - 0.006	0.00196	0	1269	0
	Total	0.010	0.003 - 0.023	0.00196	32.3	1269	5

* - No mean value is reported when fewer than 4 countable fibers were detected in the portion of sample examined
 ND - No Countable Fibers Detected
 NSS - Not Statistically Significant (1 to 3 countable fibers detected)

**TABLE 9. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

45 WARREN STREET, NEW YORK CITY

STRUCTURES GREATER THAN 0.5 MICROMETER

Sample Description	Fiber Type	Structure Concentration, Structures/mL			Structures per Square Millimeter	Volume of Air Sampled Liters	Number of Structures Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 45WAR-2-A4 9/18/01 2nd Floor Open Blank	Chrysotile	ND	0 - 0.007	0.00206	0	1200**	0
	Amphibole	ND	0 - 0.007	0.00206	0	1200**	0
	Total	ND	0 - 0.007	0.00206	0	1200**	0

- * - No mean value is reported when fewer than 4 countable structures were detected in the portion of sample examined
- ND - No Countable Structures Detected
- NSS - Not Statistically Significant (1 to 3 countable structures detected)
- ** - Assumed air volume for calculation

**TABLE 10. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

45 WARREN STREET, NEW YORK CITY

STRUCTURES GREATER THAN 0.5 MICROMETER

Sample Description	Fiber Type	Structure Concentration, Structures/mL			Structures per Square Millimeter	Volume of Air Sampled Liters	Number of Structures Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 45WAR-5-A1 9/18/01 5th Floor Living Room	Chrysotile Amphibole Total	0.046	0.028 - 0.069	0.00207	142	1201	22
		ND	0 - 0.007	0.00207	0	1201	0
		0.046	0.028 - 0.069	0.00207	142	1201	22
Sample 45WAR-5-A2 9/18/01 5th Floor Dining Room	Chrysotile Amphibole Total	0.046	0.028 - 0.071	0.00221	141	1170	21
		ND	0 - 0.007	0.00221	0	1170	0
		0.046	0.028 - 0.071	0.00221	141	1170	21
Sample 45WAR-5-A3 9/18/01 5th Floor Bedroom Level	Chrysotile Amphibole Total	0.051	0.033 - 0.076	0.00204	162	1226	25
		ND	0 - 0.007	0.00204	0	1226	0
		0.051	0.033 - 0.076	0.00204	162	1226	25

* - No mean value is reported when fewer than 4 countable structures were detected in the portion of sample examined
 ND - No Countable Structures Detected
 NSS - Not Statistically Significant (1 to 3 countable structures detected)

**TABLE 11. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

**45 WARREN STREET, NEW YORK CITY
FIBERS AND BUNDLES LONGER THAN 5 MICROMETERS**

Sample Description	Fiber Type	Fiber Concentration, Fibers/mL			Fibers per Square Millimeter	Volume of Air Sampled Liters	Number of Fibers Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 45WAR-5-A1 9/18/01 5th Floor Living Room	Chrysotile	0.008	0.002 - 0.019	0.00155	24.2	1201	5
	Amphibole	ND	0 - 0.005	0.00155	0	1201	0
	Total	0.008	0.002 - 0.019	0.00155	24.2	1201	5
Sample 45WAR-5-A2 9/18/01 5th Floor Dining Room	Chrysotile	0.013	0.004 - 0.029	0.00221	40.2	1170	6
	Amphibole	ND	0 - 0.007	0.00221	0	1170	0
	Total	0.013	0.004 - 0.029	0.00221	40.2	1170	6
Sample 45WAR-5-A3 9/18/01 5th Floor Bedroom Level	Chrysotile	0.008	0.002 - 0.018	0.00153	24.4	1226	5
	Amphibole	ND	0 - 0.005	0.00153	0	1226	0
	Total	0.008	0.002 - 0.018	0.00153	24.4	1226	5

* - No mean value is reported when fewer than 4 countable fibers were detected in the portion of sample examined
 ND - No Countable Fibers Detected
 NSS - Not Statistically Significant (1 to 3 countable fibers detected)

**TABLE 12. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

45 WARREN STREET, NEW YORK CITY

PCM-EQUIVALENT FIBERS AND BUNDLES

(Length >5 micrometers; Width >0.25 micrometer; Aspect Ratio ≥3:1)

Sample Description	Fiber Type	Fiber Concentration, Fibers/mL			Fibers per Square Millimeter	Volume of Air Sampled Liters	Number of Fibers Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 45WAR-5-A1 9/18/01 5th Floor Living Room	Chrysotile	NSS	0 - 0.009	0.00155	4.8	1201	1
	Amphibole	ND	0 - 0.005	0.00155	0	1201	0
	Total	NSS	0 - 0.009	0.00155	4.8	1201	1
Sample 45WAR-5-A2 9/18/01 5th Floor Dining Room	Chrysotile	NSS	0 - 0.013	0.00221	6.7	1170	1
	Amphibole	ND	0 - 0.007	0.00221	0	1170	0
	Total	NSS	0 - 0.013	0.00221	6.7	1170	1
Sample 45WAR-5-A3 9/18/01 5th Floor Bedroom Level	Chrysotile	ND	0 - 0.005	0.00153	0	1226	0
	Amphibole	ND	0 - 0.005	0.00153	0	1226	0
	Total	ND	0 - 0.005	0.00153	0	1226	0

* - No mean value is reported when fewer than 4 countable fibers were detected in the portion of sample examined
 ND - No Countable Fibers Detected
 NSS - Not Statistically Significant (1 to 3 countable fibers detected)

**TABLE 13. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

45 WARREN STREET, NEW YORK CITY

STRUCTURES GREATER THAN 0.5 MICROMETER

Sample Description	Fiber Type	Structure Concentration, Structures/mL			Structures per Square Millimeter	Volume of Air Sampled Liters	Number of Structures Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 45WAR-5-A4 9/18/01 5th Floor Roof, Outside Loft	Chrysotile	NSS	0 - 0.012	0.00210	6.5	1183	1
	Amphibole	ND	0 - 0.007	0.00210	0	1183	0
	Total	NSS	0 - 0.012	0.00210	6.5	1183	1
Sample 45WAR-5-A5 9/18/01 5th Floor Open Blank	Chrysotile	ND	0 - 0.007	0.00205	0	1200**	0
	Amphibole	ND	0 - 0.007	0.00205	0	1200**	0
	Total	ND	0 - 0.007	0.00205	0	1200**	0

- * - No mean value is reported when fewer than 4 countable structures were detected in the portion of sample examined
- ND - No Countable Structures Detected
- NSS - Not Statistically Significant (1 to 3 countable structures detected)
- ** - Assumed air volume for calculation

significantly elevated if the asbestos-containing dust and debris on the surfaces was disturbed by routine methods of dry dusting and vacuuming.

The results of the TEM analyses for asbestos in the air samples collected at 250 South End Avenue are shown in Tables 14 through 17. Because these samples were heavily loaded with large numbers of chrysotile fibers, the counting of structures greater than 0.5 μm had to be terminated after TEM examination of only one grid opening for each of the indoor samples. Examination of the TEM specimens for asbestos structures greater than 5 μm was continued. The maximum concentration of chrysotile structures greater than 0.5 μm was estimated to be 3.74 structures/mL, with an upper 95% confidence limit of 4.53 structures/mL, based on the TEM examination of only one grid opening. The maximum concentration of chrysotile fibers longer than 5 μm was 0.29 fiber/mL, with an upper 95% confidence limit of 0.35 fiber/mL. In Sample 250SEA-10D-A5, two fibers of richterite asbestos (longer than 5 μm) were detected, corresponding to an upper 95% confidence limit for the airborne richterite asbestos concentration of 0.030 fiber/mL (fibers longer than 5 μm). During the limited TEM examination of Sample 250SEA-10D-A5 for asbestos structures greater than 0.5 μm , one amosite fiber (longer than 5 μm) was detected, corresponding to an estimated upper 95% confidence limit for airborne amosite of 0.23 structure/mL. The maximum mean airborne concentration of PCM-equivalent chrysotile fibers observed under the passive conditions of the air sampling indoors was 0.075 fiber/mL, and the maximum upper 95% confidence limit was 0.12 fiber/mL. The two PCM-equivalent amphibole fibers (richterite asbestos) detected correspond to an upper 95% confidence limit of 0.030 fiber/mL. The maximum mean concentration of PCM-equivalent asbestos fibers and bundles (chrysotile + amphibole) was found to be 0.081 fiber/mL in Sample 250SEA-10D-A5, with an upper 95% confidence limit of 0.13 fiber/mL.

Chrysotile was detected in the exterior sample collected outside the apartment window at 250 South End Avenue. The concentration of chrysotile structures greater than 0.5 μm was 0.22 structure/mL, with an upper 95% confidence limit of 0.27 structure/mL; the mean concentration of chrysotile fibers longer than 5 μm was 0.022 fiber/mL, with an upper 95% confidence limit of 0.043 fiber/mL. In this exterior sample, one fiber of amosite (shorter than 5 μm) was detected, corresponding to an upper 95% confidence limit for the airborne amosite

**TABLE 14. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

250 SOUTH END AVENUE, NEW YORK CITY

STRUCTURES GREATER THAN 0.5 MICROMETER - ESTIMATES BASED ON 1 GRID OPENING ONLY

Sample Description	Fiber Type	Structure Concentration, Structures/mL			Structures per Square Millimeter	Volume of Air Sampled Liters	Number of Structures Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 250SEA-10D-A1 9/18/01 Apartment 10D Den	Chrysotile	3.74	3.07 - 4.53	0.0347	10620	1092	108
	Amphibole	ND	0 - 0.11	0.0347	0	1092	0
	Total	3.74	3.07 - 4.53	0.0347	10620	1092	108
Sample 250SEA-10D-A2 9/18/01 Apartment 10D Den	Chrysotile	3.01	2.39 - 3.75	0.0372	7832	1001	81
	Amphibole	ND	0 - 0.12	0.0372	0	1001	0
	Total	3.01	2.39 - 3.75	0.0372	7832	1001	81
Sample 250SEA-10D-A3 9/18/01 Apartment 10D Living Room	Chrysotile	2.56	1.98 - 3.26	0.0388	6277	944	66
	Amphibole	ND	0 - 0.12	0.0388	0	944	0
	Total	2.56	1.98 - 3.26	0.0388	6277	944	66
Sample 250SEA-10D-A4 9/18/01 Apartment 10D Living Room	Chrysotile	2.45	1.89 - 3.13	0.0377	6285	987	65
	Amphibole	ND	0 - 0.12	0.0377	0	987	0
	Total	2.45	1.89 - 3.13	0.0377	6285	987	65
Sample 250SEA-10D-A5 9/18/01 Apartment 10D Bedroom	Chrysotile	3.01	2.36 - 3.78	0.0407	7155	915	74
	Amphibole	NSS	0 - 0.23	0.0407	97	915	1
	Total	3.05	2.39 - 3.83	0.0407	7252	915	75

* - No mean value is reported when fewer than 4 countable structures were detected in the portion of sample examined

ND - No Countable Structures Detected

NSS - Not Statistically Significant (1 to 3 countable structures detected)

**TABLE 15. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

250 SOUTH END AVENUE, NEW YORK CITY

FIBERS AND BUNDLES LONGER THAN 5 MICROMETERS

Sample Description	Fiber Type	Fiber Concentration, Fibers/mL			Fibers per Square Millimeter	Volume of Air Sampled Liters	Number of Fibers Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 250SEA-10D-A1 9/18/01 Apartment 10D Den	Chrysotile	0.22	0.16 - 0.28	0.00348	611	1092	62
	Amphibole	ND	0 - 0.011	0.00348	0	1092	0
	Total	0.22	0.16 - 0.28	0.00348	611	1092	62
Sample 250SEA-10D-A2 9/18/01 Apartment 10D Den	Chrysotile	0.23	0.17 - 0.30	0.00376	597	1001	61
	Amphibole	ND	0 - 0.012	0.00376	0	1001	0
	Total	0.23	0.17 - 0.30	0.00376	597	1001	61
Sample 250SEA-10D-A3 9/18/01 Apartment 10D Living Room	Chrysotile	0.16	0.12 - 0.22	0.00264	402	944	62
	Amphibole	ND	0 - 0.008	0.00264	0	944	0
	Total	0.16	0.12 - 0.22	0.00264	402	944	62
Sample 250SEA-10D-A4 9/18/01 Apartment 10D Living Room	Chrysotile	0.29	0.23 - 0.35	0.00251	746	987	116
	Amphibole	ND	0 - 0.008	0.00251	0	987	0
	Total	0.29	0.23 - 0.35	0.00251	746	987	116
Sample 250SEA-10D-A5 9/18/01 Apartment 10D Bedroom	Chrysotile	0.28	0.21 - 0.36	0.00407	658	915	68
	Amphibole	NSS	0 - 0.030	0.00407	19.3	915	2
	Total	0.28	0.22 - 0.36	0.00407	677	915	70

* - No mean value is reported when fewer than 4 countable fibers were detected in the portion of sample examined

ND - No Countable Fibers Detected

NSS - Not Statistically Significant (1 to 3 countable fibers detected)

**TABLE 16. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

250 SOUTH END AVENUE, NEW YORK CITY

PCM-EQUIVALENT FIBERS AND BUNDLES

(Length >5 micrometers; Width >0.25 micrometer; Aspect Ratio ≥3:1)

Sample Description	Fiber Type	Fiber Concentration, Fibers/mL			Fibers per Square Millimeter	Volume of Air Sampled Liters	Number of Fibers Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 250SEA-10D-A1 9/18/01 Apartment 10D Den	Chrysotile	0.063	0.037 - 0.099	0.00348	178	1092	18
	Amphibole	ND	0 - 0.011	0.00348	0	1092	0
	Total	0.063	0.037 - 0.099	0.00348	178	1092	18
Sample 250SEA-10D-A2 9/18/01 Apartment 10D Den	Chrysotile	0.060	0.034 - 0.098	0.00376	157	1001	16
	Amphibole	ND	0 - 0.012	0.00376	0	1001	0
	Total	0.060	0.034 - 0.098	0.00376	157	1001	16
Sample 250SEA-10D-A3 9/18/01 Apartment 10D Living Room	Chrysotile	0.048	0.028 - 0.076	0.00264	117	944	18
	Amphibole	ND	0 - 0.008	0.00264	0	944	0
	Total	0.048	0.028 - 0.076	0.00264	117	944	18
Sample 250SEA-10D-A4 9/18/01 Apartment 10D Living Room	Chrysotile	0.075	0.050 - 0.11	0.00251	193	987	30
	Amphibole	ND	0 - 0.008	0.00251	0	987	0
	Total	0.075	0.050 - 0.11	0.00251	193	987	30
Sample 250SEA-10D-A5 9/18/01 Apartment 10D Bedroom	Chrysotile	0.073	0.043 - 0.12	0.00407	174	915	18
	Amphibole	NSS	0 - 0.030	0.00407	19.3	915	2
	Total	0.081	0.043 - 0.13	0.00407	193	915	20

* - No mean value is reported when fewer than 4 countable fibers were detected in the portion of sample examined

ND - No Countable Fibers Detected

NSS - Not Statistically Significant (1 to 3 countable fibers detected)

**TABLE 17. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR AIRBORNE ASBESTOS**

250 SOUTH END AVENUE, NEW YORK CITY

STRUCTURES GREATER THAN 0.5 MICROMETER

Sample Description	Fiber Type	Structure Concentration, Structures/mL			Structures per Square Millimeter	Volume of Air Sampled Liters	Number of Structures Counted
		Mean *	95% Confidence Interval	Analytical Sensitivity			
Sample 250SEA-10D-A6 9/18/01 Apartment 10D Outside L R Window	Chrysotile	0.22	0.17 - 0.27	0.00270	548	977	80
	Amphibole	NSS	0 - 0.016	0.00270	6.8	977	1
	Total	0.22	0.17 - 0.28	0.00270	554	977	81
Sample 250SEA-10D-A7 9/18/01 Apartment 10D Open Blank	Chrysotile	ND	0 - 0.007	0.00207	0	1200**	0
	Amphibole	ND	0 - 0.007	0.00207	0	1200**	0
	Total	ND	0 - 0.007	0.00207	0	1200**	0

- * - No mean value is reported when fewer than 4 countable structures were detected in the portion of sample examined
- ND - No Countable Structures Detected
- NSS - Not Statistically Significant (1 to 3 countable structures detected)
- ** - Assumed air volume for calculation

asbestos concentration of 0.016 structure/mL. Some contamination of the exterior air sample by chrysotile might have been expected, given that asbestos-containing debris from the collapse of the buildings had accumulated on the exterior window ledges to the maximum depth possible. No asbestos structures of any size were detected on the open field blank.

All horizontal surfaces of Apartment 10D were covered by a thick layer of dust and debris that contained asbestos. It is important to take into account that the indoor air concentration results reported were obtained under passive sampling conditions with no active ventilation and minimum disturbance of the surface dust and debris. Disturbance of the dust by routine methods of dry dusting and vacuuming would significantly increase the airborne asbestos concentrations in the apartment. Based on the amount of visible dust and debris on surfaces in the apartment, the airborne asbestos could increase by orders of magnitude.

5.2 Dust and Debris Samples Collected from Surfaces in Buildings

5.2.1 Sample Collection

At 45 Warren Street, dust and debris were visible on surfaces in the apartments. A wet non-woven cloth was used to collect dust and debris samples in accordance with ASTM D6480-99.

At 250 South End Avenue, a window had been broken and the hard surfaces of furniture were coated with a layer of dust and debris sufficiently thick that it could be swept up with a brush. A new toothbrush was first used to remove dust and debris from a known area of the surface, and the collected material was transferred to a plastic container, after which a wet non-woven cloth was used to collect the visible dust and debris that still remained on the surface. Sampling was conducted in accordance with ASTM D6480-99. Each wet cloth was stored in a plastic container.

5.2.2 Sample Analysis

The wipe samples were analyzed according to ASTM D6480-99. For each of the two dust and debris samples collected using a toothbrush at the 250 South End Avenue location, a known weight of the dust and debris sample was dispersed in 100 mL of filtered distilled water.

The TEM specimens from these suspensions were then prepared according to ASTM D6480-99 in all subsequent steps.

5.2.3 Results

The results for the samples collected at 45 Warren Street are shown in Tables C18 and C19. Table C18 shows the results for asbestos structures greater than 0.5 μm , and Table C19 shows the results for asbestos fibers and bundles longer than 5 μm . In these samples, surface chrysotile concentrations up to 470,000 structures/ cm^2 were observed, of which up to 79,000 fibers/ cm^2 were fibers and bundles longer than 5 μm . Only one amosite fiber, equivalent to a surface concentration of 2200 structures/ cm^2 , was observed.

During preparation of the specimens from the 5th Floor at 45 Warren Street, vermiculite particles in the aqueous suspension were found to be visible to the unaided eye.

The results for the samples collected at 250 South End Avenue are shown in Tables 20 and 21. Table 20 shows the results for asbestos structures longer than 0.5 μm , and Table 21 shows the results for asbestos fibers and bundles longer than 5 μm . There are two results for each of the two surfaces sampled. The first result is for the dust and debris collected using a toothbrush. It should be noted that the collection areas specified are calculated from the actual area sampled multiplied by the proportion of the total sample analyzed. The second result in each location is for the follow-up wipe sample, and the collection area specified is the actual area sampled. For each sample location, the results for the two measurements in the final column of Tables 20 and 21 should be added to obtain the total asbestos concentration on the sampled surface. Surface chrysotile concentrations of up to 990,000 structures/ cm^2 were observed, of which up to 46,000 were fibers and bundles longer than 5 μm . No amphibole fibers were detected in these samples.

The results show that the dust and debris that have settled on the surfaces in each of the apartments contain substantial amounts of chrysotile. It is important to recognize that the analytical method used is an indirect-transfer method, and that the results from this method, particularly in the case of chrysotile, do not represent the size distribution of the asbestos-containing particles as they existed on the original surface. The analytical method results in the dispersal of large clusters of chrysotile into individual chrysotile fibers and

**TABLE 18. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR ASBESTOS IN DUST AND DEBRIS**

45 WARREN STREET, NEW YORK CITY

STRUCTURES GREATER THAN 0.5 MICROMETER

Sample	Approximate Collection Area cm ²	Dispersal Volume mL	Volume Filtered mL	Analytical Sensitivity structures/cm ²	Type of Asbestos	Number of Asbestos Structures Detected	Concentration of Asbestos Structures on Surface structures/cm ²
Sample 45WAR-2-D1, 9/18/01 2nd Floor, Living Room Table Near Window Wipe Sample	14710	500	1.0	165	Chrysotile	174	29000
					Amphibole	0	<500
					Total	174	29000
Sample 45WAR-2-D2, 9/18/01 2nd Floor, Living Room Window Sill Wipe Sample	3716	500	0.3	2240	Chrysotile	211	470000
					Amphibole	1	2200
					Total	212	470000
Sample 45WAR-5-D1, 9/18/01 5th Floor, Dining Room Large Dining Table Wipe Sample	13316	500	0.1	1760	Chrysotile	264	460000
					Amphibole	0	<5300
					Total	264	460000
Sample 45WAR-5-D2, 9/18/01 5th Floor, Roof Level Office Green Wooden Chair Wipe Sample	2439	500	1.0	980	Chrysotile	110	110000
					Amphibole	0	<3000
					Total	110	110000

**TABLE 19. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES FOR
ASBESTOS IN DUST AND DEBRIS**

45 WARREN STREET, NEW YORK CITY

FIBERS AND BUNDLES LONGER THAN 5 MICROMETERS

Sample	Approximate Collection Area cm ²	Dispersal Volume mL	Volume Filtered mL	Analytical Sensitivity fibers/cm ²	Type of Asbestos	Number of Asbestos Fibers Detected	Concentration of Asbestos Fibers on Surface fibers/cm ²
Sample 45WAR-2-D1, 9/18/01 2nd Floor, Living Room Table Near Window Wipe Sample	14710	500	1.0	165	Chrysotile	14	2300
					Amphibole	0	<500
					Total	14	2300
Sample 45WAR-2-D2, 9/18/01 2nd Floor, Living Room Window Sill Wipe Sample	3716	500	0.3	2240	Chrysotile	27	60000
					Amphibole	0	<6700
					Total	27	60000
Sample 45WAR-5-D1, 9/18/01 5th Floor, Dining Room Large Dining Table Wipe Sample	13316	500	0.1	1760	Chrysotile	45	79000
					Amphibole	0	<5300
					Total	45	79000
Sample 45WAR-5-D2, 9/18/01 5th Floor, Roof Level Office Green Wooden Chair Wipe Sample	2439	500	1.0	980	Chrysotile	22	22000
					Amphibole	0	<3000
					Total	22	22000

**TABLE 20. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR ASBESTOS IN DUST AND DEBRIS**

250 SOUTH END AVENUE, NEW YORK CITY

STRUCTURES GREATER THAN 0.5 MICROMETER

Sample	Approximate Collection Area cm ²	Dispersal Volume mL	Volume Filtered mL	Analytical Sensitivity structures/cm ²	Type of Asbestos	Number of Asbestos Structures Detected	Concentration of Asbestos Structures on Surface structures/cm ²
Sample 250SEA-10D-D1, 9/18/01 Apartment 10D, Bedroom Top of Cupboard with Glass Doors (A) Debris Collected by Toothbrush	111	100	1.0	4230	Chrysotile	70	300000
					Amphibole	0	<13000
					Total	70	300000
Sample 250SEA-10D-D1, 9/18/01 Apartment 10D, Bedroom Top of Cupboard with Glass Doors (B) Follow-up Wipe Sample	1677	500	0.3	2400	Chrysotile	111	270000
					Amphibole	0	<7200
					Total	111	270000
Sample 250SEA-10D-D2, 9/18/01 Apartment 10D, Living Room High Boy Side Table (A) Debris Collected by Toothbrush	870	100	0.3	1830	Chrysotile	190	350000
					Amphibole	0	<5500
					Total	190	350000
Sample 250SEA-10D-D2, 9/18/01 Apartment 10D, Living Room High Boy Side Table (B) Follow-up Wipe Sample	2523	500	0.3	3160	Chrysotile	203	640000
					Amphibole	0	<9500
					Total	203	640000

**TABLE 21. SUMMARY OF RESULTS OF TRANSMISSION ELECTRON MICROSCOPY ANALYSES
FOR ASBESTOS IN DUST AND DEBRIS**

250 SOUTH END AVENUE, NEW YORK CITY

FIBERS AND BUNDLES LONGER THAN 5 MICROMETERS

Sample	Approximate Collection Area cm ²	Dispersal Volume mL	Volume Filtered mL	Analytical Sensitivity fibers/cm ²	Type of Asbestos	Number of Asbestos Fibers Detected	Concentration of Asbestos Fibers on Surface fibers/cm ²
Sample 250SEA-10D-D1, 9/18/01 Apartment 10D, Bedroom Top of Cupboard with Glass Doors (A) Debris Collected by Toothbrush	111	100	1.0	4230	Chrysotile	5	21000
					Amphibole	0	<13000
					Total	5	21000
Sample 250SEA-10D-D1, 9/18/01 Apartment 10D, Bedroom Top of Cupboard with Glass Doors (B) Follow-up Wipe Sample	1677	500	0.3	2400	Chrysotile	8	19000
					Amphibole	0	<7200
					Total	8	19000
Sample 250SEA-10D-D2, 9/18/01 Apartment 10D, Living Room High Boy Side Table (A) Debris Collected by Toothbrush	870	100	0.3	1830	Chrysotile	10	18000
					Amphibole	0	<5500
					Total	10	18000
Sample 250SEA-10D-D2, 9/18/01 Apartment 10D, Living Room High Boy Side Table (B) Follow-up Wipe Sample	2523	500	0.3	3160	Chrysotile	9	28000
					Amphibole	0	<9500
					Total	9	28000

bundles, leading to reported chrysotile fiber concentrations higher than would be the case if the material were examined directly on the sampled surface. The magnitude of the increase is a function of fiber length, with long fibers and bundles being less affected than short fibers and bundles. It is also important to consider that if the surface dust and debris are disturbed in such a manner that they become airborne, then elevated airborne asbestos levels will be generated.

5.3 Measurements of Asbestos in Exterior Dust and Debris

5.3.1 Sample Collection

Each sample of exterior dust and debris was collected by removing the material down to the substrate, and transferring the collected material to a clean polyethylene bag. On the north side of the World Trade Center site, one sample was collected from the roof of an automobile parked on Church Street, south of Duane Street, and a second sample was collected from the apartment roof outside the 5th Floor loft at 45 Warren Street. On the southwest side of the World Trade Center site, two samples were collected at 250 South End Avenue. One sample was collected from the exterior window ledge of Apartment 11D, on which material originating from the collapse of buildings had collected to the maximum thickness possible on the ledge. Another sample was collected from the top of a low-level wall in the ground-level courtyard at the back of the building.

5.3.2 Sample Analysis

A gravimetric matrix reduction procedure (ASTM STP 1342) was used to analyze the samples. To ensure that the analyses were representative of the collected materials, a sub-sample of several grams was analyzed for each sample. In the gravimetric matrix reduction procedure, organic constituents were removed by ashing, acid-soluble constituents were removed using hydrochloric acid, and large particles were separated by sedimentation. The chrysotile in the material remaining suspended after sedimentation was quantified by optical microscopy using size-selective point counting of prepared filters. Large fiber bundles of chrysotile were hand-picked from the sediment and weighed. In order to quantify any amphibole asbestos present, the sediment remaining from the gravimetric matrix reduction was further separated by heavy liquid centrifugation. Large amphibole asbestos fibers were

hand-picked from the centrifugate and identified by both polarized light microscopy (PLM) and transmission electron microscopy (TEM), and then their dimensions were measured. On mounted point counting filters, amphibole fibers can be classified only on the basis of morphology, birefringence, and optical sign. Accordingly, on the point counting filters, discrimination between amosite and actinolite/richterite asbestos is not possible. Numerically, these amphibole asbestos fibers were infrequent, and did not contribute to the point counting data. The amount of amphibole asbestos on the point counting filters could be quantified, however, by measuring the dimensions of the fibers. The weight percent of amphibole asbestos was calculated from the dimensional measurements made on both the fibers hand-picked from the sediment and the amphibole asbestos fibers observed during the point counting. The weight percent of chrysotile was calculated from the weight of hand-picked fibers and the results of the point counting.

5.3.3 Results

Table 22 presents the summary results of the analyses of samples of exterior dust and debris.

The material collected from the roof of the automobile contained 0.67% chrysotile by weight, and the material collected from the roof outside the 5th Floor loft at 45 Warren Street contained 1.05% chrysotile by weight. Fibers hand-picked from the centrifugates showed that actinolite asbestos and richterite asbestos were present in both of these samples, amosite was present in the sample collected from the roof outside the 5th Floor loft at 45 Warren Street, but no amosite was detected in the sample collected from the roof of the automobile on Church Street. During point counting of filters to determine the presence of chrysotile in these two samples, amphibole asbestos fibers were observed. Because most of the amphibole asbestos hand-picked from these two samples was actinolite/richterite asbestos, it is reasonable to conclude that the fibers on the corresponding point counting filters are also primarily actinolite/richterite asbestos. Based on this assumption, the concentration of actinolite/richterite asbestos in the sample collected from the roof of the automobile on Church

**TABLE 22. SUMMARY OF RESULTS OF GRAVIMETRIC ANALYSES FOR
ASBESTOS IN EXTERIOR DUST AND DEBRIS**

WORLD TRADE CENTER AREA, NEW YORK CITY

Sample	Weight of Sub-Sample Analyzed grams	Weight Percent Amphibole Asbestos				Total Weight Percent Amphibole Asbestos	Total Weight Percent Chrysotile
		Hand-Picked from Centrifugate Following Heavy Liquid Separation		Amphibole Asbestos Detected on Point Counting Slides			
		Amosite	Actinolite/Richterite				
CHURCH STREET, SOUTH OF DUANE STREET Roof of Automobile 17 September, 2001 Gray Fibrous Material	7.7657	None Detected	0.0057	0.0127	0.018	0.67	
45 WARREN STREET Roof, Outside 5th Floor Loft Gaps in Stone Floor 18 September, 2001 Gray Fibrous Material	2.2423	0.0004	0.001	0.0196	0.021	1.05	
250 SOUTH END AVENUE Apartment 11D Exterior Window Ledge 18 September, 2001 Gray Fibrous Material	7.1188	0.0021	None Detected	0.0139	0.016	2.25	
250 SOUTH END AVENUE Ground Level Courtyard Top of Wall 18 September, 2001 Gray Fibrous Material	6.5851	0.0059	None Detected	0.0126	0.019	2.05	

Street was approximately 0.018% by weight, and the concentration in the sample collected from the roof outside the 5th Floor loft at 45 Warren Street was approximately 0.021% by weight .

At 250 South End Avenue, the material collected from the exterior window ledge of Apartment 11D contained 2.25% chrysotile by weight, and the material collected from the top of a wall in the ground-level courtyard contained 2.05% chrysotile by weight. In both samples, these results include large fiber bundles equivalent to approximately 0.2% chrysotile by weight, which were hand-picked from the sediment. No actinolite/richterite asbestos was detected in either of these samples. Both of these samples, however, contained low concentrations of amosite. After heavy liquid separation, it was possible to hand-pick fibers of amosite from the centrifugate. During point counting of filters to determine the presence of chrysotile in these two samples, amphibole asbestos fibers were observed. Because all of the amphibole asbestos hand-picked from these samples was amosite, it is reasonable to conclude that the fibers on the corresponding point counting filters are also primarily amosite. Based on this assumption, the concentration of amosite in the sample collected from the exterior window ledge of Apartment 11D was approximately 0.016% by weight, and the concentration of amosite in the sample collected from the top of the wall in the ground level courtyard was approximately 0.019% by weight.

During the analyses, it was observed that the samples collected north of the World Trade Center site, from the automobile on Church Street and the roof outside the 5th Floor loft at 45 Warren Street, contained substantial amounts of vermiculite. The samples collected from 250 South End Avenue contained substantially less vermiculite, but a higher concentration of chrysotile.

Analyses of these four exterior dust and debris samples show that the dust cloud generated by the collapse of the buildings was not homogeneous, and that the dispersed material is different in the two directions from the site. This result would not be surprising if different products had been used in different buildings. Nevertheless, the two samples collected in each of the two different directions relative to the World Trade Center site are very consistent with each other with respect to both the nature of the constituents and the concentrations of chrysotile and amphibole asbestos. The measurements indicate that

actinolite/richterite asbestos is probably associated with vermiculite because samples collected to the north of the World Trade Center site show both, whereas samples collected to the southwest contain much less vermiculite and actinolite/richterite asbestos was not detected. A small amount of amosite was detected in one of the samples taken north of the World Trade Center site, and a higher level of amosite was present in the samples collected at 250 South End Avenue.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The sampling conducted on 18 September 2001 revealed that the concentrations of PCBs, PCDD/PCDFs (expressed as 2,3,7,8-TCDD Equivalents), and inorganic metals (excluding calcium) were generally low or below comparative background levels. However, the concentrations of asbestos found in dust samples and in the air inside the apartments were significantly elevated. Because these air samples were collected under passive conditions, any disturbance of this material could increase the airborne concentrations and potentially increase exposure to asbestos.

The following recommendations can ensure proper cleanup of the asbestos-contaminated dust and reduce exposures of cleanup personnel and occupants returning to the building. Unless proven otherwise through testing, all dust should be assumed to be asbestos-containing.

- 1) The dust cleanup should be conducted by an environmental contractor with expertise in asbestos contamination cleanup or remediation of hazardous materials. Contractors selected for this work should be licensed by the proper authorities in the City of New York and/or the State of New York for asbestos or hazardous material cleanup activities. Individuals working for these companies should be properly trained by completing asbestos training courses certified by the New York State Department of Health and licensed for asbestos activities by the New York State Department of Labor. In lieu of this requirement, at a minimum, individuals should have Awareness Training in accordance with the OSHA Asbestos Standard, 29 CFR 1926.1101. The training should cover the potential exposures (such as asbestos and caustic irritant dust) that may be encountered during the activities, appropriate personal protective equipment, and work practices.
- 2) Individuals performing the dust cleanup should be equipped with proper personal protective equipment to reduce exposure to asbestos-containing and alkaline dust. This equipment should include the use of half-face air-purifying respirators that are equipped with high-efficiency particulate air (HEPA) filters. *Note:* The level of respiratory protection can be modified according to the conditions of worker exposure and the airborne level of asbestos. Respiratory protection should be provided in accordance with OSHA Standard 29 CFR 1910.134. Additionally, individuals should use protective clothing such as disposable coveralls or similar whole-body clothing including hoods, boots, and gloves.
- 3) To reduce dust recirculation, all surfaces (including those inside of cabinets, etc.) should be cleaned using vacuum cleaners equipped with HEPA filters. The surfaces should

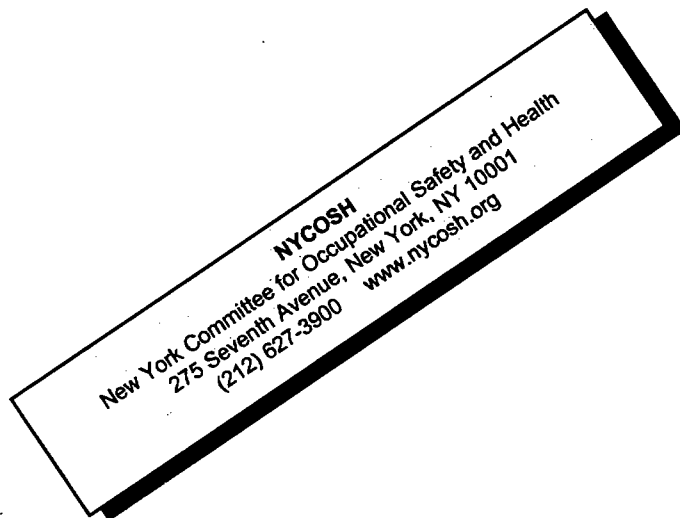
then be wet-wiped with amended water containing a non-sudsing surfactant. No surface should be dry swept or dusted because this will re-entrain the dust. Upholstery and carpets should be HEPA-vacuumed and cleaned using either steam or a hot-water extraction method (Kominsky et. al, 1990). All clothing, linens, and other similar items should be laundered.

- 4) The heating, ventilation, and air-conditioning (HVAC) system should be inspected. If the system was in operation during or after the September 11th incident, it may contain asbestos-contaminated dust. An environmental consultant should be consulted to determine the most efficient procedures to clean the system including the air-handling unit and ventilation ducts (supply and return).
- 5) A suitable re-occupancy clearance criterion needs to be established. This criterion can be based on a thorough visual inspection and/or air testing.
- 6) To prevent or minimize the outdoor dust from entering the apartment: (1) keep windows closed and repair all broken glass; (2) set the air-conditioner to re-circulate air (closed vents), change the filter initially and frequently thereafter; and (3) remove shoes before entering the apartment.

Asbestos In Settled Dust Concentrations Outdoors In New York City Before September 11, 2001

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Surface dust sampling in Manhattan during the late 1980's found an average of 5100 asbestos structures per square centimeter (s/cm^2) outdoors. The 79 samples were taken from window ledges, building facades, and rooftops. Horizontal surfaces were generally higher than vertical surfaces, and the concentrations tended to diminish based on the height of the sampling location. Chrysotile was the form of asbestos found in any significant quantity. Surface dust samples reported taken on May 25, 2000 outside of the World Trade Center complex found an average of 2500 s/cm^2 at ground level in 9 samples by indirect TEM preparation, and no structures reported by direct preparation ($<45 s/cm^2$). Area and personal air samples ($N=9$) reported taken outdoors at the World Trade Center complex on May 25, 2000 found 0.14 s/cc by indirect TEM preparation, and essentially no fibers detected by direct TEM preparation. These data may be helpful in establishing cleanliness criteria following the World Trade Center collapse.



**Phase 2 Sampling and Quality Assurance Project Plan
Revision 0**

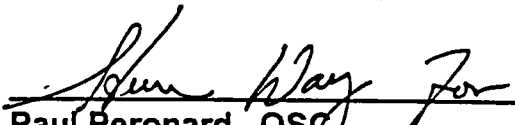
**For
Libby, Montana**

Environmental Monitoring for Asbestos


***Evaluation of Exposure to
Airborne Asbestos Fibers
During Routine and Special Activities***



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A. PROJECT MANAGEMENT

A4. PROJECT/TASK ORGANIZATION

Project Directors

This project is being planned and funded by the U. S. Environmental Protection Agency (EPA), Region 8. The following individuals are the EPA project directors with overall responsibility for the design and conduct of this project, and will be the principal data users and decision makers:

Paul Peronard
On-Scene Coordinator (Primary Contact)
Libby, MT Response

Duc Nguyen (Secondary Contact)
On-Scene Coordinator
Libby, MT Response

Doug Skie, Director
Emergency Response Program
Ecosystems Protection and Remediation

Christopher P. Weis, PhD, DABT
Regional Toxicologist
Scientific Support Coordinator for the Response
Ecosystems Protection and Remediation

Aubrey Miller, MD, MPH.
Medical Coordinator for Environmental Emergencies and Hazards
U.S. Public Health Service Region 8 and
USEPA Region 8

Project Managers

Responsibility for implementation of the tasks specified in this project Plan has been assigned to the U.S. Department of Transportation Volpe Center, working under an inter-agency agreement with the USEPA. The following individuals are the Volpe Center Project Managers with overall responsibility for ensuring successful performance of the tasks specified in this plan:

John McGuiggin (primary contact)
Project Manager
U.S. Department of Transportation, Volpe Center

Mark Raney (secondary contact)
Technical Lead
U.S. Department of Transportation, Volpe Center

Quality Assurance

All Quality Assurance activities associated with the implementation of this plan will be coordinated by:

Mary Goldade
Quality Assurance Coordinator
U.S. Environmental protection Agency, Region 8

Ms. Goldade may personally assess any aspect of this plan and require response actions as needed, or may delegate assessment responsibility to qualified staff.

A5. PROBLEM DEFINITION and BACKGROUND

Libby, Montana, is a community located near an open pit vermiculite mine which began limited operations in the 1920's and was operated on a larger scale by the W. R Grace Company from approximately 1963 to 1990. Studies at the site revealed that the vermiculite from the mine contains amphibole-type asbestos, and that workers at the mine had an increased risk of developing asbestos-related lung disease (Amandus et al. 1978, McDonald et al. 1986, Amandus et al., 1987, Amandus and Wheeler 1987). Although the mine has ceased operations, concern exists that historic or continuing releases of asbestos from mine-related materials could be serving as a source of on-going asbestos exposure and risk to current and future residents in the area.

The U.S. Environmental Protection Agency (USEPA) is implementing an investigation to characterize the nature and extent of asbestos contamination of the environment in and around Libby. This investigation is being performed in several phases. Phase 1 of the program (USEPA 2000b) focused on collection of air samples from multiple indoor and outdoor locations around the community, along with samples of different potential sources of asbestos fibers in air. The results from this phase of the investigation indicate that amphibole-type asbestos fibers are present in a number of environmental samples, including indoor air, dust, soil, and insulation.

Because human health risk from asbestos is mediated by inhalation exposure, greatest emphasis has been placed on collection and analysis of air samples. To date, most air samples at homes have been collected using a stationary air monitor located in the principal living area of the home, and the concentration of fibers has been estimated using Transmission Electron Microscopy (TEM). However, there are issues which exist with regard to both the collection technique (stationary air monitors) and the analytical technique (TEM).

With regard to the stationary air monitor sampling method, the potential issue is that, in a location where asbestos fibers are present in a source such as dust, soil, or insulation, some types of human activities may tend to "kick up" asbestos fibers into the air, resulting in an increase in asbestos fiber concentration in the breathing zone of the person engaged in the activity. A stationary monitor located in such a home is useful and appropriate for assessing the "passive" exposures of people in the home who are not engaged in the activity, but may tend to underestimate exposures of the people directly engaged in activities which do generate dust. ***Therefore, the first objective of this sampling effort (Phase 2 of the environmental characterization project plan) is to measure asbestos levels in the breathing zone of individuals engaged in routine and special activities in and about Libby, and to compare those measurements to data collected from co-located stationary air monitors.*** This information will be helpful in deciding what type of air sampling method is needed to evaluate risks to individuals engaged in both routine and special activities in the home.

With regard to the analytical technique, the issue is that air samples have historically been analyzed for asbestos using Phase Contrast Light Microscopy (PCM), and the EPA current slope factor for quantifying lung cancer risk from asbestos in air is expressed in units of risk per PCM fiber per cc of air (USEPA 2000a). Thus, even though it is widely recognized that TEM analyses are more accurate and more powerful than PCM analyses, measurements of asbestos concentration based on TEM are difficult to convert to an equivalent concentration by PCM (this is referred to as PCM equivalents, or PCME). ***Thus, the second objective of this sampling effort is to analyze a series of different air samples by both the TEM and PCM methods in order to derive a site-specific relationship between the two, and to help judge which type of measurement is most appropriate.***

As noted above, the chief reason for collecting data on asbestos fiber levels in air is to support risk assessment and risk management decision making. ***Thus, the third objective of the study is to utilize the data collected to derive preliminary assessments of the potential health risk to people who engage in the types of routine and special activities investigated during the study.*** Because the study will not span all possible exposure conditions and all exposure locations, the data will be used to

help estimate the range of different exposure levels (and hence health risks) that residents of Libby may experience from both routine and special activities.

A6. PROJECT/TASK DESCRIPTION

The basic tasks required to achieve the three main objectives of this phase of the Libby site investigation are listed below:

1. Collect samples of air from the breathing zone of people engaged in routine and special activities in homes in and about Libby where asbestos-contaminated soil, dust or insulation might result in increased concentrations of asbestos fibers in air.
2. Collect air samples from a fixed air monitor in the main living area of homes where individuals engage in the routine or special activities referred to above.
3. Analyze each air sample by each of two methods (TEM, PCM).
4. Compare the personal air monitoring data to the data from the fixed air monitors to judge the reliability of the fixed air monitors in predicting exposures associated with routine or special activities.
5. Compare the results of the TEM and PCM measurements and (if the data warrant) derive a site-specific empirical conversion factor that relates one to the other.
6. Using current (USEPA 2000a) and proposed (Berman and Crump 2000b) risk assessment methods for airborne asbestos, compare and contrast the risk estimates derived by each of the two approaches in order to determine whether one or more of the routine or special activities is associated with exposures that are above a level of health concern.

A7. QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

EPA has developed a seven-step Data Quality Objectives (DQO) procedure that is designed to ensure that sampling and analysis plans are carefully thought out and that the results of the effort will be adequate to meet the basic objectives of the program. Application of this seven step procedure to each of the three main objectives of this project are presented below.

FIRST OBJECTIVE: Personal Air Monitor vs Stationary Air Monitor**Step 1. State the Problem**

The primary issue to be addressed is that asbestos levels in air collected using stationary air monitors located in the central living space of a home may not accurately represent exposures of people engaged in routine or special activities in locations where asbestos may be released to air from soil, dust or insulation.

Step 2. Identify the Decision

The decision to be made is whether stationary air monitors can be used to evaluate exposure and risk to residents from airborne asbestos in homes in Libby, or whether personal air sampling should be used in addition to or in place of stationary air monitors.

Step 3. Identify Inputs to the Decision

Data needed to achieve this objective consist of accurate and reliable measurements of asbestos levels in the breathing zone of people engaged in routine or special activities in a home, paired with accurate and reliable measurements of asbestos levels in air collected using a stationary air monitor located in the main living area of the same home. Measurements of asbestos levels in breathing zone air will be collected using personal air monitors.

The number of paired samples needed for each routine or special activity that is investigated is difficult to judge, since it is expected that there could be wide variations between locations in the levels of asbestos in source material (dust, insulation, soil), and in the amount of each source material suspended in air by the activity. Thus, the range of concentration and risk estimates based on either personal or stationary air samples could vary substantially from case to case. In general, when variability is wide, more samples are needed to support risk management decisions. However, since the special exposure scenarios being evaluated in this study are only trial simulations of authentic exposures of area citizens, it is expected that judgements about the relative hazard associated with each activity can be based on only a few samples. Thus, each activity will be performed at 3-8 different residences, with one sample of each type of air sample (personal air monitor, fixed air sampler) collected at each location.

Step 4. Define the Study Boundaries

There are a wide variety of routine and special human activities which might result in the generation of elevated levels of asbestos in breathing zone air. The activities selected for evaluation in this investigation are listed below:

- 1) Routine household activities (excluding active cleaning)
- 2) Active house cleaning activities (dusting, sweeping, etc.)
- 3) Simulated remodeling activities that involve direct contact or handling of vermiculite insulation
- 4) Rototilling a home garden containing vermiculite in the soil

Step 5. Develop a Decision Rule

The degree of similarity (or dissimilarity) of concentration values measured by personal air monitors and by fixed air monitors will be judged semi-quantitatively. The exact data evaluation procedure cannot be stated *a priori*, but it is expected that, for each type of activity investigated, a simple plot of the fixed station value (x-axis) versus the corresponding personal air value (y-axis) will reveal if there is a systematic pattern of differences between the two. For example, if the slope of the line is close to 1.0, it will be decided that there are no large and consistent differences, and that fixed air monitoring is adequate for assessing human exposure associated with the activity being considered. Conversely, if the slope of the line is substantially greater than 1.0, it will be concluded that fixed air monitors tend to underestimate personal exposures for individuals engaged in the specific activities investigated. In general, if significant differences exist between the two types of measurements, personal air samples will be judged to be most appropriate for assessing risks to individuals engaged in the activities, and data from stationary air monitors will be considered appropriate for individuals residing within the same house who may be passively exposed to the dust generated by the activity.

Step 6. Specify Limits on Decision Errors

With regard to the decision as to whether data from stationary air monitors are adequate for assessing personal exposure during some routine or special activity, the decision is semi-quantitative and no formal limit is imposed on decision error.

Step 7. Optimize the Design for Obtaining Results

Additional air samples or samples from different types of activities may be collected and incorporated into the study results as data become available on actual airborne exposure levels associated with specific types of activity.

SECOND OBJECTIVE: PCM vs TEM

Step 1. State the Problem

The second issue being addressed by this study is that most air concentration data obtained to date at the site are based on TEM measurements, while the current risk

assessment method used by EPA for asbestos is based on fiber counts measured by PCM. The reasons for this dichotomy are mainly historic: most historic epidemiological studies of asbestos exposure in workers used PCM to quantify asbestos levels in air, and these studies provide the basic dose-response data used by EPA to establish the slope factor for lung cancer. However, PCM is subject to a number of limitations, and it is well recognized that TEM can identify thinner fibers than PCM, and is also able to clearly distinguish asbestos from non-asbestos fibers. For these reasons, TEM is the preferred approach, but an estimate of what the PCM result would be is also needed in order to be able to utilize the current cancer slope factor. Thus, a site-specific empiric conversion factor between TEM and PCM fiber counts is required to allow fiber counts measured by one technique to be extrapolated to the results that would have been obtained by the other technique.

Step 2. Identify the Decision

The purpose of this part of the study design is to develop an empiric conversion factor to convert from TEM to PCM fiber counts (and vice versa). No formal decision will be based on this conversion factor. Note that an empiric factor derived for the Libby site may not be applicable to other sites.

Step 3. Identify Inputs to the Decision

Data required to establish a site-specific empirical correlation factor between PCM fibers and TEM fibers is an extensive set of samples analyzed by each method. Ideally, this set of samples should span a wide range of fiber concentrations so that the relationship is well constrained over most of the relevant range.

Step 4. Define the Study Boundaries

The bounds of the study are the same as described above.

Step 5. Develop a Decision Rule

No formal decision will be made with the correlation factor derived from this study.

Step 6. Specify Limits on Decision Errors

Since no quantitative decision will be made, no limits on decision errors are needed.

Step 7. Optimize the Design for Obtaining Results

Additional samples may be added to this project if the original data collected do not span an adequate range of concentration values to reliably quantify the correlation between PCM and TEM counts.

THIRD OBJECTIVE: PRELIMINARY RISK EVALUATION**Step 1. State the Problem**

The third question being addressed by this study is whether or not levels of asbestos fibers may reach a level of potential health concern to area residents who engage in routine or special activities that may cause asbestos fibers to become resuspended in air.

Step 2. Identify the Decision

The decision to be made is whether or not EPA needs to take action to protect human health from asbestos exposures associated with the routine or special activities investigated during this study.

Step 3. Identify Inputs to the Decision

The key data required to estimate human health risk from airborne asbestos exposures include accurate and reliable measurements of the concentration of fibers in air that result from the routine and special activities being evaluated, and the approximate exposure frequency and duration associated with each type of exposure scenario.

Step 4. Define the Study Boundaries

The bounds of the study are the same as described above.

Step 5. Develop a Decision Rule

The degree of risk posed by measured air levels will be assessed using two alternative risk methods. The first is the method currently recommended by USEPA (2000a), and is based on the measured concentration of PCM fibers in air in accordance with the following equation:

$$\text{Risk} = C(\text{PCM f/cc}) * \text{TWF} * 0.23 (\text{PCM f/cc})^{-1}$$

where:

Risk = Lifetime excess cancer risk due to exposure being evaluated
 C = Concentration of asbestos fibers in air quantified using PCM
 TWF = Time-weighting factor to account for less than lifetime exposure via the activity being evaluated. For example, if the activity is sweeping the floor, and this activity is performed for 1 hour per day, three days per week for 50 years, the TWA would be $1/24 \times 3/7 \times 50/70 = 0.0128$.

The second method that will be used is currently under development by the USEPA (Berman and Crump 2000b). This method has not yet been peer reviewed, but a formal review is planned for Spring, 2001. The basic equation is as follows:

$$\text{Risk} = [C_{5-10} * UR_{5-10} + C_{>10} * UR_{>10}] * \text{TWF}$$

where:

Risk = Lifetime excess risk due to exposure being evaluated
 C_{5-10} = Concentration of amphibole asbestos fibers in air that are 5-10 μm in length and thinner than 0.5 μm , quantified using TEM
 $C_{>10}$ = Concentration of amphibole asbestos fibers in air that are greater than 10 μm in length and thinner than 0.5 μm , quantified using TEM
 UR_{5-10} = Unit risk $(\text{f/cc})^{-1}$ for amphibole fibers in the 5-10 μm size range
 $UR_{>10}$ = Unit risk $(\text{f/cc})^{-1}$ for amphibole fibers in the >10 μm size range
 TWF = Time-weighting factor to account for less than lifetime exposure via the activity being evaluated

Risk coefficients stratified by effect (lung cancer, mesothelioma), gender, smoking status, fiber size, and asbestos type (amphibole, chrysotile) are given in Berman and Crump (2000b). The mean unit risks for lung cancer plus mesothelioma combined due to amphibole exposure, averaged across gender and smoking status, are as follows:

Fiber Size	Unit Risk (TEM f/cc) ⁻¹
5-10 μm	5.74E-02
> 10 μm	1.89E+01

As seen, the unit risk is much higher for fibers longer than 10 μm than for fibers between 5-10 μm , so in this approach the risk to a person is largely determined by the level of these long fibers.

The level of risk that is unacceptable is a matter of risk management judgement. In general, USEPA considers excess lifetime risks that are below $1E-04$ to $1E-06$ to be sufficiently small that remedial action under Superfund is usually not warranted. Risks above $1E-04$ are generally considered to warrant some sort of action or intervention, to the extent feasible.

Step 6. Specify Limits on Decision Errors

It is standard EPA policy to provide a margin of safety in risk management decisions regarding health risk from environmental contamination. Generally, this is achieved by basing risk calculations on the 95% upper confidence limit (95% UCL) of the arithmetic mean concentration of contaminant in the environment. In the case of asbestos concentrations in air measured by counting the number of fibers present on a filter, the 95% UCL of concentration is derived by using the 95% UCL of the fiber count, based on the Poisson distribution (e.g., see ISO 10312). However, since the data collected during this investigation are not intended to serve as the basis of final risk management decision-making at any specific residence or sampling location, but rather to serve as a preliminary assessment of the range of exposures and risks that may be associated with certain types of activities, preliminary judgements regarding risk will take both the mean and the 95% UCL into account.

Step 7. Optimize the Design for Obtaining Results

Additional sampling of air or source media and/or investigation of other types of activities may be added to this project as data on asbestos levels in air generated by the original activities investigated become available.

B. MEASUREMENT/DATA ACQUISITION

B1. SAMPLING PROCESS DESIGN

Information to be collected during this program includes three types of data:

- 1) Concentrations of asbestos in various types of environmental media
- 2) Attributes of the houses or other buildings that participate in the program
- 3) Details of the specific activities engaged in during the sampling program

The following sections present the methods to be used for collection of each of these types of information.

B1a. Environmental Samples

Overview

Environmental samples to be collected during this program include samples of air (drawn through a filter) and samples of potential asbestos source materials (dust, insulation, soil). With regard to the air samples, analytical sensitivity is controlled by two key variables: the volume of air drawn through the filter, and the number of grids openings or fields examined by the microscopist. Appendix G presents calculations that estimate the target volume of air needed for each activity scenario, assuming the goal is to be able to quantify cancer risk at the 1E-04 level, and assuming that 50 TEM grid openings or 100 PCM fields will be evaluated. The precise combination of flow rate and sampling time needed to approach or exceed these target volumes will be selected by the field teams based on the specific requirements for each scenario.

Scenario 1: Sampling During Routine Household Activities

Twelve residences in Libby will be selected for sampling during routine household activities. To the extent possible, these will be chosen based on the results of previous asbestos sampling programs to provide a range of expected conditions and exposures, as follows:

Target Number of Homes To Be Sampled

Vermiculite Insulation Present	Observed Amphibole Fibers in Indoor Air or Dust		
	None	5-10 um	> 10 um
No	2	2	2
Yes	2	2	2

Participation in the investigation is strictly voluntary. Because the results for individual properties are considered to be confidential, the names and addresses of participants will not be made public.

Preference will be given to volunteers who are non-smokers, since smoke particles in air collect on filters and could tend to reduce analytical sensitivity of air samples collected.

Air samples for asbestos analysis will be collected using both personal and stationary air sampling pumps.

The personal air sampler will be worn by an adult resident in the home, who will engage in all normal activities except active cleaning. The participant will need to remain indoors as much as possible throughout the sampling period. As discussed in Appendix G, the target volume of air needed to obtain a detection limit equivalent to a 95% UCL risk level of $1E-04$ is quite large (4,900 L for the IRIS method and over 80,000 L for the Berman and Crump method). Thus, every effort should be taken to maximize flow rates and collection times. To this end, collection may be extended across two or more days, if the resident is willing. Due to the presumed length of the sampling period, the sampling team will return to the home periodically (about every 4 hours) to ensure the pumps are operating properly. To ensure the battery does not run down during sampling, the team will change the personal air sampling pump every visit (about 4 hours apart).

The location of the stationary air sampler will be the main living area of the home (see USEPA 2000b). A high volume pump will be used to collect the stationary sample. The sampling time for the stationary air monitor should be the same as for the personal air monitor. Flow rates may be higher than for the personal pump in order to increase sensitivity.

Whenever feasible, all pumps (high volume and low volume) will be programmed, calibrated, and placed at the sampling location on the evening prior to the sampling event.

Scenario 2: Sampling During Active Household Cleaning Activities

The investigation of airborne levels during active cleaning activities will be conducted at the same 12 locations as were selected for the routine household activities investigation above. Residents will be asked to NOT engage in cleaning activities for one week prior to this event. Due to the possibility that such activities might be associated with increased exposure to asbestos fibers, the cleaning activities will be performed not by the residents of the home, but by an EPA staff member or consultant with appropriate health and safety training and wearing adequate personal protective equipment (PPE).

As before, both personal and stationary air samples will be collected. The personal air sample will be collected using a portable high-volume air sampler worn by the person performing active cleaning activities such as sweeping, vacuuming, and dusting. This activity will be conducted for a time period of approximately 2 hours. To the extent possible, the cleaning activities performed in each house will be standardized as follows:

Vacuuming. This will be done using the vacuum cleaner owned by the resident. If the resident does not own a suitable vacuum cleaner, then a vacuum will be provided by EPA. This will be a standard commercial cleaner, not a HEPA device.

Vacuuming should be performed for approximately 40 minutes, and should cover carpets, rugs that a resident might normally vacuum.

Sweeping. This will be done using a straw or plastic broom. If possible, this will be a broom owned by the resident, but a broom provided by EPA may also be used. Sweeping should be done mainly on uncarpeted floors. Sweeping should be from the edges toward the center. If the sweeping generates a visible pile of dust or dirt, this should be sampled using the microvac method (SOP ASTM 5755-95), and the remainder picked up with a dust pan and discarded as IDW. Total time spent sweeping should be approximately 40 minutes.

Dusting. Dusting will be done with a clean dry rag provided by EPA. Dusting may be done on any surface that might normally be dusted by a resident, including table tops, counters, window sills, picture frames, lamp shades, etc. Total time spent dusting should be approximately 40 minutes.

The stationary air sampler will be a high volume pump located in the same central living area of the main house as was used during the routine activity investigation (above). The sampling time will be the same for the stationary sampler as for the personal sampler. To the extent feasible, pump flow rates will be adjusted to approach or exceed the target volumes specified in Appendix G.

In order to help quantify the impact of the activity (active cleaning) on asbestos levels in air, the stationary air monitor will also be used to collect a pre-activity and a post activity sample as well as the sample during the activity. The sampling duration for these samples should be approximately 3 hours. An example sampling scheme is summarized below:

Activity	Example Clock time	Minimum Target Volume ^a (L)	
		Personal Air Monitor	Stationary Air Monitor
Pre-sampling	8:00-11:00		690
Active cleaning	11:30-1:30	690	690
Post activity	2:00-5:00		690

^a If feasible, collection of volumes greater than the minimum should be achieved since this will increase sensitivity.

The stationary air sample collected post activity will be analyzed using the AHERA method (USEPA 1987). A property will be considered suitable for re-habitation if this sample complies with the AHERA standard (or a more stringent standard, as directed by the EPA

SCC). If the clearance sample fails this standard, either more clearance samples may be collected, or alternatively, the pre-activity sample may be analyzed. In this case, the residence will be considered suitable for re-habitation if the final clearance sample does not have a fiber concentration higher than the pre-activity sample.

Immediately prior to initiation of the cleaning activities, a composite dust sample will be collected from the house in accord with SOP ASTM 5755-95. This sample is intended to provide a representative composite of the dust inside the house, especially in living areas. As noted above, if sweeping or dusting activities results in the generation of a pile of dust, a sample of this material will also be collected using the microvac technique in order to provide a second sample to evaluate for fiber content.

If preliminary practice sessions reveal that active cleaning generates sufficient dust to be detectable by real-time aerosol monitors, then two such aerosol monitors will be used to quantify the level of dust particles in the air before, during, and after the cleaning activities. One will be located in close proximity to the stationary air monitor in the main living area of the home, and one will be located in close proximity to the cleaning activity. Real-time aerosol monitoring will not be used during Scenario 2 if trial runs indicate that no useful data will be collected.

Scenario 3: Sampling During Simulated House Remodeling Activities

Houses selected for inclusion in this category will be selected based on previously obtained data on asbestos levels in insulation. One house will be selected where the insulation is not believed to contain asbestos, and three houses will be selected where the insulation is vermiculite and the vermiculite is known to contain detectable levels of asbestos.

The simulated remodeling activities performed will be relatively simple in nature, and will be representative of activities which a homeowner might undertake that could lead to direct exposure to vermiculite insulation. For example, this might include removing vermiculite insulation from a wall or ceiling, moving (bagging, sweeping) insulation from an attic to gain access to plumbing or wiring, replacing or repairing drywall or paneling on an insulated wall, etc. Specific activities will be selected on a house-by-house basis, depending on the location and accessibility to vermiculite insulation.

Because of the possibility that this type of activity might lead to increased exposure to asbestos fibers in air, all simulated remodeling activities will be performed by EPA staff or contractors with adequate health and safety training and wearing adequate PPE.

Homes selected for this scenario may be either vacant or occupied. In the case of homes that are currently occupied, the residents will be asked to leave the house until activities are completed and airborne levels of fibers are returned to acceptable levels.

This scenario will be carefully monitored by air sampling both in the vicinity of the simulated remodeling activity and in the main living area of the home. These samples are described below.

Personal Air Monitor for Simulated Worker

The individual performing the simulated remodeling will engage in simulated remodeling activities for a period of approximately one hour. This individual will wear a portable low-volume air sampling pump. Because it is expected that this activity will be associated with high airborne dust levels, the flow rate will be set at a low value (e.g., 0.5 L/min). If overloading does not occur, the entire sampling activity will be collected on one filter. If pilot studies suggest that 60 minutes of sample collection will result in filter overload, then a series of sequential samples will be collected (e.g., two 30-minutes samples or four 15-minute samples, etc.).

Fixed Air Monitor at the Work Area

One 3-hour air sample will be collected from the simulated work area before simulated remodeling begins, and a set of three sequential 3-hour samples will be collected after the work is completed to monitor the time course of fiber disturbance and settling. The pre- and post-activity sampling will be done using a stationary high volume pump, placed in a convenient position within the work area that can be accessed by the sampling team without re-disturbing the insulation. The flow rate for these pre- and post-activity samples will be selected to yield a volume that meets or exceeds the minimum target volume specified in Appendix G without causing filter overload.

Stationary Air Monitor in the Main House

The stationary air sampler will be located in the main living area of the house. These samples will serve to measure the impact of the simulated remodeling on "passive" air exposure at locations remote from the simulated remodeling. In addition, these samples will serve as "clearance" samples to establish when the house is suitable for re-occupation by the resident. Samples will be collected before, during and for three sequential time periods after simulated remodeling work is completed. Pump flow rates will be set to ensure that a minimum volume of at least 1,200 L will be collected during each 3-hour sampling period (e.g., 7-8 L/min). Analysis of these samples will be done using the AHERA method (USEPA 1987). A property will be considered suitable for re-habitation if

the final clearance sample complies with the AHERA standard or a more stringent standard, as directed by the EPA SCC. If the final clearance sample fails this standard, either more clearance samples may be collected, or alternatively, the pre-activity sample may be analyzed. In this case, the residence will be considered suitable for re-habitation if the final clearance sample does not have a fiber concentration higher than the pre-activity sample.

The following tables provides an example schedule summarizing the that will be collected for this scenario:

Time Period	Example Clock time	Work area		Main living area	
		Type	Min Vol (L)	Type	Min Vol (L)
Pre-sampling	8:00AM-11:00AM	Fixed	1200	Fixed	1200
Simulated remodeling	11:00AM-12:00PM	Personal	14	Fixed	400
Post activity 1	12:00PM-3:00PM	Fixed	1200	Fixed	1200
Post activity 2	3:00PM-6:00PM	Fixed	1200	Fixed	1200
Post Activity 3	6:00 PM-9:00 PM	Fixed	1200	Fixed	1200

Dust Monitors

In addition to sampling for asbestos, two real-time aerosol monitors will be used to quantify the level of dust particles in the air before, during, and after the simulated remodeling activities. One aerosol monitor will be located in close proximity to the stationary air monitor, and the other will be located in the enclosed area where the simulated remodeling is occurring.

Bulk Insulation

In all locations where simulated remodeling activities are performed, samples of the bulk insulation will be collected and analyzed for asbestos in accordance with NIOSH Method 9002, or using improved methods currently being developed by USEPA for use on this project.

Scenario 4: Sampling During Garden Rototilling Activities

Sites will be selected for inclusion in this test scenario based on the results of previous garden soil analyses. One property will be selected where the garden does not contain visible vermiculite and where PLM analysis does not reveal the presence of asbestos material. Two gardens will be selected where vermiculite is visible and/or where PLM soil analysis reveals the presence of asbestos fibers. Sampling will be performed in summer (e.g., July-August) when garden soils are likely to be drier (and hence more likely to release dust and fibers) than in the spring. In addition, EPA Project managers may direct that a second (optional) sample be collected in spring (e.g., late May), when residents first begin preparation of their gardens for planting. In order to help reduce variability between sites, the same rototiller will be used at all locations (with appropriate decontamination between locations).

Because of the possibility that rototilling might lead to increased exposure to asbestos fibers in air, this activity will be performed by EPA staff or contractors with adequate health and safety training and wearing adequate PPE.

Stationary air monitors will be used to collect ambient air samples at two locations: either 5 meters upwind and 5 meters downwind of the garden, or the upwind and downwind perimeter of the property (whichever is closer). The direction and speed of the wind will be recorded throughout the rototilling event. The operator of the rototiller will wear a personal air sampling pump. Flow rate for both the stationary and personal air pumps will be approximately equal and will be sufficient to collect the minimum target volume specified in Appendix G (70 L), and the sampling durations will also be equal (about 1 hour).

In order to help quantify the impact of the activity (garden rototilling) on asbestos levels in ambient air, the down-wind stationary air monitor will also be used to collect a pre-activity and a post activity sample as well as a sample during the activity. Both the pre- and the post activity samples will be at a flow rate adequate to yield a minimum volume of 1200 L, collected over a sampling duration of about 3 hours. This sampling scheme is summarized in the following example schedule:

Activity	Example Clock time	Minimum Target Volume (L)	
		Personal Sampler	Stationary Monitor
Pre-sampling	8:00-11:00		1200
Garden rototilling	11:30-12:30	70	70
Post activity	1:00-4:00		1200

A downwind aerosol monitor will also be used to monitor dust generation before, during and after rototilling.

One soil sample will be collected from each garden before rototilling occurs. This will be accomplished by dividing the garden into six approximately equal areas, and collecting one grab sample from each of grid areas. These grab samples will then be composited into a single sample representative of the garden as a whole. Grab samples will be collected from the depth interval rototilled (about 0-12 inches). Soil sampling and analysis for asbestos will be performed in accordance with methods currently under development by EPA for use at this site. Soil moisture content will be measured in the laboratory by weighing the composite sample before and after drying to constant weight.

Summary of Sampling Design

Field samples and other data items scheduled for collection during this investigation are summarized in Table B-1. Flow charts tracing the path and handling of the air samples collected in Scenarios 1-4 are shown in Figures B-1 to B-4, respectively.

B1b. Housing Characteristics

For Scenarios 1, 2, and 3, potentially relevant attributes of the house or building where samples are collected will be recorded using the Housing Attributes field data sheet provided in Appendix A. In addition, videotape will be used to record the appearance of the structure (inside and out), and to record qualitative information on airflow direction and rate (as assessed using a smoke generator). This data collection and recording will be done prior to the initiation of any environmental sampling activities.

B1c. Documentation of Activities

Scenario 1

Each volunteer who participates in Scenario 1 will be instructed that they should remain indoors to the maximum extent possible, and that they should engage in all normal activities except active cleaning. Each time that a project team member comes to the house to check or change pumps, the activities of the resident during the preceding time interval will be recorded on an activity log (see Appendix D). Videotaping of the resident during routine activities will not usually be performed, but any special activities that are judged to be a likely source of increased exposure to airborne asbestos fibers may be videotaped to document the activity.

Scenarios 2, 3, and 4

The activities specified in Scenario 2 (active cleaning), Scenario 3 (simulated remodeling), and Scenario 4 (garden rototilling) will all be documented using video exposure monitoring, as described in EPA SOP-LIBBY-02. Whenever possible, Tyndall lighting will be used so that particles of dust in air can be observed in the videotape. A smoke generator may be used to help reveal the direction and rate of airflow during the activities, as needed.

B2. SAMPLING METHODS REQUIREMENTS

Air Samples

All air samples (both personal air and fixed station) to be analyzed for asbestos will be collected by drawing air through a cellulose acetate filter at the flow rates and times specified above. All samples collected using a high-volume pump will employ filters that have pores that are 0.45 μm in diameter. For personal air samples using a low volume pump, filters with pores that are 0.8 μm in diameter may be used, since this decreases back-pressure and increases flow rate without significant impact on the quality of the sample. The details of the air sampling method for personal and stationary air monitors are provided in SOP EPA-LIBBY 01.

Because some of the activities being investigated in this project may generate significant concentrations of airborne dust, it is important to ensure that air filters collected during the activity do not become overloaded with particulate material. This is not a concern for air filters collected during routine household activities, and is not likely to be of concern for filters collected during active cleaning activities (sweeping, dusting), or during garden rototilling (unless the soil is very dry). The chief concern is for personal air samples collected during simulated house remodeling activities that involve active disturbance of vermiculite insulation. For this scenario, it may be necessary to use a low flow (e.g., 0.5 L/min) and to collect several sequential samples during the activity to avoid filter overload.

Dust Samples

As noted above, dust samples will be collected at each of the eight houses in which routine and active cleaning activities are investigated. All dust samples for evaluation of asbestos content will be collected using a Microvac method as detailed in SOP ASTM 5755-95, as modified for this project.

Garden Soil Samples

All garden soil samples will be collected in accordance with SOP CDM SOP 1-3. After collection, each soil sample will be prepared in accordance with SOP ISSI-Libby-01.

Insulation Samples

Bulk insulation sampling locations will be determined based on the amount of vermiculite within each building, current and historic insulation layers, and the location of vermiculite insulation within the building. At least one bulk vermiculite insulation sample will be collected within each building. This sample will normally be collected from the attic, walls, or crawlspace of the building, depending on the location of the vermiculite insulation. In the case of larger buildings or buildings which have been renovated, it may be necessary to collect more than one bulk insulation sample to get a more representative sampling of the building.

All bulk insulation samples will be collected in accordance with NIOSH Method 9002, Asbestos (bulk) by TEM. There will be no modifications to this method for the purposes of collecting bulk samples for this project.

The samples will be collected by placing approximately 2 ounces of vermiculite insulation into a plastic zip-top bag. The bag will then be placed into a second plastic zip-top bag. All vermiculite insulation samples will be double bagged. The bulk material will preferably be collected from several locations at different depths in order to obtain a homogenized sample of the insulation. PES personnel will wear disposable nitrile gloves while sampling the insulation. A new pair of gloves will be donned prior to each sample being collected. PES personnel will also wear appropriate respiratory protection at all times while collecting bulk insulation samples.

Airborne Dust Monitoring

Airborne dust levels will be measured using a real-time aerosol monitor in accord with the method contained within SOP EPA-LIBBY-03. In general, one aerosol monitor will be located in close proximity to the stationary air monitor, and another will be located in close proximity to the person engaged in the activity. For the rototilling scenario, the aerosol monitor will be co-located with the downwind monitor.

Deviations from SOPs

Every reasonable effort will be made to adhere strictly to specified SOPs for sample and data collection. Where deviation from an SOP is unavoidable, documentation of the

deviation and its potential impact on the outcome of the data collection effort will be clearly indicated in field notes and subsequent reports.

B3. SAMPLE DOCUMENTATION, HANDLING AND CUSTODY REQUIREMENT

Documentation of sample collection, handling, and shipment will include completion of chain-of-custody forms in the field, use of field maps and field data forms, and entry of data into a field logbook. Each sample will be properly labeled with the a unique sample identifier. A chain-of-custody form shall accompany every shipment of samples to the analytical laboratory. The purpose of the chain-of-custody form is to establish the documentation necessary to trace possession from the time of collection to final disposal.

Field Log Book

Each sampling team will maintain a field log book in which the following information is recorded for each location visited:

- Names of team members
- Location (address) of sample collection site
- Date and time of sample collection
- Number and type of samples collected
- Any special circumstances that influenced sample collection

Field Data Sheets

Detailed information on each sample collected will be entered onto a field data sheet. Minimally, the field data sheet will have the following information:

- Site name or project number
- Type of medium sampled (air, dust, soil, insulation)
- Sample type (field, QA)
- Sample collection method (SOP number)
- Sample location
- Date and time of sample collection
- Unique sample identification number
- Sampler's signature

Field data sheets to be used for each medium are presented in Appendix A.

Sample Numbering System

All environmental samples collected during the Phase 2 investigation will be assigned a sample number of the following format:

2-xxxxx (e.g., 2-00458)

These sample numbers may be assigned to samples of any medium in any order that is convenient for field supervisors and sampling crews. In order to minimize the chance of error in number assignment, pre-printed sheets of adhesive labels with sequential sample numbers will be prepared and provided to field crews. Each sheet will have two identical labels for each sample number. Once a sample is collected, one adhesive label will be attached to the sample, and the second adhesive label with the same number will be attached to the appropriate field data sheet (see Appendix A).

Sample Handling and Custody Requirements

All samples collected must be handled in accordance with the methods specified in the sampling SOP and must be maintained under chain of custody.

The chain-of-custody for all samples will be prepared using the form presented in Appendix E, in accordance with CDM SOP 1-2. All corrections to the chain-of-custody record will be initialed and dated by the person making the corrections. Each chain-of-custody form will include signatures of the appropriate individuals indicated on the form. The originals will accompany the samples to the laboratory, and copies documenting each custody change will be recorded and kept on file.

When shipping samples from EPA custody to an analytical laboratory, the shipping forms or transmittal memo from EPA will describe:

- Number of containers
- Sample preservative (N/A)
- Date and time of sample shipments

All required paper work, including sample container labels, chain-of-custody forms, custody seals and shipping forms will be fully completed in ink (or printed from a computer) prior to shipping of the samples to the laboratory. Shipping from sample storage to laboratory will be by overnight delivery.

Upon receipt, the samples will be given to the laboratory sample custodian. The coolers will be opened and the contents inspected. Chain-of custody forms will be reviewed for

completeness, and samples will be logged and assigned a unique laboratory sample number. Any discrepancies or abnormalities in samples will be noted and the Project Director will be promptly notified.

Record Keeping

Chain-of-custody will be maintained until final disposition of the samples by the laboratory and acceptance of analytical results by EPA. One copy of the chain-of-custody will be kept by field personnel.

Following completion of the project, the EPA On-Scene Coordinator will consolidate and maintain all original log books, field data sheets, analytical data packages and reports, and any other information required to document and support the findings of the investigation.

B4. ANALYTICAL METHODS REQUIREMENTS

Appendix B provides detailed SOPs for each analytical method used in this project.

Air and Dust Samples

As discussed above, all air and dust samples collected during this study will be analyzed using both PCM and TEM methods.

Direct vs Indirect Preparation Methods

For both TEM and PCM, two alternative approaches are available: "direct" and "indirect" analysis. In direct analysis, the sample is prepared with minimal handling, generally by placing the test material directly under the microscope for examination. However, this approach may sometimes be inadequate because a) the fibers are accompanied by an excessive level of non-asbestos material, or b) the concentration of asbestos fibers is either too low or too high for reliable quantification. In these cases, an indirect approach may be used. In the indirect method, the sample is generally diluted, concentrated, and/or treated to remove interferences, such that the asbestos fibers can be more reliably quantified. However, because indirect preparation steps may alter fiber morphology and/or may alter fiber recovery, indirect sampling may introduce uncertainty into the results.

For the purposes of this study, direct preparations are strongly preferred for all air filters, and a direct preparation will be made and examined for all air samples. When reliable fiber counts cannot be obtained for one or both methods due to interfering materials, an

indirect preparation will be made and the indirect preparation will be re-analyzed by both methods. For dust, only the secondary preparation method will be used.

Counting Rules

The microscopist will record all observations on a TEM or PCM Laboratory Microscopy Results Form, which are included in Appendix C. For TEM, for each fiber that is characterized in accord with the applicable counting rules, the microscopist will record the size (length, thickness) and type (chrysotile, amphibole, non-asbestos) of the fiber. These data will then serve to support calculation of fiber counts in specified size and type categories ("bins"). For PCM, only the number (and not the dimensions or type) of fibers which meet the counting rules will be recorded.

For TEM, the counting rules specified in ISO 10312 will be used for all air and dust samples. In addition, air samples collected by the stationary air filter in the central location of the home before, during and after the active cleaning and simulated remodeling scenarios will be analyzed according to the AHERA method by the field laboratory that EPA has established on-site. This analysis is needed to shorten the analytical turnaround time for these samples, since the results from these samples are required to ensure that levels in the home are safe before allowing the residents to return.

For PCM, the counting rules established by NIOSH 7400 (Revision 2) will be used for all samples. Differential counting (i.e., excluding fibers which the analyst suspects are not asbestos) will not be used.

Stopping Rules

The analytical sensitivity and detection limit of microscopic methods such as TEM and PCM are a function of the volume of air drawn through the filter and the number of grids openings or fields counted. In principle, any required sensitivity or detection limit can be achieved simply by increasing number of grid openings or fields examined. Likewise, statistical uncertainty around the number of fibers observed can be reduced simply by counting more and more fibers. Because of the open-ended nature of this situation, stopping rules are needed to specify when microscopic examination should end, both at the low end (zero or very few fibers observed) and at the high end (many fibers observed). For the purposes of this investigation, the following stopping rules will be employed:

Method	Count Until
TEM	Number of structures longer than 5 um counted is ≥ 20 OR number of grid openings equals 50
PCM	100 fields are viewed OR 100 fibers are counted (but not less than 20 fields must be counted)

At the low end, based on the assumed flow rates and sampling durations described previously, these rules will allow quantification of combined cancer risks (lung cancer plus mesothelioma) at or below a level of $1E-04$ for all scenarios and methods except for routine exposures of residents based on the Berman and Crump risk assessment methodology (assuming 30% of the protocol structures are longer than 10 μm). In this case, it would be necessary to count 500-1000 grids to establish a 95% UCL on low fiber counts that approaches $1E-04$.

At the high end, a plot of the ratio of the 95% UCL on fiber count as a function of the number of fibers counted reveals that there is relatively little reduction in uncertainty after the number of fibers reaches 15-20. Thus, for the TEM method, counting will stop if 20 structures are observed. For PCM, because counting is faster than for TEM, the stopping point is 100 fibers.

Garden Soil Samples

Garden soil samples will be evaluated for asbestos content using one or more methods to be specified after completion of a study specifically designed to evaluate the relative advantages and limitations of a number of alternative methods for measuring asbestos in soil and other solid media (EPA 2000c).

Insulation Samples

Vermiculite insulation samples will be evaluated for asbestos content using polarized light microscopy (PLM), in accord with SOP NIOSH 9002. Other methods may also be used, as needed, and considering the results of a study designed to evaluate the relative strengths and weaknesses of a number of alternative methods for measuring asbestos in soil and other solid media (EPA 2000c).



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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MEMORANDUM

DEC 20 2001

SUBJECT: Amphibole Mineral Fibers in Source Materials in Residential and Commercial Areas of Libby Pose an Imminent and Substantial Endangerment to Public Health

FROM: Christopher P. Weis, Ph.D., DABT.
Senior Toxicologist / Science Support Coordinator
Libby Asbestos Site

TO: Paul Peronard, On-Scene Coordinator
Libby Asbestos Site

I PURPOSE

This memorandum presents the rationale for determination of imminent and substantial endangerment to public health from asbestos contamination in various types of source materials at residential and commercial areas in and around the community of Libby, Montana. With this memorandum, I confirm and extend a similar conclusion derived in two previous memoranda from my office to you (dated May 10, 2000, and July 9, 2001).

II SUMMARY OF FINDINGS

- 1) Asbestos occurs in ore and processed vermiculite obtained from the Libby mine.
- 2) Asbestos fibers of the type that occur in vermiculite ore from the mine in Libby are hazardous to humans when inhaled.
- 3) Asbestos material fibers that are characteristic of those that occur in materials from the Libby mine are present in a variety of different source materials at residential and commercial locations in and around the community of Libby. Outdoor source materials include yard soil, garden soil, driveway material, and assorted mine waste materials, while indoor source materials include dust and vermiculite insulation.
- 4) Disturbance of asbestos-contaminated source materials by activities similar to those that are likely to be performed by area residents or workers can result in exposure to respirable asbestos fibers in air.
- 5) The concentrations of fibers in air generated by disturbance of source materials may exceed OSHA standards for acceptable occupational exposure, and estimated

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excess cancer risks can exceed EPA's typical risk range (1E-04 to 1E-06) by an order of magnitude or more. There are several factors which suggest these risk estimates may be too low and that actual risks are even greater.

On this basis, I conclude that source materials such as soil and soil-like media, dust, and vermiculite insulation that contain friable asbestos minerals are a likely source of on-going release of hazardous fibers to indoor and/or outdoor air at multiple residences and commercial facilities in Libby. In light of clear biological evidence of human asbestos exposure in Libby and the associated increase in human risk, I recommend that EPA take appropriate steps to reduce or eliminate pathways of exposure to these source materials in order to protect area residents and workers.

III BACKGROUND

A large deposit of vermiculite was discovered on Zonolite Mountain in the Rainy Creek Mining District of Lincoln County, Montana, in 1916 by E.N. Alley. Alley formed the Zonolite Company and began commercial production of vermiculite in 1921. Another company, the Vermiculite and Asbestos Company (later known as the Universal Insulation Company), operated on the same deposits (BOM 1953). W.R. Grace purchased the mining operations in 1963 and greatly increased production of vermiculite until 1990 when mining and milling of vermiculite ceased.

Vermiculite ore bodies on Zonolite Mountain contain amphibole asbestos at concentrations ranging up to nearly 100% in selected areas (Grace). Although early exploration and mining efforts by the Zonolite Company focused upon the commercial viability of fibrous amphibole deposits found on Zonolite Mountain (DOI 1928), no commercial production of asbestos from the Libby mine is reported. During early vermiculite mining operations, airborne concentrations of asbestos fibers at the mine exceeded 100 fibers per cubic centimeter (f/cc) in several job classifications (Amandus et al. 1987a,b, & c). Historical airborne fiber concentrations in the residential area of Libby also exceeded the present occupational Permissible Exposure Level (PEL) of 0.1 f/cc established by OSHA (1994) (MRI 1982; Eschenbach deposition). This exposure limit is recognized as being associated with significant risk (3.4 additional asbestos-related cancers per 1000 individuals as per OSHA estimates) to workers, and risks to residents could be even higher.

Residual fiber contamination from the subject facilities continues to present potential exposure to workers, residents, and visitors at these facilities, but is presently being addressed under removal authorities provided in the Comprehensive Environmental Response Compensation and Liability Act Section 104 (CERCLA or Superfund). These actions by the U.S. Environmental Protection Agency Region 8 office in Denver, CO began on November 22, 1999 and continue today. The investigative team is working closely with Local, State, and other Federal Agencies to determine the nature and extent of mineral fiber contamination throughout Libby, and to take appropriate action to protect the health of current residents and workers.

IV ENDANGERMENT RATIONALE

The rationale for determination of imminent and substantial endangerment from asbestos-contaminated source materials in residential and commercial areas of Libby is five-fold:

- 1) Asbestos fibers occur in ore and processed vermiculite from the Libby mine site.
- 2) Asbestos fibers from the Libby mine site are hazardous to humans as evidenced by the occurrence of asbestos-related disease in area workers and residents. Workers exposed to asbestos fibers at the Libby mine site have been shown to experience clear and significant increases in the incidence of asbestos-related conditions, including asbestosis, lung cancer and mesothelioma. Asbestos-related lung diseases have also been observed in area residents with no direct occupational exposures, including family members of mine workers, and even in those with no known association with the vermiculite mining or processing;
- 3) Asbestos fibers can be detected in several types of source materials (yard soil, garden soil, driveway material, waste piles, indoor dust, vermiculite insulation) at multiple locations in and around the residential and commercial area of Libby. These contaminated materials constitute a potential source of asbestos exposure to area residents and workers;
- 4) Asbestos fibers in contaminated source materials may be released into air by a variety of activities similar to those that area residents or workers may engage in under normal living or working conditions. This demonstrates that a complete exposure pathway exists by which asbestos-contaminated source materials may cause inhalation exposure of area residents and workers;
- 5) The concentrations of asbestos fibers that occur in air following disturbance of source materials may reach levels of potential human health concern, as evidenced by a) exceedences of OSHA standards for the protection of workers following disturbance of vermiculite material, and b) exceedences of EPA's normal risk range ($1E-04$ to $1E-06$) for acceptable lifetime excess cancer risks for exposed humans. Actual risks may be even greater than estimated.

Summaries of the evidence supporting each of these elements of rationale are presented below.

1. Asbestos occurs in ore and vermiculite from the Libby mine

In order to gain a reliable understanding of the mineralogical characteristics of asbestos material associated with the Libby mine, the United States Geological Survey (USGS) collected 30 samples of asbestos-enriched ore material from the mine (USGS, 2001). Analysis of multiple

asbestos fibers in these samples was performed by electron dispersive spectroscopy (EDS) and electron diffraction in order to determine the elemental composition and the associated mineralogical class. The results are shown in Figure 1. As seen, fibers obtained from the mine span a range of over-lapping mineral types, including actinolite, tremolite, winchite, and richterite, with lower amounts of magnesio-arfvedsonite and edenite/ferro-edenite. For the purposes of this memo, fibers included in the group above are referred to as "Libby-class amphiboles".

2. Libby Asbestos Fibers Are Hazardous to Human Health (Hazard Assessment)

Evidence of the adverse effects from exposure to asbestos fibers associated with the vermiculite ore body on Zonolite Mountain is abundant. During the 1980s, MacDonald et al. (1986a,b), and Amandus et al. (1987a,b,c) conducted investigations of asbestos exposure, and the morbidity and mortality of workers involved in various aspects of vermiculite mining, milling and refining processes in Libby, MT. These investigations found that workers had significantly increased occurrence of asbestosis, lung cancer, mesothelioma, and asbestos-related pleural disease associated with exposure to the vermiculite. Additionally, increased asbestos-related lung abnormalities were found among workers at an expansion plant in Marysville, Ohio, that were exposed to vermiculite from the Libby mine, Lockey et al. (1984).

Since the cessation of vermiculite mining and processing operations in Libby, local physicians and nearby pulmonary specialists have continued to identify individuals suffering from asbestosis, lung cancer and mesothelioma as a result of exposure to asbestos mineral fibers. One board-certified pulmonologist has reportedly seen over 150 cases of asbestos-related disease from the Libby area (Whitehouse 2000). In addition to former mine workers, this physician reported striking findings of asbestos-related disease among household contacts of former workers and among area residents with no identifiable connection to the former mine or processing activities. Some of those area residents with asbestos-related disease and no connection to the mining operations were reportedly exposed to asbestos through activities such as playing in open piles of vermiculite ores and wastes near recreational parks, gardening in soil containing vermiculite, and contact with vermiculite insulation in the home. Reports by area physicians are supported by recent morbidity and mortality assessments of Libby residents conducted by the Agency for Toxic Substances and Disease Registry (ATSDR). A mortality study for Libby area residents from 1979 to 1998 found increased rates of asbestosis (40-60 times higher than the normal background rate for the United States) and mesothelioma (ATSDR 2000). Additionally, ATSDR, working in cooperation with USEPA Region 8, U.S. Public Health Service, the State of Montana, and Lincoln County, has performed an extensive exposure and medical testing program involving nearly 6000 individuals that worked or lived in Libby for at least six months prior to 1991. Preliminary analysis of the data indicate that the crude odds ratio for the occurrence of pleural abnormalities is significantly elevated for individuals who were workers at the mine, and also for a variety of other non-occupational exposure pathways involving contact with vermiculite. Individuals with multiple exposure pathways to vermiculite or mine materials had higher disease incidence than those with no known exposure. Asbestos-associated radiologic abnormalities, similar to those observed among medical testing participants

in Libby, have been shown in other populations to be associated with significant progression of disease, morbidity, and mortality (Miller 1983, Cookson 1986, Rosenstock 1991, Erlich 1992, Hillerdal 1997).

3. Asbestos Fibers Occur in Several Types of Source Material in Residential/Commercial Areas

For approximately 2 years, EPA has been collecting samples of asbestos material associated with former mining and milling in the Libby, MT environment. This has included collection numerous types of potential source materials (outdoor yard soil, garden soils, indoor dust, vermiculite insulation, various types of waste piles, etc) as well as numerous air samples. Examination and evaluation of soil-like materials and bulk insulation samples was performed using polarized light microscopy (PLM), while samples of dust were evaluated by transmission electron microscopy (TEM), as detailed in the *Sampling and Quality Assurance Project Plan (Revision 1) for Libby, MT* (USEPA 2000). Initial sample collection efforts (referred to as Phase 1) focused mainly on areas formerly associated with mining and processing operations (the export plant, the screening plant, Rainy Creek Road, etc.), but also included samples collected from the residential and commercial areas of Libby. The second round of sampling (referred to as Phase 2) focused primarily on asbestos levels in the residential setting, with special attention on the effect of disturbance of source materials on asbestos levels in air.

The following sections summarize available data on the range of concentration values of Libby-type asbestos in samples of potential source materials (e.g., yard soil, garden soil, waste piles, driveway material, indoor dust, vermiculite insulation, etc.) at numerous locations in residential and light commercial areas of Libby. The data presented do not include measurements from former mine-related sites (e.g., the export facility, the screening facility, or Rainy Creek Road). Also, data from schools are not included, since they are not likely to be a good model for residential and commercial structures, and separate regulations exist for dealing with asbestos in schools. All data utilized in the following sections were based on a query of the Libby database performed on December 12, 2001, and all of the data from this query are available upon request.

Soil-Like Media (Yard Soil, Garden Soil, Waste Piles, and Driveway Material)

As noted above, samples of soil and related soil-like materials were analyzed for asbestos by PLM. Garden soils were grouped differently than yard soils since some garden soils might be amended with vermiculite even when the yard soil is not contaminated. Each sample was classified into one of the following groups:

Non-Detect (ND)	Presence of asbestos could not be confirmed by PLM
Trace	Asbestos is present, but the amount is too low (less than about 1% asbestos by mass) to allow reliable quantification
Detect	Asbestos is present at a level (typically 1% by mass or higher) such that quantification by PLM is possible.

Summary statistics for individual samples, grouped by medium, are presented below:

Table 1: Summary Statistics for Soil Like Media (Grouped by Sample)

Source Medium	Total Number of Samples	Number of Samples With Result Specified			Range of Detects
		ND	Trace	Detect	
Yard Soil	832	610	200	22	1%-5%
Garden Soil	183	96	80	7	1%-5%
Waste Piles	12	1	1	10	1%-10%
Driveway material	137	118	18	1	1%
All soil-like media	1164	825	299	40	1%-10%

As these data demonstrate, asbestos is detectable by PLM in about 29% (339 out of 1164) of the samples of soil and soil-like media have been collected from residential and commercial areas of Libby. Summary statistics for the maximum value detected at each of the individual residences or commercial buildings investigated are shown below:

Table 2: Summary Statistics for Maximum Values Grouped by Location

Source Medium	Total Number of Locations	Number With Maximum Result Specified			Range of Max
		ND	Trace	Detect	
Yard Soil	258	139	106	13	1%-5%
Garden Soil	109	43	59	7	1%-5%
Waste Piles	3	1	0	2	8%-10%
Driveway	94	77	16	1	1%
Any of the above	263	101	141	21	1%-10%

As indicated in table 2, of the total homes and commercial properties investigated, about 62% (162 out of 263) have detectable levels of asbestos present in one or more samples of an outdoor soil-like medium.

These findings support the conclusion that multiple locations exist where asbestos levels in outdoor soil-like media may serve as an on-going source of human exposure. Moreover, it is important to recognize that the PLM method has a relatively high detection limit for asbestos, and a non-detect by PLM is not equal to proof the sample is not contaminated with asbestos. To the contrary, other microscopic techniques (e.g., scanning electron microscopy) have shown that some soil samples that are below the limit of detection by PLM do contain high levels of asbestos

fibers (see Weis 2000 for a scanning electron microscope image of asbestos fibers in a soil sample that was below the limit of detection by PLM, and Addison 1995). The EPA is working to develop scanning electron microscopy and other related methods for the analysis of fiber in soil, but the methods are not yet sufficiently refined to support quantitative estimates of fiber concentration.

Vermiculite Insulation

Samples of bulk vermiculite insulation were analyzed for asbestos by PLM, and each sample was classified into one of three groups, as described above. Detection frequencies and ranges of quantifiable concentrations in individual samples, grouped by medium, are summarized below:

Table 3: Summary Statistic for Samples of Vermiculite Insulation

Grouped by	Total Number	Number With Result Specified			Range of Detects
		ND	Trace	Detect	
Sample	82	22	53	7	1%-5%
Location	69	15	47	7	1%-5%

As seen, asbestos fibers are detectable in about 60 of 82 (73%) samples of all vermiculite insulation, and in about 54 out of 69 (78%) of all locations tested. Concentration values range from trace (<1%) up to 5% by mass.

Indoor Dust

Analysis of indoor dust samples collected from residential locations or commercial buildings was performed using TEM in accord with the methods and counting rules specified in ISO 10312. In this procedure, individual asbestos structures are observed, and their size, shape, and mineral category are recorded. Because of this, there are several alternative ways in which the concentration of asbestos in the dust may be expressed. For the purposes of this memo, emphasis is placed on the concentration of fibers that are equivalent to those that would be detected using phase contrast microscopy (PCM), since this is the traditional method for measurement of asbestos fibers in air, and current methods for estimating risk from asbestos in air are based on the PCM method of quantification. PCM fibers are equal to or longer than 5 μm , have an aspect ratio of at least 3:1, and are thick enough to be detected by PCM (about 0.25 μm in diameter). Fibers observed under TEM that have these attributes are referred to as PCM-equivalents (PCME). Although PCM can not distinguish between asbestos fibers and non-asbestos fibers, this distinction is possible with TEM, so the PCME values derived from TEM analysis may be based either on all fibers, or on asbestos fibers only. In this report, PCME estimates based on all fibers (asbestos plus non-asbestos) are referred to as PCME-all and estimates based on Libby-type amphibole asbestos fibers only are referred to as PCME-asb. Because concentrations based on PCME-all are likely to over-estimate asbestos fiber concentrations in exposure situations such

as the home where non-asbestos fibers are common, this value is not used in this memo and emphasis is placed on PCME-asb.

Detection frequencies and ranges of quantifiable concentrations in dust, grouped either by individual sample or by maximum at a property, are summarized below for both Phase 1 and Phase 2 samples:

Table 4: Summary Statistics for Indoor Dust Samples

Grouped by	Data Set (a)	Total Number	PCME-asb	
			Detection Freq.	Range of Detects (s/cm ²)
Sample	Phase 1	258	30/258	20-22645
	Phase 2	3	3/3	1011-3658
Property (max value)	Phase 1	108	25/108	20-22645
	Phase 2	3	3/3	1011-3658

(a) Results from the Phase 1 study are currently reported only as "binned" fiber counts (i.e., the number of fibers within certain size classes), while in Phase 2, data were reported on the size (length, width) of each individual fiber. Thus, for Phase 1 data, PCME fibers are estimated by summing the number of fibers in size bins that overlap the definition of PCM fibers, while for Phase 2, the number of PCM equivalent fibers can be calculated directly.

As seen, PCME-asb fibers are detected in 33 out of 261 (13%) of the dust samples collected, and in at least one sample at 28 out of 111 (25%) of all residential and commercial locations sampled. This indicates that there are multiple locations around Libby that are likely to contain asbestos fibers in indoor dust, and that this dust may serve as an on-going source of potential exposure for residents.

4. Disturbance of Contaminated Source Materials Can Release Fibers to Air

Asbestos fibers in soil or dust are not inherently hazardous to humans if left undisturbed. However, most soils and dusts are subject to disturbance, either now or in the future, by many different types of activities that are common for residents.

Information on the potential for release to air from each type of source material is summarized below. In all cases, the concentration values in air reported below are averages based on samples that were above the limit of detection. Air samples were normally analyzed by TEM and by PCM.

Release from Waste Piles

No studies have been performed in the residential/commercial area of Libby to quantify the release of asbestos from piles of vermiculite or other related mine waste materials, but studies performed during Phase 1 and subsequent remedial activities at these locations clearly

demonstrate that disturbance of this type of material has the potential to release high levels of asbestos fibers into air. These results have been presented in my previous memo (Weis, 2001).

Release from Driveway Material

No studies have been performed in the residential area of Libby to quantify the release of asbestos from driveway material, but studies along Rainy Creek Road clearly demonstrate that disturbance of asbestos in roadways by vehicle traffic has the potential to release high levels of asbestos fibers into air. These results have been presented in my previous memo (Weis, 2001).

Release from Garden Soil

To date, only limited data are available on the release of fibers to air from disturbance of garden soil. As part of EPA's Phase 2 study, samples of personal air were collected by an individual engaged in rototilling a garden in Libby. These data are summarized below:

Table 5: Concentration of Asbestos in Air Associated with Rototilling

Analytical Method	Mean Concentration of Detects (f/cc)	
	Personal	Stationary
PCM	0.227	0.020
TEM (PCME-asb)	0.066	0.019

As seen, elevated levels of fibers are observable in both personal air samples and in nearby stationary air monitors during the rototilling activity. The increase is larger when measured by PCM than by TEM (PCME-asb), suggesting that some of the increase detected by PCM is non-asbestos in nature. The soil concentrations in this garden were measured in six samples by PLM. Four of the six samples analyzed were non-detects, and two samples detected trace amounts (less than 1% by mass) of asbestos. As noted above (see Table 1), other gardens in Libby may have asbestos concentrations up to 5%, suggesting releases at other gardens might be substantially greater.

Release from Yard Soil

At present, no data have been collected that specifically address the potential for disturbance-based release of asbestos fibers from yard soil to air. It is expected that release will not be extensive at locations that are grass-covered, but could be extensive at locations that have little or no vegetative cover. Some release might occur through processes such as wind erosion, but human disturbances are likely to be of greater concern, especially under conditions when the soil is dry. This might include walking or playing in sparsely vegetated areas, or disturbances of the soil from mechanical devices such as bikes, lawn mowers, etc.

This conclusion is strongly supported by the study of Addison (1995) who generated airborne dusts from a series of soils with varying levels of asbestos contaminations. The study concluded that *“even the lowest bulk amphibole concentration tested (0.001%) was still capable of producing measurable airborne asbestos concentrations (greater than 0.01 fibers mt⁻¹)”*

Release from Indoor Dust

In order to obtain information on the potential for human activities to cause elevated asbestos levels in indoor air, EPA planned and performed a study referred to as Phase 2. The design of this investigation is presented in the *Phase 2 Sampling and Quality Assurance Project Plan (Revision 0) For Libby, Montana* (USEPA 2001). In brief, personal air monitors were used to measure the concentration of asbestos fibers in the breathing zone of people engaged in a series of scenarios that involved routine and special activities in the home, and stationary air monitors were used to measure the concentration in the general vicinity of the activities. The first two scenarios investigated in Phase 2 involved routine residential behaviors, as follows:

Scenario 1: Routine household activities

Scenario 2: Active cleaning activities (dusting, sweeping, vacuuming, etc.)

Results are summarized below.

Table 6: Concentration of Asbestos in Air Associated with Household Activities

Scenario	Method	Type	Detection Frequency	Values for Detects (f/cc)	
				Mean	Range
1 (Routine activity)	PCM	Personal	6/9	0.007	0.001-0.014
		Stationary	19/20	0.006	0.002-0.012
	PCME-asb	Personal	2/5	0.035	0.023-0.048
		Stationary	4/10	0.009	0.0003-0.036
2 (Active cleaning)	PCM	Personal	37/46	0.112	0.014-1.017
		Stationary	22/31	0.021	0.007-0.068
	PCME-asb	Personal	6/26	0.010	0.004-0.013
		Stationary	3/17	0.008	0.007-0.010

As indicated above, routine residential activities (Scenario 1) resulted in a small increase in fibers in personal air compared to nearby stationary air monitors when measured by PCM, and a clearer increase when measured by TEM (PCME-asb). For Scenario 2 (active cleaning), a clear increase was observed by PCM, with a smaller increase for TEM (PCME-asb). These data indicate that routine human activities in the home are associated with inhalation exposure to

asbestos fibers in air, and reveal that fiber counts based on PCM may not be reliable for evaluation of asbestos risks due to confounding by increased levels of non-asbestos fibers.

Release from Vermiculite

As part of the Phase 2 study, EPA collected data from personal and stationary air monitors in the immediate vicinity of people actively engaged in disturbing vermiculite insulation. This scenario (referred to as Scenario 3) was intended to assess exposures that might be experienced either by homeowners who engaged in activities in unfinished attic areas, or for contractors who might come into contact with vermiculite during repair or remodeling activities. The results are summarized below.

Table 7: Concentration of Asbestos in Air Associated with Disturbance of Vermiculite

Sample Type	Analytical Method	Detection Frequency	Values for Detects (f/cc)	
			Mean	Range
Personal	PCM	4/5	0.568	0.118-1.62
	TEM (PCME-asb)	5/5	0.309	0.042-1.057
Stationary	PCM	4/4	0.142	0.035-0.324
	TEM (PCME-asb)	3/4	0.309	0.023-0.789

As seen, active disturbance of vermiculite results in very high concentrations of fibers as measured by both PCM and TEM (PCME-asb).

These findings are consistent with previous studies conducted by W.R. Grace (see Figure 2). These "drop tests" demonstrated that fiber concentrations in air resulting from pouring vermiculite insulation onto the floor under controlled conditions can be extremely high even when bulk concentrations in the vermiculite are less than 1% (Grace 1976).

These results clearly indicate that vermiculite insulation in homes or commercial buildings is a substantial reservoir of asbestos-contaminated source material that may lead to on-going exposure of area residents and workers.

Summary of Evidence for Disturbance-Based Release

Taken together, the data summarized above (including EPA's Phase 1 studies from the screening plant, export plant, and Rainy Creek Road, EPA's Phase 2 studies in the residential/commercial areas of Libby, and studies by W. R. Grace) strongly support the conclusion that human activities that disturb potential source materials can result in elevated concentrations of asbestos fibers in the breathing zone of residents and workers.

5. Fiber Concentrations in Air are of Human Health Concern (Risk Characterization)

Exceedences of OSHA Standard

The Occupational Safety and Health Administration (OSHA) has established two occupational standards for exposure of workers: an 8-hour time-weighted average (TWA) value of 0.1 f/cc, and a short-term exposure limit (STEL) of 1 f/cc. As shown in Table 8, a number of personal air samples collected from residential or commercial locations (mainly those associated with active disturbance of vermiculite) exceed one or both of these standards.

Table 8: Exceedences of OSHA Standards

Activity	TWA Exceedance Frequency (a)		STEL Exceedance Frequency	
	PCM	PCME-asb	PCM	PCME-asb
Routine	0 / 9	1 / 5	0/9	0/5
Active cleaning	1/122	0/80	4/125	0/83
Simulated remodeling	2/20	2/20	3/20	4/20
Rototilling	0/5	0/5	0/5	0/5

(a) All concentration values adjusted to represent an 8-hour average ($C_8 = C_t * t/8$)

It is important to recognize that occupational exposure standards for asbestos are not generally applicable or protective for residents or workers in non-asbestos environments because occupational standards are intended to protect individuals who a) are fully aware of the hazards of the occupational environment, b) have specific training and access to protective equipment such as respirators and/or protective clothing and, c) actively participate in medical monitoring (USEPA 1995). None of these conditions apply to residents or to workers at typical commercial establishments. Thus, simple compliance with the OSHA standards is not evidence that exposure levels are acceptable in a home or in a non-asbestos workplace. Indeed, risks to residents or workers occur at exposure levels substantially below the OSHA workplace standards, as discussed below.

Screening Level Cancer Risk Estimates

A number of alternative methods have been developed for estimating the risk of lung cancer and/or mesothelioma in humans from inhalation of asbestos fibers. Risk models developed by USEPA (1986), NIOSH (Stayner et al. 1997), and NRC (1984) all take the following form:

$$\text{Risk} = \text{Concentration (PCM f/cc)} \cdot \text{Slope factor (risk per PCM f/cc)}$$

The slope factors derived by these different groups are presented below:

Table 9: Inhalation Slope Factors for Asbestos

Source	Slope factor (Risk per PCM f/cc)
EPA (1986)	0.23
Stayner et al. (1997)	0.078
NRC (1984)	0.154

These slope factors are intended to apply to long-term average concentrations rather than peak concentrations that occur during short-term activities, so application of the basic risk model to the evaluation of intermittent exposures requires a term to account for the less than continuous nature of the exposure:

$$\text{Risk} = \text{Concentration (PCM f/cc)} \cdot \text{TWF} \cdot \text{Slope Factor (risk per PCM f/cc)}$$

where:

TWF = Time-weighting factor to account for less-than-lifetime exposure via the activity being evaluated. For example, if an activity were performed for 1 hour per day, three days per week for 50 years, the TWF would be $(1/24) \cdot (3/7) \cdot (50/70) = 0.0128$.

EPA is in the process of obtaining site-specific data on the likely exposure frequency and duration (TWF) for the various scenarios of potential concern, but plausible screening level exposure frequencies and durations are shown in Table 7. These values are generally similar to the reasonable maximum exposure (RME) assumptions commonly employed for residents and workers at other Superfund sites, except that the exposure duration was assumed to be somewhat higher than the normal default (25 years for workers and 30 years for residents) due to greater stability of the Libby community.

Table10: Screening Level Exposure Parameters for Residential/Worker Exposures

Activity	Exposure Assumptions			
	hrs/dy	days/yr	yrs	TWF
Scenario 1 (Routine activities by a resident))	16	350	40	0.3653
Scenario 2 (Active cleaning by a resident)	2	50	40	0.0065
Scenario 3a (Extensive contact with vermiculite by a contractor)	4	30	40	0.0078
Scenario 3b (Limited contact with vermiculite by a resident)	1	12	40	0.0008
Scenario 4 (Rototilling a home garden by a resident)	2	8	40	0.0010

Because detection limits for asbestos were rather high in some air samples (due to a small volume of air and/or a small number of grid openings counted), all non-detect values were evaluated by assigning a value of zero. Note that this approach is likely to underestimate the true level of risk, although the magnitude of the underestimation cannot be quantified.

The screening level risk estimates are shown in Figure 3. The results in the upper panel are based on the average values across samples within a Scenario, while the lower panel shows the results for the maximum value within a Scenario. Thus, the upper panel yields an overview of the risks that may be "typical" for the scenarios evaluated, while the lower panel reflects the risks at the most contaminated sub-locations.

When exposure is assessed based on PCM (open symbols), the estimated risks based on both average and/or maximum approach or exceed the upper bound of EPA's usual risk range (a value of $1\text{E-}04$, as shown by the horizontal dashed lines) in all cases except Scenario 4 (rototilling). When exposure is assessed by TEM (PCME-abs) (solid symbols), results are generally similar or higher, except for Scenario 2. In this case, predicted risks are lower by PCME-abs than by PCM. As noted above, this is because PCM measurements for Scenario 2 capture a number of fiber structures that are not asbestos, leading to an overestimation of exposure.

In interpreting these risk estimates, it is important to stress that the values are screening level, both because of uncertainties in the concentration term and in the exposure assumptions. Nevertheless, the results strongly indicate that exposure to fibers released to air by disturbance of contaminated source materials may be of substantial human health concern. Further, even though screening level calculations generally tend to be conservative, there are several reasons to think that the risk values above may tend to underestimate true risk, as discussed below.

These Risk Estimates Could Be Too Low

Several factors suggest the risk estimates presented above may be too low and that actual risks may be higher.

- 1) All calculations of risk presented above treated non-detects as if they were zero. However, this is very unlikely to be the case. Indeed, even if the number of TEM fibers observed in a sample is zero, there is a 5% chance the true number could be as high as 3. Thus, many samples where no fibers were detected (i.e., were non-detect) could have 1-3 fibers present, and the associated concentrations would be greater than zero. EPA guidance for risk calculations at Superfund sites specifies that non-detects should normally be evaluated by assuming a concentration value equal to $1/2$ the detection limit. This practice was not followed in the screening level calculations above because detection limits (sensitivity values) were sufficiently high in some samples that risks calculated in this way would be significantly influenced by the non-detects, with a contribution to risk of $1\text{E-}05$ to $4\text{E-}05$ for some scenarios. Nevertheless, it is very likely that at least some samples that were treated as non-detects did actually contain PCM or PCME fibers, and evaluating them by assigning a concentration of zero caused an underestimate of the true concentration and true risk values.

2) Calculations of risk based on PCM or PCME-asb consider only a fraction of the total fibers present. Figure 4 summarizes data on the size (thickness and length) of Libby-class amphibole fibers detected in air samples from various locations in Libby. As seen, fiber lengths range from less than 1 μm to more than 20 μm , and fiber thicknesses range from around 0.1 to 1 μm . Libby amphibole class fibers that are in the PCME "bin" (thicker than 0.25 μm , longer than 5 μm , and with an aspect ratio of 3:1 or greater) include only about one third of the total fibers observed. Even though recent studies support the view that asbestos toxicity does depend on fiber thickness and length (see below), the likelihood that Libby amphibole fiber toxicity is confined strictly to fibers in this regulatory size fraction is neither toxicologically sound nor supported by the available health data from Libby (MacDonald et al., 1986, Amandus et al., 1987a,b,c; ATSDR 2001).

3) An alternative risk model is currently under development by the USEPA (1999). This risk model seeks to account for apparent differences in lung cancer risk as a function of fiber size and type. Although this risk model has not yet been peer reviewed, it is potentially important because fiber toxicity is expected to vary as a function of fiber length, with longer fibers displaying greater toxicity than shorter fibers. Thus, it is possible that actual cancer risks presented here may be underestimated using the slope factors developed by EPA, NRC, and/or NIOSH, since these slope factors are based mainly on studies where exposures to long fibers ($> 10 \mu\text{m}$) may not have been as likely as at Libby.

4) Additionally, EPA has no methods available for calculating the risk of non-cancer health effects due to asbestos exposure, despite extremely elevated incidence of asbestosis mortality in the community of Libby (ATSDR, 2000). Libby residents have 40-60 times the national rate of asbestosis (placing Lincoln county, Montana, among the top ten counties for this condition in the country). The cancer risks estimated above do not address this condition or other non-malignant asbestos-related conditions (i.e., asbestos-related pleural disease) recently found to be occurring among a large number of Libby residents. Asbestos exposure, as evidenced by non-malignant chest radiographic abnormalities, is also associated with an increased lifetime risk of lung cancer, especially among smokers. The models used to estimate cancer risk do not account for increased risk as a result of prior lung disease. Thus risks in Libby may be significantly higher as a result of historical exposure.

Taken together, these considerations all support the conclusion that risk estimates, derived as above, may substantially underestimate the true public health risk to area residents and workers from on-going exposures to asbestos contamination.

V CONCLUSIONS

Asbestos contamination exists in a number of potential source materials at multiple locations in and around the residential and commercial area of Libby. These potential source materials include yard soil, garden soil, driveway material, waste piles, indoor dust, and vermiculite insulation. If these contaminated sources are disturbed by human activities, fibers are likely to be released to air. The concentration levels released to air depend on the concentration of fibers in the source material and on the nature of the disturbance. Risks are proportional to the

concentration of fibers in air and the frequency and duration of exposure. While data are not yet sufficient to perform reliable human-health risk evaluations for all sources and all types of disturbance, it is apparent that releases of fiber concentrations higher than OSHA standards may occur in some cases (mainly those associated with active disturbance of vermiculite), and that screening-level estimates of lifetime excess cancer risk can exceed the upper-bound risk range of $1E-04$ usually used by EPA for residents under a variety of exposure scenarios. The occurrence of non-occupational asbestos-related disease that has been observed among Libby residents is extremely unusual, and has not been associated with asbestos mines elsewhere, suggesting either very high and prolonged environmental exposures and/or increased toxicity of this form of amphibole asbestos. On this basis, I recommend that steps be taken to further identify, quantify, minimize and/or eliminate pathways of human exposure to amphibole asbestos in the residential areas of Libby.

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Figure 1: Mineralogical Characterization of Libby-Class Amphiboles

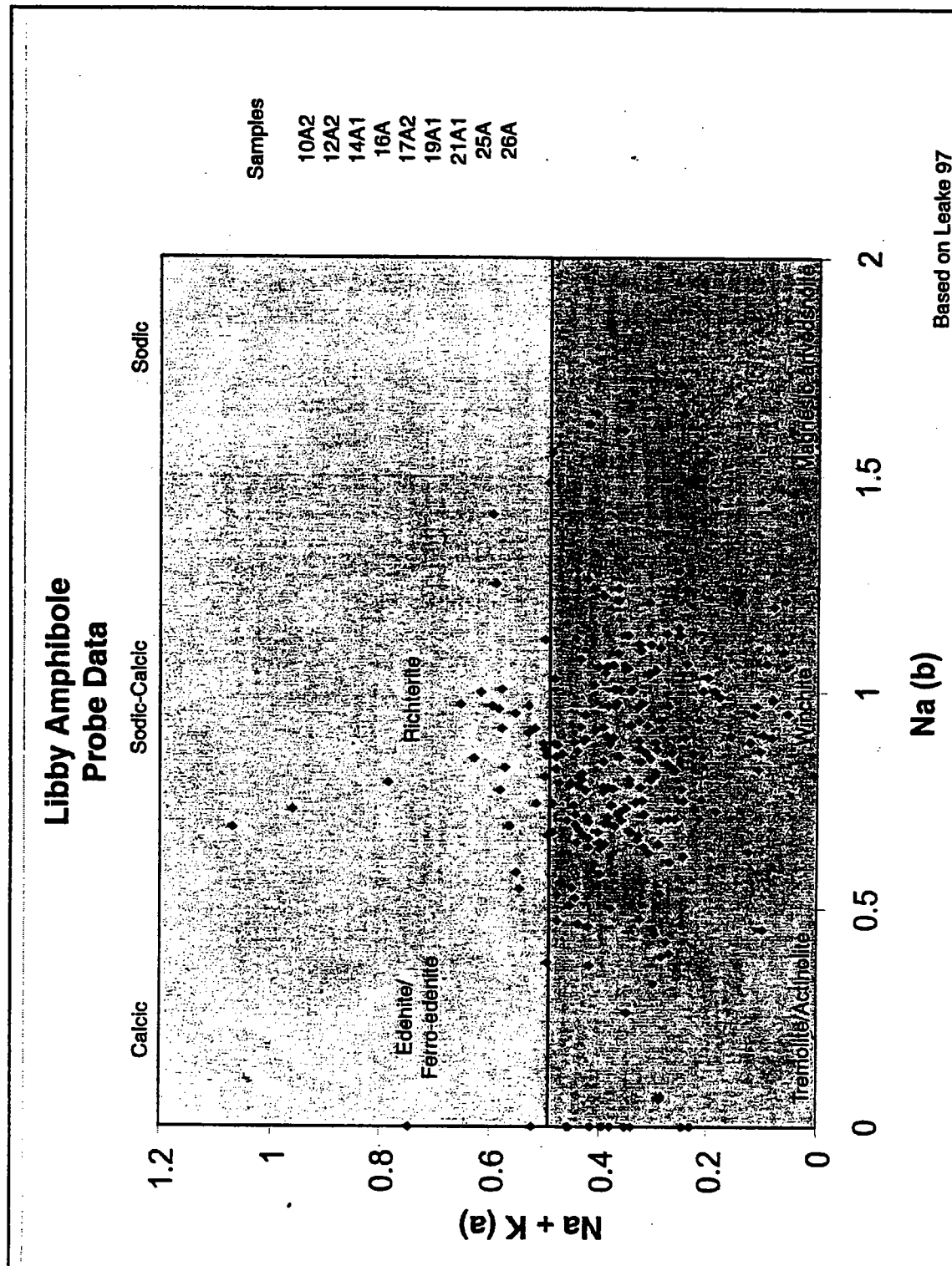
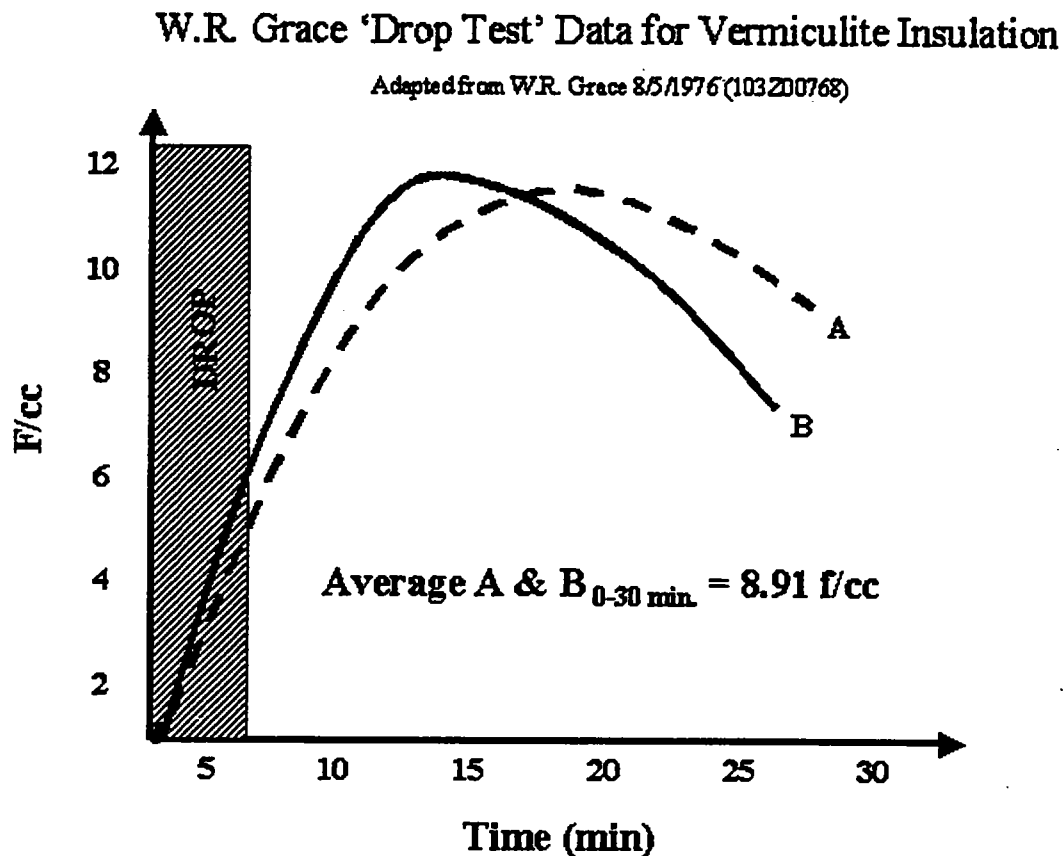


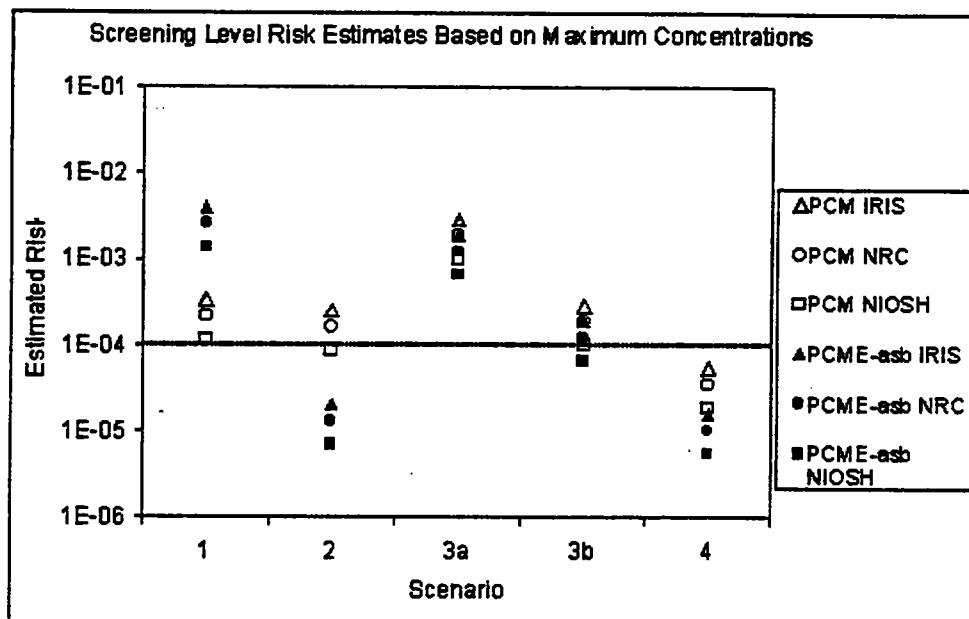
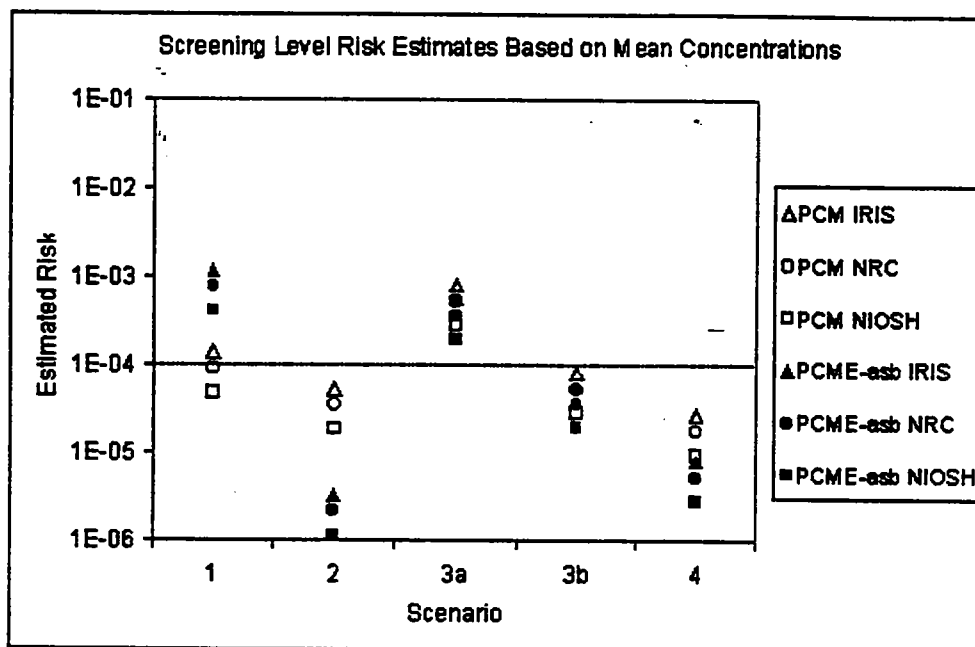
Figure 2: Release of Asbestos to Air from Vermiculite.

Drop tests were performed by W.R. Grace on Libby #2 vermiculite. A and B represent



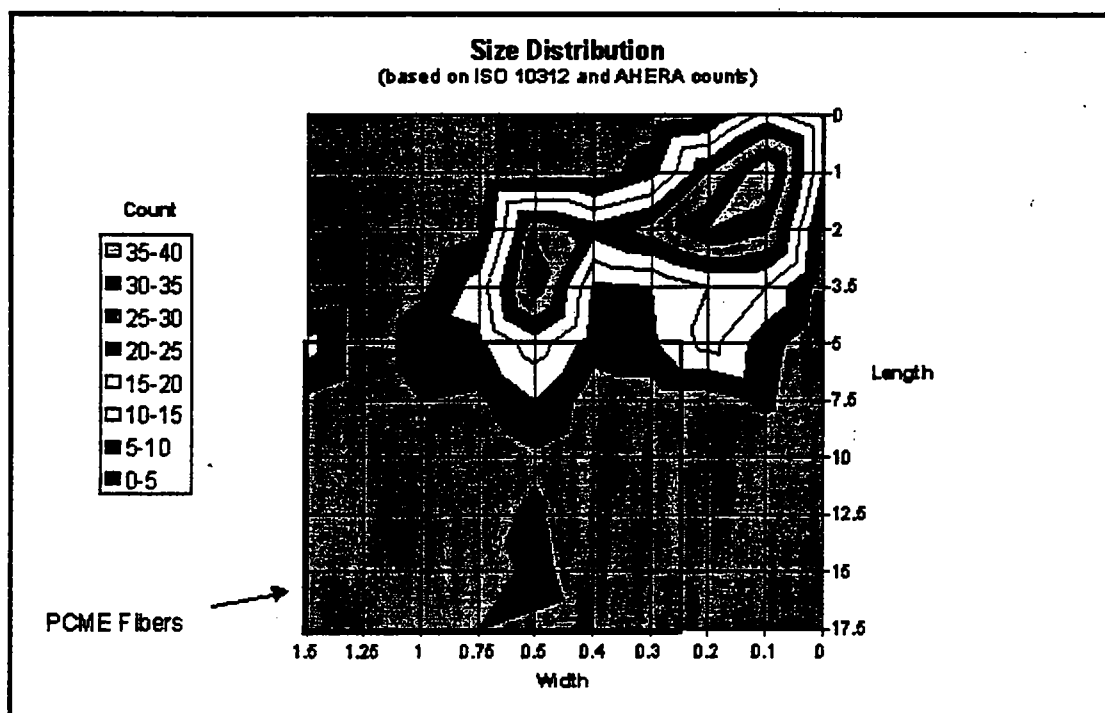
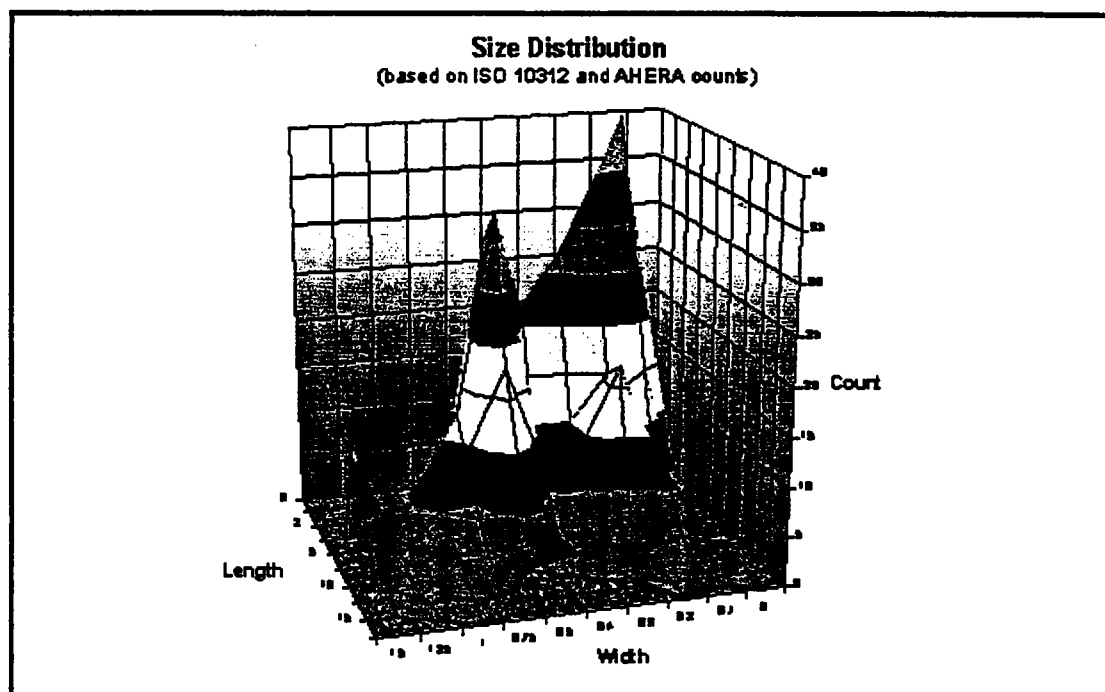
sequential tests. Grace found that expanded vermiculite retains significant quantities of fiber which can be released in subsequent exposure.

Figure 3. Screening Level Risk Estimates for Activities Evaluated in Phase 2



All non-detects evaluated by assuming a concentration of zero
 Scenario 1 is routine household activity by a resident
 Scenario 2 is active cleaning (sweeping, dusting, vacuuming) by a resident
 Scenario 3a is frequent direct contact with vermiculite by a contractor
 Scenario 3b is limited direct contact with vermiculite by a resident
 Scenario 4 is garden rototilling by a resident

Figure 4: Libby Fiber Length and Width Distributions



THE CITY OF NEW YORK - DEPARTMENT OF ENVIRONMENTAL PROTECTION
Environmental Compliance

Asbestos Rules and Regulations

The following asbestos control program regulations apply to all asbestos abatement activities occurring within the City of New York. This includes owners of buildings where asbestos abatement activity occur and contractors engaged in asbestos abatement activities. (Last updated July 7, 2000) <http://www.ci.nyc.ny.us/html/dep/html/asbestos.html>

Chapter 1 - Asbestos Control Program

Subchapter

- A Scope, Application, Definitions and Variances
- B Training and Certification Provisions
- C Reporting and Filing Requirements, Plans and Fees
- D Air and Bulk Sampling, Monitoring and Analysis
- E Personnel Protection and Equipment Specifications
- F Large Asbestos Project Procedures
- G Pre-Demolition Abatement Activity Procedures

Subchapter A

Scope, Application, Definitions and Variances

- §1-01 Scope and Application**
- §1-02 Definitions**
- §1-03 Variances**

§1-01 Scope and Application. (a) The following asbestos control program regulations, § 1-01 et seq., shall apply to all asbestos abatement activities occurring within the City of New York.

(b) Every owner of a building where asbestos abatement activity occurs shall be responsible for the performance of the asbestos abatement activities by his/her agent, contractor, employee, or other representative.

(c) Every contractor and worker engaged in asbestos abatement activities shall comply with the provisions of this chapter except as otherwise specified.

(d) Every investigator engaged to identify the presence and evaluate the condition of asbestos in a building or structure shall comply with the provisions of this chapter except as otherwise specified.

(e) No person shall knowingly make a false statement or submit a false document to the Department as to any matter concerning an asbestos project or any document required to be filed under these Rules.

(f) The Department may inspect at a reasonable time and in a reasonable manner anything which affects or may affect the emission or release of asbestos fibers or the disturbance of asbestos-containing material, including but not limited to the premises where an asbestos project is being conducted, or the premises for which a notification has been filed under § 1-21 - § 1-26 of these Rules, or the premises where an application has been filed with the Department

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Building owner. "Building owner" shall mean the person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance building owner means the person in whom beneficial title is vested.

Certified industrial hygienist. "Certified industrial hygienist" (CIH) shall mean an individual with a minimum of five years experience as an industrial hygienist and who has successfully completed both levels of the examination administered by the American Board of Industrial Hygiene and who is currently certified by that Board.

Certified safety professional (CSP). "Certified safety professional" (CSP) shall mean an individual having a bachelor's degree from an accredited college or university and a minimum of four years experience as a safety professional and who has successfully completed both levels of the examination administered by the Board of Certified Safety Professionals and who is currently certified by that Board.

Clean room. "Clean room" shall mean an uncontaminated area or room which is part of the worker decontamination enclosure system with provisions for storage of workers' street clothes and protective equipment.

Clearance air monitoring. "Clearance air monitoring" shall mean the employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers, and shall be performed as the final abatement activity.

Commissioner. "Commissioner" shall mean the Commissioner of the New York City Department of Environmental Protection.

Contractor. "Contractor" shall mean a public authority or any other governmental agency or instrumentality thereof, self-employed person, company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in an asbestos project.

Curtained doorway. "Curtained doorway" shall mean a device which consists of at least three overlapping sheets of plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to ensure that the sheets hang straight and maintain a seal over the doorway when not in use.

Decontamination enclosure system. "Decontamination enclosure system" shall mean a series of connected rooms, separated from the work area and from each other by air locks, for the decontamination of workers, materials, waste containers, and equipment.

Demolition. "Demolition" shall mean the dismantling or razing of a building, including all operations incidental thereto (except for asbestos abatement activities), for which a demolition permit from the New York City Buildings Department is required.

Department or DEP. "Department" or "DEP" shall mean the New York City Department of Environmental Protection.

Disturb. "Disturb" shall mean any action taken which may alter, change, or stir, such as but not limited to the removal, encapsulation, enclosure or repair of asbestos-containing material.

ELAP. "ELAP" shall mean the Environmental Laboratory Approval Program administered by the New York State Department of Health.

Encapsulant (sealant) or encapsulating agent. "Encapsulant (sealant) or encapsulating agent" shall mean pigmented (non-transparent) liquid material which can be applied to asbestos-containing material or the bare surfaces exposed after an abatement which temporarily controls the possible release of asbestos fibers from the material or surface either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).

Encapsulation. "Encapsulation" shall mean the coating or spraying of asbestos-containing material or the bare surfaces exposed after an abatement with a pigmented (non-transparent) sealant.

Enclosure. "Enclosure" shall mean the construction of airtight walls and ceilings between the ACM and the facility environment, or around surfaces coated with ACM, or any other appropriate procedure as determined by the Department which prevents the release of asbestos fibers.

EPA. "EPA" or "USEPA" shall mean the United States Environmental Protection Agency.

Equipment room. "Equipment room" shall mean a contaminated area or room which is part of the worker decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

Fiber. "Fiber" shall mean an acicular single crystal or a similarity elongated polycrystalline aggregate which displays some resemblance to organic fibers by having such properties as flexibility, high aspect ratio, silky luster, axial lineation, and others, and which has attained its shape primarily through growth rather than cleavage.

Fixed object. "Fixed object" shall mean a unit of equipment or furniture in the work area which cannot be removed from the work area.

Friable asbestos material. "Friable asbestos material" shall mean any asbestos or any ACM that can be crumbled, pulverized or reduced to powder when dry, by hand or other mechanical pressure.

Glovebag technique. "Glovebag technique" shall mean a method for removing friable asbestos-containing material from heating, ventilation and air conditioning (HVAC) ducts, short

pipings runs, valves, joints, elbows, and other nonplanar surfaces. The glovebag assembly is a manufactured device consisting of a large bag (constructed of at least 6-mil transparent plastic), two inward-projecting long sleeve gloves, one inward-projecting waterwand sleeve, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process.

HEPA filter. "HEPA filter" shall mean a high efficiency particulate air filter capable of trapping and retaining 99.97 percent of particles (asbestos fibers) greater than 0.3 micrometers mass median aerodynamic equivalent diameter.

HEPA vacuum equipment. "HEPA vacuum equipment" shall mean vacuuming equipment with a HEPA filter.

Holding area. "Holding area" shall mean a chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area.

Homogeneous work area. "Homogeneous work area" shall mean a portion of the work area which contains one type of asbestos-containing material and/or where one type of abatement is used.

Industrial hygiene. "Industrial hygiene" shall mean that science and art devoted to the recognition, evaluation and control of those environmental factors or stresses, arising in or from the work place, which may cause sickness, impaired health and well being, or significant discomfort and inefficiency among workers or among the citizens of the community.

Industrial hygienist. "Industrial hygienist" shall mean an individual having a college or university degree or degrees in engineering, chemistry, physics, or medicine or related biological sciences who, by virtue of special studies and training, has acquired competence in industrial hygiene. Such special studies and training must have been sufficient in all of the above cognate sciences to provide the abilities:

- (1) To recognize the environmental factors and to understand their effect on people and their well being; and
- (2) To evaluate, on the basis of experience and with the aid of quantitative measurement techniques, the magnitude of these stresses in terms of ability to impair people's health and well being; and
- (3) To prescribe methods to eliminate, control or reduce such stresses when necessary to alleviate their effects.

Isolation barrier. "Isolation barrier" shall mean the construction of partitions, the placement of solid materials, and the plasticizing of apertures to seal off the work place from surrounding areas and to contain asbestos fibers in the work area.

Large asbestos project. "Large asbestos project" shall mean an asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of 260 linear feet or more of friable asbestos-containing material or 160 square feet or more of friable asbestos-containing material.

Log. "Log" shall mean an official record of all activities that occurred during the project and it shall identify the building owner, agent, contractor, and workers, and other pertinent information (e.g., equipment malfunctions, contamination beyond the work area, etc.).

Minor project. "Minor project" shall mean a project involving the disturbance (e.g. removal, enclosure, encapsulation, repair) of 25 linear feet or less of friable asbestos containing material or 10 square feet or less of friable asbestos containing material.

Movable object. "Movable object" shall mean a unit of equipment or furniture in the work area which can be removed from the work area.

Negative air pressure equipment. "Negative air pressure equipment" shall mean a portable local exhaust system equipped with HEPA filtration. The system shall be capable of creating a negative pressure differential between the outside and inside of the work area.

NIOSH. "NIOSH" shall mean the National Institute for Occupational Safety and Health.

NYSDOH. "NYSDOH" shall mean the New York State Department of Health.

Occupied Area. "Occupied area" shall mean an area of the worksite where abatement is not taking place and where personnel or occupants normally function or where workers are not required to use personal protective equipment.

OSHA. "OSHA" shall mean the United States Occupational Safety and Health Administration.

Outside air. "Outside air" shall mean the air outside the work place.

Person. "Person" means any individual, partnership, company, corporation, association, firm, organization, governmental agency, administration or department, or any other group of individuals, or any officer or employee thereof.

Personal air monitoring. "Personal air monitoring" shall mean a method used to determine employees' exposure to airborne fibers. The sample is collected outside the respirator in the worker's breathing zone.

Personal protective equipment. "Personal protective equipment" (PPE) shall mean appropriate protective clothing, gloves, eye protection, footwear, head gear.

Phase contrast microscopy. "Phase contrast microscopy" (PCM) shall mean the

measurement protocol for the assessment of the fiber content of air. (NIOSH Method 7400).

Physician. "Physician" shall mean an individual licensed or otherwise authorized under Article 131 §65.22 of the New York State Education Law.

Plasticize. "Plasticize" shall mean to cover floors and walls with plastic sheeting as herein specified or by using spray plastics as acceptable to the Department.

Polarized light microscopy. "Polarized light microscopy" (PLM) shall mean the measurement protocol for the assessment of the asbestos content of bulk materials. (Interim Method for the Determination of Asbestiform Materials in Bulk Insulation Samples- 40 CFR Part 763, Subpart F, Appendix A as amended on September 1, 1982)

Professional engineer. "Professional engineer" (PE) shall mean an individual licensed or otherwise authorized by the New York State Department of Education, Division of Professional Licensing Services, to practice engineering and use the title Professional Engineer.

Qualitative fit test. "Qualitative fit test" shall mean the individual test subject's responding (either voluntarily or involuntarily) to a chemical challenge outside the respirator face piece. Three of the most popular methods include:

- (1) Irritant smoke test;
- (2) Odorous vapor test;
- (3) Taste test.

Quantitative fit test. "Quantitative fit test" shall mean exposing the respirator wearer to a test atmosphere containing an easily detectable, nontoxic aerosol, vapor or gas as the test agent. Instrumentation, which samples the test atmosphere and the air inside the face piece of the respirator, is used to measure quantitatively the leakage into the respirator. There are a number of test atmospheres, test agents, and exercises to perform during the tests.

Registered architect. "Registered architect"(RA) shall mean an individual licensed or otherwise authorized by the New York State Department of Education, Division of Professional Licensing Services, to practice architecture and use the title Registered Architect.

Removal. "Removal" shall mean the stripping of any asbestos-containing materials from surfaces or components of a facility or taking out structural components in accordance with 40 CFR 61 Subparts A and M.

Renovation. "Renovation" shall mean an addition or alteration or change or modification of a building or the service equipment thereof, that is not classified as an ordinary repair as defined in §27-125 of the Administrative Code of the City of New York.

Repair. "Repair" shall mean corrective action using specified work practices e.g. glovebag, plastic tent procedures, etc. to minimize the likelihood of fiber release from minimally

damaged areas of ACM.

Replacement material. "Replacement material" shall mean any material used to replace ACM that contains less than .01 percent asbestos.

Shift. "Shift" shall mean a worker's, or simultaneous group of workers', complete daily term of work.

Shower room. "Shower room" shall mean a room between the clean room and the equipment room in the worker decontamination enclosure with hot and cold running water controllable at the tap and arranged for complete showering during decontamination.

Small asbestos project. "Small asbestos project" shall mean an asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of more than 25 and less than 260 linear feet of friable asbestos-containing material or more than 10 and less than 160 square feet of friable asbestos-containing material.

Staging area. "Staging area" shall mean the work area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.

Strip. "Strip" shall mean to remove friable asbestos materials from any part of the facility.

Structural member. "Structural member" shall mean any load-supporting member of a facility, such as beams and load-supporting walls, or any nonload-supporting member, such as ceiling and nonload-supporting walls.

Surface barriers. "Surface barriers" shall mean the plasticizing of walls, floors, and fixed objects within the work area to prevent contamination from subsequent work.

Surfactant. "Surfactant" shall mean a chemical wetting agent added to water to improve penetration.

Transmission electron microscopy (TEM). "Transmission electron microscopy (TEM)" shall mean the measurement protocol for the assessment of the asbestos fiber content of air. (Interim Transmission Electron Microscopy Analytical Methods-40 CFR Part 763, Subpart E, Appendix A)

Visible emissions. "Visible emissions" shall mean any emissions containing particulate material that are visually detectable without the aid of instruments.

Washroom. "Washroom" shall mean a room between the work area and the holding area in the equipment decontamination enclosure system where equipment and waste containers are wet cleaned and/or HEPA vacuumed prior to disposal.

Waste decontamination enclosure system. "Waste decontamination enclosure system" shall mean the decontamination enclosure system designated for the controlled transfer of

materials and equipment, consisting of a washroom and a holding area.

Wet cleaning. "Wet cleaning" shall mean the removal of asbestos fibers from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.

Wet methods. "Wet methods" shall mean the use of amended water or removal encapsulants to minimize the generation of fibers during ACM disturbance.

Work area. "Work area" shall mean designated rooms, spaces, or areas of the building or structure where asbestos abatement activities take place. For glovebag procedures, the work area shall also include the areas contiguous to where the procedure takes place.

Worker. "Worker" shall mean asbestos handler and/or asbestos handler supervisor.

Worker decontamination enclosure system. "Worker decontamination enclosure system" shall mean that portion of a decontamination enclosure system designed for controlled passage of workers, and other individuals and authorized visitors, consisting of a clean room, a shower room, and an equipment room separated from each other and from the work area by airlocks and curtained doorways.

Work place. "Work place" shall mean the work area and the decontamination enclosure system(s).

Work site. "Work site" shall mean premises where asbestos abatement activity is taking place, and may be composed of one or more work areas.

§1-03 Variances. (a) Application for any variance from these rules or Part 56 of Title 12 of New York Codes, Rules and Regulations (Subparts 56-4 through 56-17) shall be made directly to the Department at least two weeks prior to the commencement of work. Work involving a variance may not commence prior to the receipt of the Department's approval of the application.

(b) The Department's "Asbestos Variance Application" (ACP9) form shall be submitted by the building owner or authorized agent, and shall include the following information:

(1) Identification of those portions of the rules for which a variance is requested, providing each numbered section and subsection;

(2) Explanations as to why the procedures required by the rules cannot be used;

(3) The alternative procedures the applicant will employ to satisfy each requirement as modified; and

(4) A copy of any asbestos inspection report previously filed. If the applicant has not previously filed an asbestos inspection report, such report shall be filed with the

application together with the applicable fee specified in §1-25(c).

(c) For each variance application where the combined amount (total of both square and linear feet on the ACP7) of ACM is less than 5000 feet, payment of the variance processing fee shall accompany the application and shall conform with the payment schedule as follows:

(1) Request to waive seven day notification requirement: \$300 fee.

(2) Request to modify no more than one lettered subdivision in any section category listed in subdivision (e) below: \$400 fee.

(3) For each additional subdivision in any category listed in subdivision (e): \$200 fee.

(4) The maximum fee: \$1200.

(d) For each variance application where the combined amount (total of both square and linear feet on the ACP7) of ACM is greater than or equal to 5000 feet, payment of the variance processing fee shall accompany the application and shall conform with the payment schedule as follows:

(1) Request to waive seven day notification requirement: \$400.

(2) Additional variance requests shall adhere to the following schedule:

(i) Request to modify no more than one lettered subdivision in any section category listed in subdivision (e): \$600.

(ii) For each additional subdivision in any category listed in subdivision (e): \$300.

(iii) The maximum fee: \$1800.

(e) Section categories shall be as follows:

CATEGORY	NYC Asbestos Control Program Section #s	12 NYCRR Part 56 Section #s
—		
Air Monitoring	71-85	56-17
Materials and Equipment	61	56-7

Work Place Preparation	81-83	56-8
Work Place Procedures	91-94	56-4, 5, 6, 9, 10, 11
Abatement Procedures	101-106	56-12, 13, 14, 16
Clean-up Procedures	111-112	56-15
Pre-Demolition Abatement Activity Procedures	120-129	---

Other unlisted section categories of the New York City Administrative Code and New York State Industrial Rule 56.

(f) Any violation of the terms of any variance issued under this section shall be considered a violation of the lettered subdivision modified by the variance.

Subchapter B

Certification Provisions

1 Certification Procedures

Part 1

Certification Procedures

- §1-11 Asbestos Handler Certificate**
- §1-12 Renewal of Asbestos Handler Certificate**
- §1-13 Restricted Asbestos Handler Certificate**
- §1-14 Asbestos Handler Supervisor Certificate**
- §1-15 Renewal of Asbestos Handler Supervisor Certificate**
- §1-16 Asbestos Investigator Certificate**
- §1-17 Renewal of Asbestos Investigator Certificate**

§1-11 Asbestos Handler Certificate. (a) No individual shall engage in an asbestos

project or in asbestos abatement activities on a minor project, for compensation, unless that individual is certified as an asbestos handler by the department and has an "Asbestos Handler Certificate" issued by the department which shall be posted in the clean room.

(b) The department shall issue an asbestos handler certificate in the form of a photo identification card which shall be valid for two years from the date of issuance to applicants who meet the following conditions:

- (1) Applicant shall be at least eighteen (18) years of age at the date of application; and
- (2) Applicant shall submit a completed application provided by the department accompanied by a fee of one hundred dollars (\$100); and
- (3) Applicant shall submit documentation of successful completion within the prior 12 months of a NYSDOH- approved Asbestos Handler training course; and
- (4) Applicant shall achieve a passing grade on a departmental examination.

§1-12 Renewal of Asbestos Handler Certificate. (a) The handler shall apply for renewal of the certificate at least 60 days prior to the date of its expiration.

(b) Application for renewal shall be made on a form approved by the department and shall be accompanied by a fee of one hundred dollars (\$100) and proof of successful completion within the prior 12 months of a NYSDOH- approved Asbestos Handler Refresher training course; and

(c) Applicant shall achieve a passing grade on a departmental examination.

§1-13 Restricted Asbestos Handler Certificate. (a) This section shall apply to individuals involved in the construction of the containment barriers of a work area (e.g., carpenters), or who otherwise enter the contained work area for a limited period of time to perform certain specialized tasks in preparation for, or ancillary to, the actual abatement (e.g., electricians); and for whom asbestos handler certification would otherwise be required. This section shall not apply to individuals performing abatement handling of ACM.

(b) The department shall issue a restricted asbestos handler certificate, in the form of a photo identification card which shall be valid for two years from the date of issuance to applicants who comply with the requirements of §§1-11(b)(1)-(4), except that the fee shall be \$50.

(c) An individual certified as a restricted asbestos handler by the department shall perform only those particular job functions specified by the department in the application for certification.

§1-14 Asbestos Handler Supervisor Certificate. (a) No individual shall supervise asbestos handlers engaged in an asbestos project, for compensation, unless that individual is certified as an asbestos handler supervisor by the department.

(b) The department shall issue an asbestos handler supervisor certificate, in the form of a photo identification card which shall be valid for two years from the date of issuance, to applicants who meet the following conditions:

(1) Applicant shall be at least twenty-one (21) years of age at the time of application; and

(2) Applicant shall submit a completed application provided by the department accompanied by a fee of one hundred dollars (\$100); and

(3) Applicant shall submit documentation of successful completion within the prior 12 months of a NYSDOH-approved Asbestos Supervisor training course.

(4) Applicant shall submit additional credentials as follows:

- (i) A professional engineer, registered architect, certified industrial hygienist, or certified safety professional shall submit a copy of the licensing credentials or certification, and documentation of one month post-graduate experience in asbestos abatement activities.
- (ii) A graduate from an accredited college or university possessing a bachelor's or advanced degree in engineering, architecture, environmental health science, industrial hygiene, occupational health and safety or a related science shall submit a copy of the degree, and documentation of three months post graduate experience in asbestos abatement activities.
- (iii) A graduate from an accredited college of university possessing an associate's degree in applied science and technology, environmental health science, public health, industrial health or a related science shall submit a copy of the degree, and documentation of six months post-graduate experience in asbestos abatement activities.
- (iv) All other applicants shall submit documentation of one year of experience in asbestos abatement activities.

The applicant's experience in asbestos abatement activities shall be listed chronologically and shall include each contractor's name/address/phone number; the number of hours worked per week on asbestos abatement activities; the applicant's job title and a brief description of duties; and

(5) Applicant shall achieve a passing grade on a departmental examination.

(c) The department may consider applicants who submit additional credentials which are not identical to the categories specified in subdivision (b)(4) above, but who present an equivalent combination of familiarity with abatement activities and demonstrated competence.

§1-15 Renewal of Asbestos Handler Supervisor Certificate. (a) The supervisor shall apply for renewal of the certificate at least 60 days prior to the date of its expiration.

(b) The supervisor shall submit the following items for renewal:

(1) A completed application provided by the department accompanied by a fee of \$100; and

(2) Documentation of successful completion within the prior 12 months of a NYSDOH-approved Asbestos Handler Supervisor Refresher training course.

(c) Applicant shall achieve a passing grade on a departmental examination.

§1-16 Asbestos Investigator Certificate. (a) (1) No individual shall engage in building survey and hazard assessment for asbestos unless that individual is certified as an asbestos investigator by the department.

(2) A non-certified individual may participate in an asbestos survey being conducted by a NYC certified investigator only if such individual works in the presence of the investigator and under his/her direct and continuing supervision.

(3) The investigator shall assume that some or all of the areas investigated contain ACM, and for each area that is not assumed to contain ACM, collect and submit for analysis bulk samples in accordance with §§1-36, 1-37 and 1-44 and EPA publications 560/5-85-024 and/or 560/5-85-030A.

(b) The department shall qualify applicants to be asbestos investigators. The applicant shall satisfy one of the following five sets of conditions:

(1) A professional engineer, a registered architect, a certified industrial hygienist or a certified safety professional shall submit a copy of licensing credentials or certification.

(2) A graduate from an accredited college or university possessing a doctorate or master's degree in architecture, engineering, environmental science, environmental health science, occupational health and safety, industrial hygiene or related environmental science shall submit a copy of the degree and documentation of six months post-graduate experience in building survey/hazard assessment for asbestos.

(3) A graduate from an accredited college or university possessing a bachelor's degree in architecture, engineering, environmental science, environmental health science, occupational health and safety, industrial hygiene or a related environmental science shall submit a copy of the degree and documentation of one year post-graduate experience in building survey/hazard assessment for asbestos.

(4) A graduate from an accredited college or university possessing an associate's degree in architecture, engineering technology, environmental health, public health, industrial health, applied science and technology or a related environmental science shall submit a copy of the degree and documentation of one year post-graduate experience in building survey/hazard assessment for asbestos and an additional two years of building survey-related experience.

(5) An individual with extensive experience in asbestos investigation on a professional level shall submit documentation demonstrating two years of experience in building survey/hazard assessment for asbestos and an additional three years of other building survey-related experience.

(c) The department shall issue an asbestos investigator certificate in the form of a photo identification card which shall be valid for two years from the date of issuance to qualified applicants who submit the following:

(1) A completed application provided by the Department accompanied by a fee of two hundred fifty dollars (\$250); and

(2) Documentation of successful completion within the prior 12 months of a New York State Restricted Asbestos Handler-III Inspector Training course, and a passing grade on the required investigator training course; and

(3) Documentation of a medical examination performed by a physician within the prior 12 months, which shall include at a minimum a pulmonary function test, evaluation of a recent chest x-ray and a physician's recommendation as to whether the applicant is able to wear a respirator in the performance of his/her job; and

(4) Documentation of a qualitative or quantitative fit test performed within the prior three months, which shall include brand name and type of respirator, date and location of test, and the signature of the industrial hygienist administering the test.

(i) Qualitative fit test may be used only for fit testing of half-mask negative pressure respirators.

(ii) Quantitative fit test shall be performed on all full-face negative pressure

respirators.

(d) Applicant shall achieve a passing grade on a departmental examination.

(e) Under special circumstances the department may consider applicants who submit additional credentials which are not identical to the categories specified in subdivision (b)(1) through (5) above.

(f) *Investigator's seal requirement.* (1) No NYC-certified asbestos investigator shall submit any plan or report to any client or any city, state, or federal agency that does not have the investigator's seal and signature affixed to it. Photocopies of the seal and signature are not acceptable.

(2) Seals used by certified asbestos investigators shall be circular in shape, approximately one and three quarter inches in diameter, with three concentric circles. The inner circle shall contain an accurate representation of the great seal of the City of New York. The legend at the top of the outer band shall read "CITY OF NEW YORK" and at the bottom "CERTIFIED ASBESTOS INVESTIGATOR". In the inner circle above the great seal of the City of New York shall be shown the name of the certified asbestos investigator.

(3) Any plan or report submitted without the investigator's seal and signature shall be considered invalid.

(4) Use of personal valid "professional engineer" or "registered architect" seal in lieu of investigators' seal by certified investigators is allowed.

§1-17 Renewal of Asbestos Investigator Certificate. (a) The investigator shall apply for renewal of the certificate at least 60 days prior to the date of its expiration.

(b) The investigator shall submit the following items for renewal:

(1) A completed application provided by the Department accompanied by a fee of \$250 payable to the Department; and

(2) Documentation of successful completion within the prior 12 months of a NYSDOH-approved Asbestos Inspector Refresher course; and

(3) Documentation of a medical examination performed by a physician within the prior 12 months, which shall include at a minimum a pulmonary function test, evaluation of a recent chest x-ray and a physician's recommendation as to whether the applicant is able to wear a respirator in the performance of his/her job; and

(4) Documentation of a qualitative or quantitative fit test performed within the prior three months, which shall include brand name and type of respirator, date and

location of test, and the signature of the industrial hygienist administering the test.

- (i) Qualitative fit test may be used only for fit testing of half-mask negative pressure respirators.
- (ii) Quantitative fit test shall be performed on all full-face negative pressure respirators.
- (c) Applicant shall achieve a passing grade on a departmental examination.

Subchapter C

Reporting and Filing Requirements, Plans and Fees

§1-21 Notifications, Reports, Plans, and Fees

§1-22 Permits

§1-23 Alterations/Renovations/Modifications

§1-24 Projects Requiring NYC Buildings Department Plan Amendment

§1-25 Projects Not Requiring Any Buildings Department Plan Approvals or Permits

§1-26 Emergency Asbestos Project Notification

§1-27 Record Keeping Requirements for Investigators

§1-21 Notifications, Reports, Plans, and Fees. (a) For the purpose of determining whether there has been compliance with any reporting or filing requirement established in §§1-22 through 1-26, the size and scope of the overall project shall control, with particular reference to the total amount of friable asbestos-containing material which will be disturbed. Such requirements may not lawfully be avoided or lessened through the performance of work in incremental or piecemeal fashion.

(b) When alternative calculations (i.e., linear feet and square feet) of the size and scope of an asbestos project result in that project coming within the definition of more than one sub-classification of asbestos project, the calculation with the higher absolute number shall determine the sub-classification of asbestos project procedures to be followed.

(c) For the purpose of §§1-21 through 1-26, the term “work” shall be understood as in the common construction usage, i.e. not specifically related to asbestos abatement activities.

§1-22 Permits. (a) This section shall apply to applications for the following NYC Department of Buildings permits:

- (1) Demolition permits, except that the provisions of this section shall not apply to the demolition of a one-story garage with a 2-car maximum capacity which is not

supplied with water lines, or to the legalization of demolition work which occurred prior to April 1, 1987.

- (2) Plumbing permits, except that applications for alteration and repair slips shall be subject to the provisions of this section only when such applications are for the installation, alteration, or removal of fuel-burning equipment.

The installation, alteration or removal of unit heaters, gas ranges, and gas dryers shall be exempt from the provisions of this section.

(b) Each building owner shall be responsible for determining the amount of friable asbestos-containing material which will be disturbed during the course of the permitted activity.

(c) The owner of the building or her/his authorized agent shall comply with the following notification requirements regarding friable asbestos-containing material which will be disturbed during the course of performing work authorized by the permit:

- (1) *"Not an Asbestos Project" notification.* If the work for which a permit is sought is not an asbestos project, a NYC-certified asbestos investigator shall complete, sign, and affix his or her seal to the "Not an Asbestos Project" form which shall be submitted with an additional fee of \$15.00 together with the permit application to the NYC Buildings Department.

(2) *Asbestos project notification.*

- (i) *Small asbestos projects.* If the cumulative total of all surfaces affected by the work for which the permit is sought is a small asbestos project, the department's "Asbestos Inspection Report," completed by the building owner or authorized agent, and listing each work area within the building separately, shall be submitted to the NYC Buildings Department, together with the permit application and a department filing fee in the following amounts:
 - (A) For work which will disturb more than 25 linear feet but less than 100 linear feet or more than 10 square feet but less than 50 square feet of friable asbestos-containing material, the fee shall be \$200.
 - (B) For work which will disturb at least 100 linear feet but less than 260 linear feet or at least 50 square feet but less than 160 square feet of friable asbestos-containing material, the fee shall be \$400.
- (ii) *Large asbestos projects.* If the cumulative total of all surfaces affected by the work for which the permit is sought is a large asbestos project, the department's "Asbestos Inspection Report," completed by the building owner or authorized agent, and listing each work area within the building separately, shall be submitted to the NYC Buildings Department, together

with the permit application and a department filing fee in the following amounts:

- (A) For work which will disturb at least 260 linear feet and less than 1,000 linear feet, or at least 160 square feet and less than 1,000 square feet of friable asbestos-containing materials, the fee shall be \$800.
- (B) For work which will disturb 1,000 linear feet or more, or 1,000 square feet or more, of friable asbestos-containing material, the fee shall be \$1,200.

(d) Modification of or deviation from the information provided in any notification submitted to the Department of Buildings under this section shall immediately be reported in writing directly to DEP if the change refers to the identity of the building owner or ACM removal contractor or the air monitoring firm; or the amount of ACM to be removed; or the dates of the project; or the specific project location. A notification may be modified no more than twice. A modification is valid only if it is received by the DEP prior to the previously filed date of completion, except for start date changes which must be received by the original start date. Thereafter, a new notification submitted directly to the department will be required. A notification to Department of Buildings or DEP shall be valid for one year from the date of original filing.

§1-23 Alterations/Renovations/Modifications. As early as possible before an alteration, renovation, or modification takes place, or changes in an alteration, renovation or modification occur, the building owner shall be responsible for determining the absence or presence of friable asbestos-containing material which will be disturbed during the course of the alteration, renovation or modification activities. The owner of the building or the authorized agent shall comply with the notification requirements of this section regarding friable asbestos-containing material.

(a) *Exceptions.* The following activities do not constitute an alteration, renovation or modification of a building or structure; therefore, the filing of a notification shall not be required as a pre-requisite for issuance of a Buildings Department plan approval. However, if friable asbestos-containing material is discovered during the course of any of the following activities, an "Asbestos Inspection Report" shall be filed immediately with DEP according to §§1-25 or 1-26.

Accessory Parking

Awnings

Candy or News Stands

Certificate of Occupancy requiring no work

Change of use or legalization requiring no work

Cranes

Curb Cuts

Debris chutes (not to be used for ACM)

Elevator equipment (not including construction & enclosure of shaft)

Emergency power not involving hard wiring (i.e. battery packs)

Erecting of fire escape

Exterior concrete work (e.g. sidewalks)

Exterior Scaffolding

Exterior trenching and drainage

Flagpoles

Kiosks

New finish material

New storefronts in existing masonry openings

Parapet Walls

Radio antenna (towers) free-standing

Relocating parking lot sheds

Replacing exterior water tanks

Replacing roof-top air conditioning unit not involving modification or removal of ductwork

Retaining Walls

Sealing Buildings

Sealing of dumbwaiters

Sidewalk Sheds, Bridges, Fences, Elevators, Hoists, and Cafes Signs

Subdivision of an existing tax lot

Swimming pools (outdoor)

Tents

Erection of Temporary Structures (e.g., trailers, etc.) supplied with electric and water lines only

Underpinning of Buildings

Zoning lot reapportionment

(b) *"Not an Asbestos Project"* notification. If the cumulative total of all surfaces

affected by the work for which plan approval is sought is not an asbestos project, a NYC-certified asbestos investigator shall complete, sign, and affix his or her seal to the "Not an Asbestos Project" form which shall be submitted with an additional fee of \$15.00 together with the appropriate Buildings Department application form(s) to the NYC Buildings Department.

(c) *Asbestos project notification.* (1) *Small asbestos projects.* If the cumulative total of all surfaces affected by the work for which plan approval is sought is a small asbestos project, the department's "Asbestos Inspection Report," completed by the building owner or authorized agent, and listing each work area within the building separately, shall be submitted to the NYC Buildings Department, together with the appropriate Buildings Department application form(s) and a department filing fee in the following amounts:

- (i) For work which will disturb more than 25 linear feet but less than 100 linear feet, or more than 10 square feet but less than 50 square feet of friable asbestos-containing material, the fee shall be \$200.
- (ii) For work which will disturb at least 100 linear feet and less than 260 linear feet, or at least 50 square feet and less than 160 square feet of friable asbestos-containing material, the fee shall be \$400.

(2) *Large asbestos projects.* If the cumulative total of all surfaces affected by the work for which plan approval is sought is a large asbestos project, the Department's "Asbestos Inspection Report," completed by the building owner or authorized agent, and listing each work area within the building separately, shall be submitted to the NYC Buildings Department, together with the appropriate Buildings Department application form(s) and a Department filing fee as follows:

- (i) For work which will disturb at least 260 linear feet and less than 1000 linear feet, or at least 160 square feet and less than 1000 square feet of friable asbestos-containing material, the fee shall be \$800.
- (ii) For work which will disturb 1000 linear feet or more, or 1000 square feet or more, of friable asbestos-containing material, the fee shall be \$1200.

(d) Modification of or deviation from the information provided in any notification submitted to the Department of Buildings under this section shall immediately be reported in writing directly to DEP if the change refers to the identity of the building owner or ACM removal contractor or the air monitoring firm; or the amount of ACM to be removed; or the dates of the project; or the specific project location. A notification may be modified no more than twice. A modification is valid only if it is received by the DEP prior to the previously filed date of completion, except for start date changes which must be received by the original start date. Thereafter, a new notification submitted directly to the department will be required. A notification to Department of Buildings or DEP shall be valid for one year from the date of original filing.

§1-24 Projects Requiring NYC Buildings Department Plan Amendment.

(a) If the amendment is for work at the same work area(s) covered in the original application, a copy of the originally-submitted "Not an Asbestos Project" form or "Asbestos Inspection Report" shall be submitted together with the amendment to the NYC Buildings Department.

(b) If the amendment is for work at (a) work area(s) not covered in the original application, the applicant shall file according to the §1-23 procedures for an original Building Alteration/Renovation/Modification application.

§1-25 Projects Not Requiring Any Buildings Department Plan Approvals or Permits. The purpose of this section is to require that notification of asbestos projects be provided directly to the DEP in circumstances where filing for Buildings Department plan approval or permit issuance is not required. This includes instances where filings with the Buildings Department are for other than plan approval or permit issuance; where no filing is required because the Buildings Department has decided not to require it; and where no filing is required because the Buildings Department is without authority to do so.

(a) This section shall apply to the following categories:

(1) Removal, encapsulation, enclosure or replacement of asbestos-containing materials (including insulation); and

(2) Work in or into plenum spaces of existing buildings (e.g. electrical, ventilation, cable, sheet metal work, etc.); and

(3) Removal of asbestos-covered structures and equipment such as boilers, pipes, etc.; and

(4) Other miscellaneous activities not previously exempted.

(b) *Work not constituting an asbestos project.* If the work is not an asbestos project, no notification or fee payable to the department shall be required, unless notification and fees are otherwise required by these regulations.

(c) *Asbestos Projects.* If the cumulative total of all surfaces affected by the work is an asbestos project, the department's "Asbestos Inspection Report," completed by the building owner or authorized agent, and listing each work area within the building separately, shall be submitted directly to the Department of Environmental Protection one week in advance of the start of the work along with a filing fee in the following amounts:

(1) For work which will disturb more than 25 linear feet but less than 100 linear feet, or more than 10 square feet but less than 50 square feet, of friable asbestos-containing material, the fee shall be \$200.

- (2) For work which will disturb at least 100 linear feet and less than 260 linear feet, or at least 50 square feet and less than 160 square feet, of friable asbestos-containing material, the fee shall be \$400.
- (3) For work which will disturb at least 260 linear feet and less than 1,000 linear feet, or at least 160 square feet and less than 1,000 square feet, of friable asbestos-containing material, the fee shall be \$800.
- (4) For work which will disturb 1,000 linear feet or more, or 1,000 square feet or more, of friable asbestos-containing materials, the fee shall be \$1,200.

(d) Modification of or deviation from the information provided in any notification submitted to the Department of Environmental Protection under this section shall immediately be reported in writing directly to DEP if the change refers to the identity of the building owner or ACM removal contractor or the air monitoring firm; or the amount of ACM to be removed; or the dates of the project; or the specific project location. A notification may be modified no more than twice. A modification is valid only if it is received by the DEP prior to the previously filed date of completion, except for start date changes which must be received by the original start date. Thereafter, a new notification submitted directly to the department will be required. A notification to DEP shall be valid for one year from the date of original filing.

§1-26 Emergency Asbestos Project Notification. (a) An emergency asbestos project involves the removal, enclosure or encapsulation of friable asbestos-containing material that was not planned but is undertaken when sudden unexpected event(s) result in a situation in which any delay in abatement would pose an immediate danger to public safety and health.

(b) When such an emergency asbestos project occurs, immediate telephone notification shall be provided to DEP's Asbestos Control Division. Telephone notification shall include:

- (1) Name, affiliation and telephone number of caller;
- (2) Nature of the emergency;
- (3) Type of asbestos work to be performed;
- (4) Exact location of the project including street address and borough;
- (5) Name, address, and telephone number of the employer of the workers handling the asbestos-containing material; and
- (6) Starting and projected completion dates.

(c) Written notification must be received as soon as possible, but not later than 48 hours after the project begins, at the DEP's Bureau of Air Resources' Asbestos Control Division.

Written notification shall be via the Asbestos Inspection Report (Form ACP7) with a cover letter stating:

- (1) "This is notification for an emergency asbestos project"; and
- (2) The nature of the emergency.

§1-27 Record Keeping Requirements for Investigators. (a) The asbestos investigator shall maintain a permanent record as required under this section for every building survey/hazard assessment for asbestos that is conducted pursuant to or submitted in accordance with §§1-22 through 1-27 of this chapter.

(b) For each building survey/hazard assessment conducted prior to preparation of either DEP Forms ACP7 or ACP5, the investigator shall compile a record which shall include at a minimum:

- (1) A detailed written description of procedures employed to detect the presence or absence of ACM; and
- (2) A blueprint, diagram, drawing, or written description of each building or portion thereof inspected by the investigator that identifies clearly each location and approximate linear or square footage of any area where material was sampled for ACM, and the exact locations where bulk samples were collected, the date of collection, and location of any areas assumed to have ACM; and
- (3) The printed name and signature of any and all persons who collect bulk samples for the purpose of determining the presence of ACM, the name and address of the laboratory analyzing the samples, the date of analysis, the results of the analysis, the method of analysis and the name and signature of the person performing the analysis; and
- (4) A detailed written description of any proposed demolition, renovation, alteration or modification work to be performed, including the techniques to be used and a description of affected facility components.

(c) The investigator shall indicate in each record all instances in which work was performed by a non-certified individual pursuant to §1-16(a)(2), and shall include such individual's name, address, telephone number, and a specific description of all activities performed by such individual.

(d) The investigator shall maintain these records for thirty (30) years.

(e) The investigator shall make these records available during normal business hours without cost or restriction for inspection by a representative of the Department.

Subchapter D

Air and Bulk Sampling, Monitoring and Analysis

- 1 Applicability**
- 2 Personnel Qualifications and Equipment Specifications**
- 3 Monitoring Procedures**

Part 1

Applicability

§1-31 Performance of Air and Bulk Sampling, Monitoring and Analysis

§1-31 Performance of Air and Bulk Sampling, Monitoring and Analysis. Air sampling, monitoring, and analysis on asbestos projects, and bulk sampling and analysis to determine asbestos content, shall be performed in accordance with the provisions of the following §§1-31 through 1-45 inclusive.

Part 2

Personnel Qualifications and Equipment Specifications

- §1-36 Persons Qualified to Perform Sampling and Analysis**
- §1-37 Sampling Equipment Requirements**

§1-36 Persons Qualified to Perform Sampling and Analysis.

(a) Sampling and analysis shall be performed by:

- (1) a third party who is contracted by the building owner and is completely independent of all parties involved in the asbestos project. The person who conducts sampling shall possess a valid New York State Asbestos Project Air Sampling Technician Certificate when performing air sampling; or
- (2) sampling and analysis staff which may not be independent of the building owner but are independent of the abatement contractor involved in the asbestos project, but only if such staff:
 - (i) performs in conjunction with a third party quality assurance program in

which 10 percent of the samples, except for bulk samples initially found to contain ACM, from each project are randomly selected and will be analyzed by both entities; and

- (ii) in the case of air sampling, possesses valid New York State Asbestos Project Air Sampling Technician Certification.
- (3) Sampling and analysis staff of a public service corporation with respect to asbestos projects that involve electric, steam or gas generation, distribution or transmission facilities provided that the requirements of subparagraphs (i) and (ii) of paragraph 2 of this section are complied with.
- (4) Only persons certified by the Department as asbestos investigators or by New York State Department of Labor as Asbestos Inspectors may select and collect bulk samples for analysis.
- (b) Bulk sample analysis (PLM) shall be performed by laboratories with accreditation in the ELAP.
- (c) Air Sample Analysis (PCM) shall be performed by laboratories with the following attributes:
 - (1) Successful completion by the laboratory's active analysts of the NIOSH 582 training course which outlines the NIOSH 7400 method; and
 - (2) Active analysts with skills in the appropriate methodology and proficiency in the NIOSH PAT Program for PCM analysis; and
 - (3) Accreditation in ELAP.
- (d) Air Sample Analysis (TEM) shall be performed by active analysts who possess skills in TEM analysis and participate in an in-house quality assurance program using the National Institute of Standards and Technology (NIST SRM 1876) or traceable standard.

§1-37 Sampling Equipment Requirements.

- (a) *Bulk sampling requirements.* (1) Bulk samples shall be taken by whatever method minimizes the potential for fiber release.
- (2) Any material which remains exposed as a result of the sampling procedure shall be sealed.
- (b) Area air sampling equipment for Phase Contrast Microscopy (PCM) shall be utilized in accordance with the equipment and sampling procedures specified within the NIOSH 7400 Method modified for area sampling.

(c) Area air sampling equipment for Transmission Electron Microscopy (TEM) shall be utilized in accordance with the sampling procedures specified within 40 CFR Part 763, Subpart E, Appendix A - Section II Mandatory Transmission Electron Microscopy Method, Subsection B - Sampling.

Part 3

Monitoring Procedures

§1-41 Air Sampling Schedule

§1-42 Monitoring Requirements

§1-43 Post-Abatement Clearance Air Monitoring

§1-44 Analysis and Reporting Results

§1-45 Action Criteria

§1-41 Air Sampling Schedule. (a) At a minimum, air sampling shall be conducted in accordance with the following schedule:

<u>Abatement Activity</u>	<u>Pre-Abatement</u>	<u>During Abatement</u>	<u>Post-Abatement</u>
Equal to or Greater than 10,000 ft. ² or 10,000 linear ft. of ACM	PCM	PCM	TEM
Less than 10,000 ft. ² or 10,000 linear ft. of ACM and greater than 10 square ft. or 25 linear ft.	PCM	PCM	PCM
Exceptions to the above:			
Boiler Rooms		PCM	PCM
Tent and Glovebag Procedures		PCM	PCM ¹
Demolitions		PCM	PCM

1. See §1-41(d)

Note: TEM is acceptable wherever PCM is required .

(b) *Pre-Abatement.* Prior to commencement of abatement activities, the number of samples specified below shall be taken during normal occupancy activities and circumstances at the work site. Samples shall be located within and at the barriers to the proposed work area.

(1) For large asbestos projects, a minimum of five.

(2) For small asbestos projects, a minimum of three.

(c) *During abatement.* Frequency and duration of the air sampling during abatement

shall be representative of the actual conditions during the abatement. The size of the asbestos project will be a factor in the number of samples required to monitor the abatement activities. The following minimum schedule of samples shall be required daily during the work shift.

(1) For asbestos projects not solely employing the glovebag and/or tent procedures, area air sampling shall be performed at the following locations:

- (i) Two area samples outside the asbestos project work area in uncontaminated areas of the building, remote from the decontamination facilities.
 - (A) Primary location selection shall be within 10 feet of isolation barriers.
 - (B) Where negative ventilation exhaust ducting runs through uncontaminated building areas, one of the area samples will be required in these areas to monitor any potential fiber release.
 - (C) Where adjacent non-work areas do not exist, an exterior area sample shall be taken; and
- (ii) One area sample within the uncontaminated entrance to each worker decontamination and waste decontamination enclosure system; and
- (iii) One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors.

(2) For abatement projects at demolition sites not solely employing glovebag and/or tent procedures, area air sampling shall be performed at the following sampling locations:

- (i) One area sample taken outside the work area within 10 feet of isolation barriers; and
- (ii) One area sample taken within the uncontaminated entrance to each worker decontamination and waste decontamination enclosure system.
- (iii) One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors.

(3) For glovebag and tent procedures, one baseline area sample shall be taken near each entrance to the work area. Area air samples shall be taken daily no less than 10 feet nor more than 15 feet from the glovebag(s) or tent actively being used in the abatement, or a similar appropriate and representative distance, using the following guidelines:

(i) For glovebag procedures:

(A) For more than 260 linear feet and less than 500 linear feet of pipe lagging to be removed - a minimum of two continuous samples shall be taken concurrently with the abatement.

(B) At least 500 linear feet of pipe lagging to be removed - a minimum of three continuous samples shall be taken concurrently with the abatement, for each 1000 linear feet of pipe lagging removal.

(C) For more than 25 linear feet and less than 260 linear feet, a minimum of 2 samples (one baseline area sample and one active abatement area sample) shall be taken in each homogeneous work area.

(ii) For tent procedures where more than 25 linear feet or 10 square feet of ACM is disturbed, a minimum of three continuous samples shall be taken concurrently throughout abatement.

(4) For boiler room equipment projects not solely employing the glovebag and/or tent procedures and not part of a pre-demolition abatement activity, the procedures outlined in §1-41 (c)(1) shall be followed.

(d) *Post-abatement.* Post-abatement clearance air monitoring shall include at a minimum the number of area samples specified below, to be taken inside each homogeneous work area.

(1) For small asbestos projects, a minimum of three.

(2) For large asbestos projects, a minimum of five. In addition to the 5 sample minimum, one representative area sample shall be collected for every 5,000 square feet above 25,000 square feet of floor space when ACM has been abated.

(3) When TEM analysis is employed a minimum of 5 samples from outside the work area shall also be collected.

(4) For small asbestos projects solely employing glovebag procedures, post-abatement clearance air monitoring is not required, unless the integrity of the glovebag was compromised or visible emissions were detected outside the glovebag and/or levels exceeded 0.01 f/cc during abatement or 0.05 f/cc for pre-demolition abatement activities. In such cases, post-abatement clearance air monitoring procedures outlined in the applicable subdivision of §1-41(d) shall be followed.

§1-42 Monitoring Requirements. Monitoring requirements and procedures for other than post-abatement clearance air monitoring are as follows:

(a) The sampling zone for indoor air samples shall be representative of the building occupants' breathing zone.

(b) If possible, ambient samplers should be placed about 6 feet above the ground surface in reasonable proximity to the building and away from obstructions and drafts that may unduly affect airflow.

For outdoor samples, if access to electricity and concerns about security dictate a rooftop site, locations near vents and other structures on the roof which would unduly affect airflow shall be avoided.

(c) Air sampling equipment shall not be placed in corners of rooms or near obstructions such as furniture.

(d) Samples shall have a chain of custody record.

(e) (1) In accordance with the above criteria, area samples (see §1-41) shall conform to the following schedule:

Samples for Analysis by	Minimum Volume	Flow Rate
PCM 25 mm	560 Liters	5 to 15 liters/min.
TEM 25 mm	560 Liters	1 to 10 liters/min.
TEM 37 mm	1,250 Liters	1 to 10 liters/min.

(2) For glovebag and tent procedures, the selected pump flow rate shall be consistent with the duration of the procedure; however, area sampling pump flow rates shall not be less than 10 liters per minute for the glovebag or tent procedures expected to be completed within 2 hours. In such cases, sampling shall extend beyond the procedure completion to obtain the minimum volume necessary.

(f) For glovebag and tent procedures, sampling shall start with glovebag/tent installation and shall run concurrently with the procedure.

§1-43 Post-Abatement Clearance Air Monitoring. Post-abatement clearance air monitoring requirements are as follows:

(a) (1) Sampling shall not begin until a visual inspection confirms that all containerized waste has been removed from work and holding areas and there is no visible ACM debris or residue on or about all abated surfaces; and

- (2) Sampling shall not begin until at least 1 hour after the area is dry from the third cleaning (see §1-112(e)) and no visible pools of water or condensation remain.

For pre-demolition asbestos abatement activity, sampling may begin 1 hour after the area is dry and no visible pools of water or condensation remain.

(b) Samplers shall be placed at random around the work area. If the work area contains the number of rooms equivalent to the number of required samples based on floor area, a sampler shall be placed in each room. When the number of rooms is greater than the required number of samples a representative sample of rooms shall be selected.

(c) The representative samplers placed outside the work area but within the building shall be located to avoid any air that might escape through the isolation barriers and shall be approximately 50 feet from the entrance to the work area, and 25 feet from the isolation barriers.

(d) The following aggressive sampling procedures shall be used within the work area during all clearance air monitoring:

- (1) Before starting the sampling pumps, use forced air equipment (such as a 1 horsepower leaf blower) to direct exhaust air against all walls, ceilings, floors, ledges and other surfaces in the work area.
 - (i) For asbestos projects: this pre-sampling procedure shall take at least 5 minutes per 1,000 sq. ft. of floor area; then install one 20-inch fan per 10,000 cubic feet of room space. Then immediately place the fan on slow speed and point it toward the ceiling.
 - (ii) For pre-demolition asbestos abatement activity, this pre-sampling procedure shall take at least three minutes, after which the 20-inch fan shall be left running unattended in the work area throughout sampling. This procedure shall be acceptable when the floor area of the work area is less than 500 square feet. At or above 500 square feet of floor area within the work area, the aggressive sampling procedures specified in this subdivision (d) for asbestos projects shall be conducted.

(2) Start the sampling pumps and sample for the required time or volume.

(3) Turn off the pump and then the fan(s) when sampling is completed.

(e) For post-abatement monitoring, area samples shall conform to the following schedule:

Area Samples for Analysis by	Minimum Volume	Flow Rate
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Area Samples for Analysis by	Minimum Volume	Flow Rate
PCM	1,800 Liters	5 to 15 liters/min.
TEM	1,250 Liters	1 to 10 liters/min.

(f) Each homogeneous work area which does not meet the clearance criteria shall be thoroughly recleaned using wet methods, with the negative pressure ventilation system in operation. New samples shall be collected in the work area as described above. The process shall be repeated until the work site passes the test.

(g) For an asbestos project with more than one homogenous work area, the release criterion shall be applied independently to each work area.

§1-44 Analysis and Reporting Results. Laboratory analyses and reporting shall be considered evidence of compliance with this chapter only if they conform to the following requirements:

(a) PCM area air samples shall be analyzed and reported in accordance with the NIOSH 7400 method using "A" Counting Rules.

(b) TEM area air samples shall be analyzed and reported in accordance with the mandatory or non-mandatory Electron Microscopy Methods set forth at 40 CFR Part 763, Subpart E, Appendix A.

(c) Bulk samples shall be analyzed and reported in accordance with Interim Method for the Determination of Asbestiform Materials in Bulk Insulation Samples found in 40 CFR Part 763, Subpart F, Appendix A as amended on September 1, 1982, or other methods approved by the National Institute of Standards and Technology, the National Institute of Occupational Safety and Health, the United States Environmental Protection Agency, or New York State Department of Health.

(d) Bulk and air sampling results/reports shall be submitted directly to the Department upon request within five calendar days.

§1-45 Action Criteria. (a) When visible emissions occur outside the work area, glovebag or tent, or any area air sample has indicated a determinant level of fiber concentrations greater than the larger of baseline levels or 0.01 f/cc, or 0.05 f/cc for abatement activities which are part of a pre-demolition abatement activity, work shall stop for inspection.

(1) For large or small asbestos projects, the integrity of barriers, if disturbed, shall be restored. Clean-up of surfaces outside of the work area using HEPA vacuums or wet cleaning techniques shall be done prior to resuming abatement activities.

(2) For glovebag and tent procedures, HVAC systems to or in the work area shall be

shut down and the work area shall be wet cleaned or HEPA vacuumed until the area air samples indicate the fiber concentration is below the determinant level. If fiber concentrations remain above the determinant level for longer than 24 hours, isolation barriers and engineering controls shall be installed and maintained.

(b) *Clearance and/or reoccupancy criteria.* (1) The clearance criteria shall be applied to each homogeneous work area independently.

(2) For PCM analysis involved in alteration or renovation projects, the clearance air monitoring shall be considered satisfactory when every sample is less than or equal to 0.01 f/cc or less than the ambient concentration, whichever is larger.

(3) For PCM analysis involved in pre-demolition abatement activities, the clearance air monitoring shall be considered satisfactory when every sample is less than or equal to 0.05 f/cc or less than the ambient concentration whichever is larger.

(4) For TEM analysis, the clearance monitoring will be considered satisfactory if conducted in accordance with 40 CFR Part 763, Subpart E, Appendix A — Section IV— Mandatory Interpretation of Transmission Electron Microscopy Results to Determine Completion of Response Actions.

(5) Clearance air monitoring results shall be submitted directly to the Department within 24 hours of request.

Subchapter E

Personnel Protection and Equipment Specifications

1 Worker Protection

2 Equipment Specifications

Part 1

Worker Protection

§1-51 Worker Protection Requirements

§1-51 Worker Protection Requirements. (a) Prior to project initiation, all workers engaged in abatement activities on an asbestos project or minor project must be certified by DEP.

(b) At least one asbestos handler supervisor shall be present at the work site while abatement activities are being conducted on an asbestos project.

(c) Personal protective equipment shall be worn by all individuals inside the work place during abatement activities, except that gloves need not be worn during those work place preparation activities which do not involve the disturbance of ACM.

Personal protective equipment shall meet the following specifications:

- (1) Disposable clothing including head, hand, foot and full body protection shall be provided by the contractor in sufficient quantities and adequate sizes for all workers and authorized visitors.
- (2) Hard hats, protective eyewear, gloves, rubber boots and/or other footwear shall be provided by the contractor as required for workers and authorized visitors. Safety shoes and hard hats shall be in accordance with ANSI Z89.1 (1969) and ANSI Z41.1 (1967).
- (3) Contaminated clothing shall be sealed in impermeable bags and the bags shall be appropriately labeled.

(d) Personal air monitoring shall be performed in accordance with OSHA standards, 29 CFR 1926.58(f). Such records shall be made available to any authorized Department inspector upon request.

(e) Personal Hygiene at the work site shall meet the following requirements:

- (1) There shall be no smoking, eating, drinking or chewing of gum or tobacco or application of cosmetics inside the work place.
- (2) Jewelry shall not be worn in contaminated areas.
- (3) The contractor shall provide clean change areas for the workers. Change areas shall be equipped with separate storage facilities for protective clothing and street clothing.
- (4) If lunch areas are provided, they shall be located outside the work place in an area in which the airborne concentrations are below 0.01 f/cc.

(f) The contractor shall have available the following information in the clean room(s) at the work site:

- (1) A copy of the U.S. Environmental Protection Agency Regulations for Asbestos, 40 CFR 61 Subparts A and M and a copy of OSHA Asbestos Regulations, 29 CFR 1926.58, and
- (2) A list of telephone numbers for local hospital, location of hospital and/or emergency squad, local fire department, the building owner (or

representative) and the N.Y.C. Asbestos Control Program, and

- (3) A copy of these Rules, the most recent Asbestos Inspection Report (Form ACP 7) filed including amendments, any variance application (Form ACP 9) and DEP approval thereof, and
- (4) A copy of all Material Safety Data Sheets (MSDS) for hazardous chemicals used during the asbestos project, and
- (5) New York City Asbestos handler and supervisor certificates of all workers in the work site, and
- (6) A copy of the current New York State Department of Labor asbestos handling license of the contractor.

(g) The contractor shall post signs during all abatement activities. Signs shall be posted at all approaches to the work place including internal doorways which provide access to the work place. These signs shall bear the following information:

**DANGER
ASBESTOS CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

(h) Warning labels shall be affixed to all waste containers containing asbestos material in and shall bear the following information:

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

Part 2

Equipment Specifications

§1-61 Materials and Equipment

§1-61 Materials and Equipment. The materials and equipment used during all abatement activities shall conform with the following:

(a) During abatement activities, replacement materials shall be stored outside the work area in a manner to prevent contamination.

(b) When asbestos-containing material that has been used for fireproofing or insulation is removed, the replacement material shall comply with all applicable provisions of the New York City Administrative Code and regulations.

(c) For plasticizing, polyethylene sheeting with 6-mil thickness or greater, in sizes to minimize the frequency of joints, shall be employed.

(d) Duct tape and selected adhesive shall be capable of sealing joints of adjacent sheets of polyethylene, facilitating attachment of polyethylene sheets to finished or unfinished surfaces, and of adhering under both dry and wet conditions, including during the use of amended water.

(e) Airtight and watertight containers shall be provided to receive and retain any asbestos-containing waste materials. Plastic bags used for waste storage or disposal shall be a minimum of 6-mil in thickness. All containers shall be labeled in accordance with OSHA Regulation 29 CFR 1926.58K(2)(ii) and (iii).

(f) Materials used to enclose ACM shall be impact resistant and assembled to be airtight. Gypsum panels taped at the seams, tongue and groove boards, and boards with spline joints all qualify.

(g) Hand power tools used to drill, cut into, or otherwise disturb ACM shall be equipped with HEPA filtered local exhaust ventilation.

(h) Ladders or scaffolds of sufficient dimension and quantity shall be available so that all work surfaces can be easily and safely reached by inspectors. Scaffold joints and ends shall be sealed with tape to prevent incursion of asbestos fibers.

(i) Electrical equipment shall be Underwriters Laboratory listed and approved.

(j) Equipment and materials may be substituted for those specified in this chapter only if determined to be equivalent after review by the Department.

Subchapter F

Large Asbestos Project Procedures

- 1 Applicability**
- 2 Work Place Preparation**
- 3 Work Place Procedures**
- 4 Abatement Procedures**
- 5 Clean-up Procedures**

Part 1

Applicability

§1-71 Applicability

§1-71 Applicability. In addition to §§1-01 through 1-61, the following sections 1-81 through 1-83, 1-91 through 1-94 and 1-111 and 1-112 shall apply to abatement activities on large asbestos projects. Sections 1-101 through 1-106 shall apply to all asbestos abatement activities.

Part 2

Work Place Preparation

§1-81 General Work Place Preparation Requirements

§1-82 Worker Decontamination Enclosure System

§1-83 Waste Decontamination Enclosure System

§1-81 General Work Place Preparation Requirements. The following procedures shall be followed during the conduct of abatement activities on large asbestos projects:

(a) The building owner or designated representative shall provide notification to all occupants of the work place and immediate adjacent areas of the asbestos project. Information provided in the notification shall include contractor, project location and size, amount and type of ACM, abatement procedure, dates of expected occurrence and the NYC-DEP telephone number. Postings of this notification shall be in English and Spanish, at eye level, in a conspicuous, well-lit place, at the entrances to the work place and immediate adjacent areas. The notice shall have the following heading: **NOTICE OF ASBESTOS ABATEMENT**, in a minimum of one inch sans serif, gothic or block style lettering, with the balance of the lettering of the notice to be of the same type lettering in a minimum of one quarter inch size. The notices shall be posted 7 calendar days prior to the start of the project and shall remain posted until clearance air monitoring is satisfactorily concluded. A lessee initiating an asbestos project shall give 10 calendar days notice to the owner of the subject building.

(b) The work place shall be vacated by the occupants prior to work place preparation and until successful clearance air monitoring.

(c) Electric power to all work areas shall be shut down and locked out except for electrical equipment that must remain in service. Safe temporary power and lighting shall be provided in accordance with all applicable codes. All power to work areas shall be brought in from outside the area through ground-fault interrupter at the source. Stationary electrical equipment within the work area, which must remain in service shall be adequately enclosed and ventilated.

(d) The worker decontamination enclosure system shall be installed or constructed prior to plasticizing the work area or before disturbing ACM. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement. The area in which these systems are located shall require HVAC system isolation and plasticizing of electrical outlets and equipment that are within 6 inches of floor level.

(e) (1) Prior to erection of partitions, ACM that may be disturbed during this activity shall be:

- (i) removed using a tent procedure (including engineering controls); and/or
- (ii) treated via wet methods.

(2) Removal by the above procedures shall be limited to a maximum of a one foot wide strip running the length and/or height of the partition and is allowed only to facilitate erection of the partitions.

(f) Heating, Ventilation and Air Conditioning (HVAC) System Isolation methods are listed below in order of preference; the more complex and potentially problematic methods may be used when the more preferred procedures are impractical.

(1) Shut down and lock out HVAC systems and install isolation barriers (see §1-81(k)) to prevent contamination and fiber dispersal to other areas of the structure, or

(2) isolate locally and provide temporary HVAC, or

(3) Positive pressurization of the HVAC system. This procedure shall be applied only under the direction and control of a professional engineer, or other knowledgeable licensed professional, after approval by the Department.

(g) Abatement shall not commence until work place preparation has been completed.

(h) Movable objects within the proposed work areas shall be pre-cleaned (i.e., prior to commencing general abatement) using HEPA filtered vacuum equipment and/or wet cleaning methods and such objects shall be removed from the work area. If carpeting is left in place, it shall be covered with 6-mil plastic sheeting, and then $\frac{3}{8}$ in. rigid flooring prior to normal plasticizing.

(i) Fixed objects which will remain within the proposed work areas shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning methods as appropriate, and enclosed with 6-mil plastic sheeting sealed to protect from re-contamination.

(j) Prior to plasticizing, the proposed work areas shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning methods. Methods that raise dust, such as sweeping or vacuuming with equipment not equipped with HEPA filters, are prohibited.

(k) The isolation barriers (i.e., sealing off of all openings, including but not limited to windows, corridors, doorways, barriers, skylights, ducts, grills, diffusers, and any other penetrations of the work place) shall be installed with two layers of 6-mil plastic sheeting sealed with tape. All seams of HVAC or other system components that pass through the work place shall also be sealed.

(l) The work area shall be segregated from the remainder of the work site by construction of temporary structural partitions as follows:

(1) Partitions shall be constructed of conventional 2 x 3 (minimum) wood or metal stud framing, 16"CC maximum, to support barriers in all openings larger than 32ft², except where any one dimension is 1 foot or less, or where openings are exits covered in subdivision (p) below.

(2) A solid construction material (e.g. plywood) of at least 3/8" thickness shall be applied to the work side of the framing. In secure interior areas where partitions are not subject to access from the public, an additional layer of 6-mil plastic sheeting may be substituted for the solid construction material.

(3) The partitions shall be caulked/sealed at the floor, ceiling, walls, joints and fixtures to form an airtight seal.

(m) In addition to the isolation barriers, floor and wall surfaces shall be sealed with a minimum of two layers of 6-mil plastic sheeting, except where the only ACM being abated in the project is vinyl asbestos floor tile, in which case the floor need not be sealed. The plastic layers on the floor shall extend 6 inches up the walls. Walls shall be covered with plastic sheeting down to the floor level, thus overlapping the floor material by a minimum of 6 inches. There shall be a distance of at least 6 inches between seams of adjacent layers.

(n) After isolation barriers are in place, ceiling-mounted objects not previously sealed that will interfere with ACM abatement shall be removed and cleaned. Amended water spraying or HEPA filtered vacuum equipment shall be used during fixture removal to reduce fiber dispersal.

(o) Suspended ceiling tiles and T-grid components, contaminated by ACM, shall remain in place until the work area has been fully prepared as outlined in this section and electrical and HVAC systems have been shutdown. Suspended ceiling components shall be removed and disposed of as asbestos-containing waste or retained for reuse after wet cleaning/HEPA vacuuming.

(p) Emergency and fire exits from the work areas shall be maintained, or alternative exits shall be established in accordance with applicable NYC Code(s) and regulations. Exits shall be checked daily against exterior blockage or impediments to exiting.

(q) Entrances to the work place that will not be used for worker entry or emergency

exits shall be locked to prevent unauthorized entry.

(r) Floor drains shall be sealed individually with two layers of 6-mil plastic sheeting and tape, and then covered as all other floor surfaces. Pits, sumps, etc., shall be covered with adequate plywood sheeting and secured to floor slabs in a manner which prevents a tripping hazard, prior to required plasticizing.

(s) Elevators running through the work area shall conform to the following:

(1) The elevator door in the work area shall be enclosed with conventional 2 x 4 stud framing, covered with $\frac{3}{8}$ " plywood sheeting and sealed at all edges and seams. The barrier shall be covered and lapped for 8 inches with two layers of 6-mil plastic sheeting adhered individually with edges taped for air tightness.

(2) Elevators not remaining in service shall have the fuses removed and the power switch locked in the open position.

(3) Elevators that remain in operation shall conform to the following additional procedures to minimize the piston effect that results:

(i) Elevator control shall be modified to bypass the work area.

(ii) A final larger layer of 6-mil plastic sheeting is to be taped airtight but with slack forming a larger perimeter diaphragm. Air leakage across the barrier shall be corrected upon discovery, and the elevator shaft shall be checked for airborne asbestos contamination.

(iii) This system shall be smoke tested daily.

(4) Elevator shafts shall not be used as waste chutes.

(t) Adequate toilet facilities shall be provided in the vicinity of the clean room external to the work place. Where such facilities do not exist, portable service shall be provided.

§1-82 Worker Decontamination Enclosure System. The following procedures shall be followed during the conduct of abatement activities on large asbestos projects:

(a) Worker decontamination enclosure systems shall be located outside the work area and attached to all locations where workers will enter or exit the work area. One system at a single location for each contained work area is preferred. These systems may consist of existing rooms outside of the work area, that offer direct access to the work area and general egress from the work place. When this situation does not exist, enclosure systems may be constructed or may consist of prefabricated or trailer units. Adequate heat and light shall be safely provided.

(b) The worker decontamination enclosure system shall consist of a clean room, a

shower room, and an equipment room, in series, separated from each other by airlocks and from the work area and non-work place by curtained doors (see Illustrations I & II).

(c) Worker decontamination enclosure systems shall be fully lined utilizing two layers of 6-mil opaque plastic sheeting at a minimum, or the equivalent.

(d) When the decontamination enclosure is constructed outdoors or in areas with public access it shall be fully framed and plywood sheathed or equivalent to prevent unauthorized entry. When located outdoors, it shall be waterproof and windproof.

(e) Prefabricated or trailer decontamination units:

(1) shall at a minimum, have functionality and security equivalent to constructed decontamination enclosure facilities, and

(2) shall be completely decontaminated prior to removal from the work site.

(f) The clean room:

(1) shall contain secure crew lockers or shelves, and clean sealable plastic bags for storage of street clothes, and

(2) shall contain shelves or appropriate facilities for storage of respirators, and

(3) shall contain clean disposable clothing, replacement filters for respirators, towels and other necessary personal protective equipment, and

(4) shall not be used for storage of tools, equipment or materials, other than personal protective equipment, nor used as office space, and

(5) shall be equipped with a lockable door to secure the work place during off-shift hours.

(g) The shower room:

(1) shall contain a minimum of one shower per 8 workers calculated on the basis of the largest shift, and

(2) shall have shower heads supplied with hot and cold water adjustable at the shower, and

(3) shall be constructed to ensure against water leakage, and

(4) shall contain liquid bath soap, shampoo, and clean dry towels in sufficient quantity for each worker for each showering.

(h) Shower water shall be drained, collected and filtered through a system with a least

5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles.

- (1) Filtered wastewater shall be discharged either to a sewer or drummed and then properly disposed.
- (2) Used filters shall be disposed of as asbestos-containing waste material.
- (i) The equipment room:
 - (1) shall be used for storage of equipment and tools used on the job that have been cleaned previously in the work area, and
 - (2) may contain a limited supply of replacement filters (in sealed containers until used) for HEPA vacuums and pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement activity, and
 - (3) shall contain labeled 6-mil plastic bags for collection of disposable clothing, and
 - (4) shall be used to store contaminated footwear (e.g. rubber boots and other reusable footwear) and contaminated clothing for reuse for the duration of the abatement activity or until disposed.

§1-83 Waste Decontamination Enclosure System. The following procedures shall be followed for removal of asbestos-containing waste material and equipment during the conduct of abatement activities on large asbestos projects:

- (a) A waste decontamination enclosure system shall consist of two totally enclosed chambers and shall also comply with the following requirements:
 - (1) the washroom shall be constructed with an airlock doorway to the work area and an airlock doorway to the holding area (see Illustration III); and
 - (2) the holding area shall be constructed with an airlock doorway to the washroom and a lockable door to the outside (see Illustration III); if remote from the washroom, it shall comply with all applicable NYC Department of Sanitation regulations pursuant to Local Laws 70 of 1985 and 21 of 1987.
- (b) Where there is only one means of egress from the work area:
 - (1) the holding area of the waste decontamination enclosure system may branch off from the equipment/decontamination room (see Illustration IV). Thus the equipment room alternates as a waste washroom. In this case the waste

washroom shall be equipped with a drain, installed to collect water and deliver it to the shower drain where it is filtered, or

- (2) where total asbestos-containing material disturbed in the asbestos project is less than 1,000 linear feet or 1,000 square feet, the shower room may be used as a waste washroom, and
 - (i) the clean room, in the configuration shown in Illustration I, may not be used for waste storage but is used for waste transfer to carts, which are stored outside the clean room in a designated holding area.
 - (ii) the holding area of the waste decontamination enclosure system may branch off from the shower room of the worker decontamination enclosure system (see Illustration II).
- (c) The waste decontamination enclosure system shall be constructed to meet the requirements of §§ 1-82 (a), (c), (d), (e), (f)(3) and (h).

Part 3

Work Place Procedures

§1-91 Engineering Controls

§1-92 Work Place Entry and Exit Procedures

§1-93 Equipment and Waste Container Decontamination and Removal Procedures

§1-94 Maintenance of Decontamination Enclosure Systems and Barriers

§1-91 Engineering Controls. The following procedures shall be followed during the conduct of abatement activities on large asbestos projects:

- (a) All large asbestos projects shall utilize negative pressure ventilation equipment.
- (b) The negative pressure ventilation equipment shall operate continuously, 24 hours a day, from the establishment of isolation barriers through successful clearance air monitoring. If such equipment shuts off, adjacent areas shall be monitored for asbestos fibers.
- (c) A static negative air pressure of 0.02 inches (minimum) water column shall be maintained at all times in the work place during abatement to ensure that contaminated air in the work area does not filter back to uncontaminated areas.
- (d) If more than one ventilation unit is installed, units shall be turned on one at a time while checking the integrity of all barriers for secure attachment and the need for additional reinforcement.
- (e) A dedicated power supply for the negative pressure ventilating units shall be utilized.

(f) On loss of negative pressure or electric power to the negative pressure ventilating units, abatement shall stop immediately and shall not resume until power is restored and negative pressure ventilation equipment is operating again. When power failure or loss of negative pressure equipment lasts or is expected to last longer than one-half hour:

- (1) the make-up air inlets shall be sealed airtight, and
- (2) the decontamination systems shall be sealed airtight after the evacuation of workers and/or authorized visitors from the work area, and
- (3) all adjacent areas shall be monitored for asbestos fiber concentration upon discovery of, and subsequently throughout, the power failure.

(g) Negative pressure ventilation equipment shall be installed and operated to provide at least one air change in the work area every 15 minutes, except during clearance air monitoring when at least one air change in the work area every 30 minutes shall be provided.

(h) Openings made in the isolation barrier to accommodate these units shall be made airtight. The units shall remain within the work area unless located securely outside the building.

(i) Negative air pressure equipment shall be in compliance with ANSI Z9.2 (1979), Local Exhaust Ventilation.

(j) Negative air pressure systems shall be operated in accordance with "Specifications and Operating Procedures for the Use of Negative Pressure Systems for Asbestos Abatement, Guidance for Controlling Asbestos-Containing Materials in Buildings", EPA Report Number 560/5-85-024 (1985).

(k) Negative pressure ventilation equipment shall be exhausted to the outside of the building away from occupied areas.

- (1) At no time shall the negative pressure ventilation unit exhaust within 40 feet of a receptor or adversely affect the air intake ports, louvers, or entrances for the building or adjacent buildings.
- (2) Heavy duty ducting of equivalent, or larger, shape and dimension as that of the negative pressure ventilation exhaust port shall be used to exhaust to the outside of the structure.
- (3) All ducting shall be sealed and braced or supported to maintain airtight joints.

(l) Where ducting to the outside is not possible, a second negative pressure ventilation unit compatible with the primary unit's capacity shall be connected in series. The area receiving the exhaust shall have sufficient, non-recycling exhaust capacity to the outside of the structure.

(m) Careful installation shall be done to ensure that the ducting does not release fibers

into uncontaminated building areas.

(n) Routine smoke testing, air monitoring and daily inspections shall be performed by the Asbestos Handler Supervisor to ensure that the ducting does not release fibers into uncontaminated building areas.

§1-92 Work Place Entry and Exit Procedures. The following procedures shall be followed during the conduct of abatement activities on large asbestos projects:

(a) *Entrance procedures.* (1) All workers and authorized visitors shall enter the work area through the worker decontamination enclosure system.

(2) All individuals who enter the work area shall sign the log located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, owner, agents, contractor(s), the project, each work area and worker respiratory protection employed. The log shall be available for examination during general business hours by the Department, the owner and the workers.

(3) All individuals before entering the work area, shall be familiar with all posted regulations, personal protection requirements and emergency procedures. The log headings shall indicate, and the signatures shall be used to acknowledge, that the regulations and procedures have been reviewed and understood by all persons prior to entering the work area. The postings and log headings shall be in English and in the language of the majority of the asbestos handlers.

(4) All individuals shall proceed first to the clean room, remove all street clothing, store these items in clean sealable plastic bags or a locker and don personal protective equipment. Clean personal protective equipment shall be provided and utilized by each individual for each separate entry into the work area.

(b) *Exit procedures.* (1) Before leaving the work area, each individual shall remove the gross contamination from the outside of the respirators and protective clothing by wet cleaning, and/or HEPA vacuuming.

(2) In the equipment room, all personal protective equipment except respirators shall be removed. Disposable clothing shall be deposited into labeled containers for disposal. Reusable contaminated clothing, footwear, and/or head gear shall be stored in the equipment room when not in use.

(3) Still wearing a respirator, each person shall proceed to the shower room, clean the outside of the respirator and the exposed face area under running water prior to removal of the respirator, and then fully and vigorously shower and shampoo to remove residual asbestos contamination. Respirators shall be washed thoroughly with soap and water or a suitable sanitizing agent. Various types of respirators may require slight modification of these procedures.

- (4) After showering and drying, personnel shall proceed to the clean room and don clean disposable clothing if returning to the work area or street clothing if remaining outside the work area.

§1-93 Equipment and Waste Container Decontamination and Removal Procedures.

The following procedures shall be followed whenever equipment or containers are removed from the work area during a large asbestos project:

- (a) When the worker decontamination enclosure system shown in Illustration I alternates as a waste decontamination enclosure system, the clean room shall be considered a holding area during the period of active waste transfer only for the purpose of the loading of carts. Storage of waste and carts in the clean room is prohibited.
- (b) Where the waste decontamination enclosure system is part of the worker decontamination enclosure system (see Illustrations II & IV), waste removal shall not occur during worker shift changes or when workers are showering or changing. Care shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.
- (c) Where only one means of egress exists and the shower room is used as a waste washroom, workers are to be stationed in each room/area of the decontamination enclosure to transfer/process (see subdivisions (d), (h) and (I) of this section) the containers and equipment to or from adjacent sections. These workers are not to cross into the adjacent areas/rooms until the waste/equipment transfer is finished for that period and the workers have gone through decontaminations required by §1-92 of this chapter. The clean room/holding area workers shall have entered from uncontaminated areas with appropriate personal protective equipment; or prior to the start of waste transfer, these workers shall have exited the work area, fully decontaminated, and subsequently donned clean personal protective equipment.
- (d) External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the work area before transferring such items into the decontamination enclosure system. Contaminated workers shall not enter the washroom during this procedure.
- (e) The cleaned containers of ACM and equipment shall be placed in uncontaminated leak-tight plastic bags or sheeting as the item's physical characteristics demand. Air volume shall be minimized and the bags or sheeting shall be sealed. Items that may puncture or tear the plastic bags or sheeting shall be placed in a hardwall container and sealed.
- (f) The clean recontainerized items shall be moved into the airlock for subsequent transfer to the holding area. The washroom workers shall not enter this airlock or the work area until waste removal is finished for that period.

(g) Recontainerized items and cleaned equipment shall be removed from the airlock to the holding area by workers who have entered from uncontaminated areas with appropriate personal protective equipment.

(h) The recontainerized items of ACM and cleaned, bagged equipment shall be placed in open top, watertight plastic carts. These carts shall be held in the holding area pending removal. The carts shall be HEPA vacuumed or wet-cleaned following the removal of the containers of ACM from them.

(i) The exit from the waste decontamination enclosure system shall be secured to prevent unauthorized entry.

(j) The carts shall be stored in a holding area of the work site.

§1-94 Maintenance of Decontamination Enclosure Systems and Barriers. The following procedures shall be followed during the conduct of abatement activities on large asbestos projects:

(a) All plastic barriers inside the work place and partitions constructed to isolate the work area from occupied areas shall be inspected by the asbestos handler supervisor at least twice per shift.

(b) Smoke tubes shall be used to test the integrity of the work area barriers and the decontamination enclosure systems daily at a minimum both before abatement activity begins and at the end of each shift. A visual inspection of the barriers, including the use of differential manometers, shall be considered acceptable as a back-up test.

(c) Damage and defects in the decontamination enclosure system shall be repaired immediately.

(d) At any time during the abatement activity, if visible emissions are observed, or elevated asbestos fiber counts outside the work area are measured, or if damage occurs to barriers, abatement shall stop. The source of the contamination shall be located, the integrity of the barriers shall be restored, and visible residue shall be cleaned up using appropriate HEPA vacuuming and wet cleaning procedures immediately.

(e) Inspections, observations, and unusual incidents (e.g. barrier damage, contamination beyond the work area, etc.) shall be documented in the log by the asbestos handler supervisor.

Part 4

Abatement Procedures

§1-101 Applicability

§1-102 ACM Disturbance, Handling and Removal Procedures

§1-103 Encapsulation Procedures

§1-104 Enclosure Procedures

§1-105 Glovebag Procedures

§1-106 Tent Procedures

§1-101 Applicability. The following §§1-102 through 1-106 inclusive shall apply to all abatement activities.

§1-102 ACM Disturbance, Handling and Removal Procedures. The following procedures shall be followed during the conduct of abatement activities:

(a) Abatement of asbestos-containing materials shall be by wet methods. Dry removal of asbestos-containing material is prohibited, unless EPA approval has been obtained. The EPA-approved alternate removal plan shall be submitted to the Department for approval a minimum of 15 days before work is scheduled to begin or begins. The plan shall explain and justify why ACM must be removed dry and how asbestos fibers will be controlled to prevent their release.

(b) When amended water is used, the ACM shall be sprayed with sufficient frequency and quantity for enhanced penetration. Sufficient time shall be allowed for penetration to occur prior to removal action or other disturbance taking place. Accumulation of standing or free water is prohibited. Fluffy friable materials shall be saturated. Non-hygroscopic materials, such as tremolite or amosite, shall be thoroughly wetted on all surfaces while work is being conducted.

(c) When used, removal encapsulants that minimize fiber generation and enhance penetration, shall be applied per manufacturer's specifications and in accordance with federal guidelines (see §1-103).

(d) ACM on detachment from the substrate is to be bagged directly or dropped onto a flexible catch basin and promptly bagged. Excess air in the bag shall be minimized and the bag shall be sealed. Non-hygroscopic materials shall not be dropped. ACM shall not be dropped from a height greater than 10 feet. Above 10 feet in height dust-free enclosed inclined chutes may be used. Vertical or near vertical chutes are prohibited. Maximum inclination from horizontal shall be 60 degrees.

(e) Large components removed intact that cannot be containerized shall be maintained wet, wrapped (minimizing excess air) in at least one layer of 6-mil polyethylene sheeting, and secured by sealing with tape.

(f) After completion of all stripping work, surfaces from which asbestos-containing materials have been removed shall be cleaned (e.g. wet-brushed and/or wet-cleaned) to remove all visible residue.

(g) After the work area has been rendered free of visible residues, a thin coat of a

pigmented (non-transparent) encapsulating agent shall be applied to all surfaces in the work area from which ACM was removed, to seal in nonvisible residue.

§1-103 Encapsulation Procedures. The following procedures shall be followed for the encapsulation of ACM:

(a) Damaged and/or missing areas of existing fireproofing or insulation materials shall be repaired with appropriate replacement materials. The replacement material shall adhere to existing surfaces and provide a base for application of encapsulating agents.

(b) Loose or hanging asbestos-containing materials shall be removed in accordance with the requirements of §1-102: "Disturbance, Handling, and Removal."

(c) Only pigmented (non-transparent) encapsulants shown to be ratable as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating requirements developed under the 1978 USEPA contract shall be used for encapsulation.

(d) The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

(e) Latex Paint with solids content greater than 15 percent may be used as an encapsulant only as follows:

(1) as a lockdown sealant for coating all non-metallic surfaces, or

(2) for sealing of cementitious ACM.

(f) Encapsulants shall be field tested prior to use by applying each to a small area to determine suitability of the material to be encapsulated.

(1) Testing is to occur only after the isolation barriers are in place.

(2) Testing shall be by the USEPA method specified in the appendix of "Guidelines for the Use of Encapsulants on Asbestos-Containing Materials" (June, 1981) or ASTM Standard Test Method E736-80. The encapsulated materials shall achieve a cohesive/adhesive strength of 100 lb/ft perpendicular to the surface.

(g) Application of bridging encapsulants over ACM shall provide the manufacturer's specified number of inches or minimum dry film thickness.

(h) A different color for each coat of encapsulant (per manufacturer's specifications) shall be used.

(i) Penetrating encapsulants shall be applied to penetrate existing asbestos-containing materials to the substrate. During treatment with a penetrating encapsulant, selected random core samples of the asbestos-containing materials shall be removed to check the depth of penetration. The resulting space shall be treated as outlined (in subdivision (a)) above and re-

encapsulated.

(j) Encapsulants shall be applied using airless spray equipment.

- (1) Spraying shall occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.
- (2) Each subsequent coat of encapsulant shall be applied at a right angle to the preceding coat application or per manufacturer's specifications.

(k) Encapsulated asbestos-containing materials shall be identified (e.g. using labels, signs or color coding) in order to warn building maintenance personnel in the event encapsulated materials must be disturbed.

(l) The following maintenance procedures are recommended:

- (1) A periodic inspection and maintenance program, consisting of an inspection at least annually to check for damage to all encapsulated surfaces. Recoating and repairs are to be performed according to procedures in this section.
- (2) Maintenance of records by the building owner, on the locations and condition of the encapsulated material and on alteration, renovation, modification, or other procedures that resulted in disturbance of the encapsulated material.
- (3) When conditions change and encapsulation is no longer an appropriate method, additional abatement methods should be conducted.

§1-104 Enclosure Procedures. The following procedures shall be followed for the enclosure of ACM:

(a) Loose and hanging asbestos-containing materials that may be disturbed during the installation of hangers or other support/framing materials for the enclosure shall be removed by wet methods in accordance with §1-102: "Disturbance, Handling, and Removal".

(b) After installation of hangers, brackets or other enclosure supports and before installation of enclosure materials, damaged areas of fireproofing/thermal insulation shall be repaired using a replacement material.

(c) Utilities' service components shall be lowered or removed as necessary and reinstalled in a manner which permits proper utilization and does not disturb the integrity of the enclosures.

(d) Enclosed asbestos-containing materials shall be identified (e.g., using a sign, label, or color coding) in order to warn building maintenance personnel in the event that the enclosure must be disturbed.

(e) The following maintenance procedures are recommended:

- (1) A periodic inspection and maintenance program, consisting of an inspection at least annually to check for damage to all enclosed surfaces. Re-enclosure and repairs are to be performed according to NYC Work Site Procedure regulations.
- (2) Maintenance of records by the building owner, on the locations and condition of the enclosed material and on alteration, renovation, modification, or other procedures resulting in disturbance of the enclosed material.
- (3) When conditions change and enclosure is no longer an appropriate method of asbestos abatement, additional abatement methods should be conducted.

§1-105 Glovebag Procedures. The following procedures shall be followed during the conduct of abatement activities:

(a) Glovebag procedures shall be done using commercially available glovebags of 6-mil clear plastic, appropriately sized for the project. Glovebags may not be shifted and shall not be moved from the initial surface to another surface, or reinstalled on the initial surface once removed.

(b) The glovebag procedure shall be performed in accordance with the following:

- (1) All necessary tools and materials shall be brought into the work area before the glovebag procedure begins.
- (2) Air monitoring shall be conducted in accordance with §§1-31 through 1-45.
- (3) Glovebag procedures shall be conducted by workers specifically trained in glovebag procedures and equipped with appropriate personal protective equipment.
- (4) The insulation diameter worked shall not exceed one half the bag working length above the attached gloves.
- (5) The ACM within the secured glovebag shall be wetted with amended water prior to stripping.
- (6) The bag shall be attached over duct tape which has been placed securely around the insulation, forming a smooth seal. The bag shall be securely attached to the insulation in a manner to prevent air transfer.
- (7) The integrity of the glovebag seal shall be smoke tested. The contents of the smoke tube shall be aspirated through the water port access sleeve of the bag.

After twist sealing the access sleeve, the bag shall be squeezed gently to check for leakage points which are then taped airtight.

- (8) If the insulation adjacent to the section which will be worked on is damaged, or if the insulation terminates or is jointed or contains an elbow adjacent to the work section, the adjacent insulation shall be wrapped in 6-mil polyethylene sheeting and sealed airtight with duct tape.
 - (9) After the insulation has been removed, the surface shall be sprayed with amended water and brush-scrubbed to remove all visible ACM. The surface, the interior of the bag, the insulation and the tools shall then be sprayed with amended water. The enclosed volume shall be misted and time allowed for the mist to settle out before breaking the seal to remove the glovebag.
 - (10) Any insulation ends created by this procedure shall be:
 - (i) sealed with encapsulant prior to bag removal, or
 - (ii) thoroughly wetted before bag removal and sealed with wettable cloth end caps and spray glue or any combination of these materials immediately following bag removal.
 - (11) The tool pouch shall be separated from the bag prior to disposal by twisting it and the wall to which it is attached several times, and taping the twist to hold it in place, thus sealing the bag and the pouch which are severed at the midpoint of the twist. Alternatively, the tools can be pulled through with one or both glove inserts, thus turning the gloves inside out. The glove(s) is/are then twist sealed forming a new pouch, taped and several mid-seal forming two separate bags.
 - (12) A HEPA vacuum shall be used for evacuation of the glovebag in preparation for removal of the bag from the surface for clean-up in the event of a spill, and for post project clean-up.
 - (13) With the glovebag collapsed and the ACM in the bottom of the bag, the bag shall be twisted several times and taped to seal that section during bag removal.
 - (14) A 6-mil plastic bag shall be slipped around the glovebag while it is still attached to the surface. The bag shall be detached from the surface by removing the tape or cutting the top with blunt scissors.
 - (15) The asbestos-containing waste, the clean-up materials, and protective clothing shall be wetted sufficiently, double-bagged minimizing air content, sealed separately, and disposed of in conformance with §§1-93 and 1-102 of this chapter.
- (d) Glovebag procedures which are large asbestos projects or part of a large asbestos project shall be conducted in accordance with all large asbestos project procedures.

§1-106 Tent Procedures. Tent Procedures shall be conducted as follows:

(a) Tent procedures shall be limited to the removal at any one time of less than 260 linear feet and 160 square feet of ACM and shall not result in disturbance of ACM during tent erection. Tent procedures may not be used as part of a large asbestos project except as provided for in section 1-81(e).

(b) Tent procedures shall be accomplished in a constructed or commercially available plastic tent, plasticizing and sealing all surfaces not being abated within the tent periphery forming an enclosure. The tent shall be of 6-mil PVC at a minimum, with seams heat-sealed, or double-folded, stapled and taped airtight and then taped flush with the adjacent tent wall. This is a single use barrier that shall not be reused once dismantled or collapsed.

(c) Asbestos handlers involved in the tent procedure shall wear personal protective equipment as specified in §1-51(c), plus a second disposable suit. All street clothes shall be removed and stored in a clean room within the work site. The personal protective equipment with two disposable suits shall be used for installation of the tent and throughout the procedure if a decontamination unit with a shower is not contiguous to the work area. If decontamination unit (with shower and clean room) is contiguous to the work area, only one disposable suit shall be required; in this case, prior to exiting the tent the worker shall HEPA vacuum and wet clean the disposable suit.

(d) The tent shall be attached to the surface to produce an airtight seal except for an appropriate section to allow for make-up air into the tent.

(e) Negative pressure ventilation equipment shall be used to continuously exhaust the enclosed area as specified under §1-91, Engineering Controls, except that the negative air pressure in §1-91(c) shall be demonstrated by smoke testing. The hose shall be attached securely and airtight through the tent wall at the most remote location possible from the ACM to be disturbed. A minimum of two volume changes per hour is required.

(f) Removal of ACM shall be by wet methods in accordance with §1-102.

(g) ACM removed shall be placed in a leak-tight container without dropping it.

(h) Upon completion of abatement, and prior to tent collapse, the enclosed surfaces shall:

(1) be wet cleaned using rags, mops or sponges; and

(2) be permitted sufficient time to dry, prior to HEPA vacuuming all substrates; and

(3) be lightly encapsulated to lockdown residual asbestos.

(i) Upon barrier disturbance, loss of engineering controls, or termination of tent usage, the tent and the enclosed surfaces shall be treated according to subdivision (h) above.

(j) The bagged waste shall be wet cleaned or HEPA vacuumed and then transferred outside the tent, double bagged, and appropriately handled prior to disposal.

(k) The outer disposable suit (if 2 suits are worn) shall be removed and remain in the tent upon exiting. Following tent disposal and work site cleanup the workers shall immediately proceed to a shower at the work site. The inner disposable suit and respirator shall be removed in the shower after appropriate wetting. The disposable clothing shall be disposed of as asbestos-containing waste material. The workers shall then fully and vigorously shower with supplied liquid bath soap, shampoo, and clean dry towels.

(l) The negative pressure ventilation equipment shall be used to filter a minimum of 6 volume changes through the tent after completion of abatement but prior to collapse of the tent/barrier. All required air monitoring must be successfully completed before the tent/barrier is collapsed.

(m) The tent shall be collapsed inward, enclosing the contaminated clothing. This contaminated material shall be disposed of in another plastic bag. The HEPA vacuum shall be decontaminated and sealed.

Part 5

Clean-up Procedures

§1-111 Preliminary Clean-up Procedures

§1-112 Additional Clean-up Procedures (Final)

§1-111 Preliminary Clean-up Procedures. The following clean-up requirements shall be followed during the conduct of abatement activities on large asbestos projects:

- (a) (1) Visible accumulations of loose asbestos-containing waste material shall be cleaned up:
 - (i) whenever sufficient asbestos-containing waste material to fill a single leak-tight container of the type commensurate with the properties of asbestos-containing waste material has been removed, or
 - (ii) at the end of each work shift, whichever shall occur first. Visible material shall be maintained wet until cleaned up.
- (2) Visible accumulations of asbestos-containing waste material shall be containerized utilizing non-metallic dust pans and non-metallic squeegees or HEPA vacuums.
- (3) Metal shovels shall not be used to pick up or move accumulated asbestos-

containing waste material or any other debris in the vicinity of isolation or surface barriers.

(b) Accumulations of dust shall be cleaned off all surfaces of the work area on a daily basis, using HEPA vacuum or wet cleaning methods.

(c) The waste decontamination enclosure system shall be wet cleaned twice using wet cleaning methods upon completion of waste removal. When the worker decontamination enclosure shower room alternates as a waste container wash room, the shower room shall be washed immediately with cloths or mops saturated with a detergent solution prior to wet cleaning.

(d) The worker decontamination enclosure system shall be wet cleaned/HEPA vacuumed, as appropriate, after each shift change and meal break.

(e) Excessive water accumulation or flooding in the work area shall require work to stop until the water is collected and disposed of properly.

(f) Spillage of asbestos-containing waste material in an elevator shaft shall require:

- (1) immediate evacuation, shut down and isolation of all elevators in the affected elevator bank, and
- (2) containerization of all spilled visible accumulations of asbestos-containing waste material from within the elevator car and shaft, and
- (3) HEPA vacuuming/wet cleaning of the contaminated surfaces in the elevator car and shaft in repetitive cycles until clearance air levels are achieved, and
- (4) one air sample to be taken at each terminus of the shaft to be analyzed by PCM on a continuing basis until clearance air levels are achieved.

§1-112 Additional Clean-up Procedures (Final). Additional clean-up procedures shall be performed in the order set forth below prior to commencement of clearance air monitoring.

(a) After removal of visible accumulations of asbestos-containing waste material, a HEPA vacuuming shall be performed on all surfaces. To pick up excess water and gross saturated debris, a wet-dry shop HEPA vacuum, dedicated to asbestos abatement, may be used.

(b) All surfaces in the work area shall be wet cleaned (first cleaning).

(c) The cleaned layer of the surface barriers shall be removed from walls and floors. The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized.

(d) After the first cleaning, the work area shall be vacated for 12 hours to allow fibers to settle. Then, all objects and surfaces in the work area shall be HEPA vacuumed and wet cleaned a second time. The remaining plastic surface barriers shall be removed, while the isolation barriers shall remain in position.

(e) After the second cleaning, the work area shall be vacated for 4 hours before wet cleaning and/or HEPA vacuuming all surfaces in the work area for a third cleaning.

(f) As a prerequisite to commencement of clearance air monitoring, a thorough visual inspection shall verify the absence of asbestos-containing waste material (e.g. dust).

(g) All containerized waste shall be removed from the work area through the decontamination enclosures and the holding area.

(h) All tools and equipment shall be removed from the work area and decontaminated in the waste decontamination enclosure system. Cloths, mops, and other cleaning aids shall be disposed of as asbestos-containing waste material.

(i) After successful clearance air monitoring (see §1-31 et seq.), the isolation barriers shall be removed in conjunction with the use of a HEPA vacuum.

Subchapter G

Pre-Demolition Abatement Activity Procedures

- 1 Applicability**
- 2 Work Procedures**

Part 1

Applicability

§1-120 Applicability of Regulations to Pre-Demolition Abatement Activities

§1-120 Applicability of Regulations to Pre-Demolition Abatement Activities. The following regulations shall apply to pre-demolition abatement activities:

§§1-01 through 1-61	General Regulations
1-82	Worker Decontamination Enclosure System
1-83	Waste Decontamination Enclosure System
1-91 through 1-94	Work Place Procedures
1-102	ACM Disturbance, Handling and Removal Procedures
1-105	Glovebag Procedure
1-106	Tent Procedure

Part 2

Work Procedures

§1-125 Work Area Preparation

§1-126 ACM Procedures: Order of Work

§1-127 Lockdown Encapsulation Procedures

§1-128 Clean-up Procedures during Abatement

§1-129 Clean-up Procedures: Preparation for Clearance Air Monitoring

§1-125 Work Area Preparation. The following work area preparation shall be followed during the conduct of pre-demolition abatement activities:

(a) Prior to the start of abatement activities, the building owner or designated representative shall post a general notification at all main entrances to the structure. Postings of this notification shall be in English and Spanish, at eye level in a conspicuous well-lit place that can be viewed by the public without obstruction. Information provided in the notification shall include contractor, project location, that the project is regulated by NYC DEP, and the NYC DEP Asbestos Control Program telephone number. The notice shall have the following heading: NOTICE OF ASBESTOS ABATEMENT, in a minimum of 2 inches sans serif, gothic or block style lettering, with the balance of the lettering of the notice to be of the same type lettering in a minimum of 1 inch size. The notification shall be posted throughout all abatement activities.

(b) The building shall be vacated prior to the start of abatement activities.

(c) Electric power to all work areas shall be shut down and locked out. Safe temporary power and lighting shall be provided in accordance with all applicable NYC Code(s) and Regulations. All power to a work area shall be brought in from outside the area through ground-fault interrupter at the source.

(d) The worker decontamination enclosure system shall be installed or constructed prior to plasticizing the work area and before disturbing ACM. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement. The area in which these systems are located shall require HVAC system isolation and plasticizing of electrical outlets and equipment that are within 6 inches of floor level.

(e) Heating, Ventilation and Air Conditioning (HVAC) System shall be shut down and locked out. Isolation barriers shall be installed to prevent interior duct work contamination.

(f) Abatement shall not commence until work place preparation has been completed.

(g) Methods that raise dust, such as sweeping or vacuuming with equipment not equipped with HEPA filters, are prohibited.

(h) Objects which can be removed from the work area prior to abatement without disturbing friable ACM shall be pre-cleaned using HEPA-filtered vacuum equipment and/or wet cleaning.

(i) The isolation barriers (i.e. sealing off of all openings, including but not limited to windows, corridors, doorways, barriers, skylights, ducts, grills, diffusers, and any other penetrations of the work areas) shall be installed with 2 layers of 6-mil plastic sheeting separately sealed with tape. All seams of HVAC or other system components that pass through the work area shall also be sealed. Chimney effects in stacks, columns, flues, shafts, double-walled enclosures, etc., that impact the work area, shall be eliminated by sealing the accesses with solid material covered with a double layer of 6-mil plastic sealed with tape.

(j) Cinderblock and porous construction materials shall be covered with one layer of 6-mil plastic sheeting, sealed at edges and seams.

(k) Flooring within the work area shall be water-tight.

(l) Suspended ceiling tiles and T-grid components in proximity to friable ACM shall remain in place until the work area has been fully prepared as outlined in this section and electrical and HVAC systems have been shut down. Contaminated suspended ceiling components shall be removed prior to abatement and treated with a penetrating encapsulant.

(m) Emergency and fire exits from the work areas shall be maintained, or alternative exits shall be established in accordance with applicable NYC Code(s) and regulations. Exits shall be checked daily against exterior blockage or impediments to exiting.

(n) Entrances to the work area that will be used for worker entry or emergency exits shall be locked against unauthorized entry.

(o) Elevators running through the work area shall conform to the following:

(1) The elevator door in the work area shall be enclosed with conventional 2 x 4 stud framing, covered with $\frac{3}{8}$ " plywood sheeting and sealed at all edges and seams. The barrier shall be covered and lapped for 8 inches with two layers of 6-mil plastic sheeting adhered individually with edges taped for airtightness.

(2) Elevators not remaining in service shall have the fuses removed and the power switch locked in the open position.

(3) Elevators that remain in service shall conform to the following additional procedures to minimize the piston effect that results:

(i) Elevator control shall be modified to bypass the work area.

(ii) A final larger layer of 6-mil plastic sheeting is to be taped airtight but with

slack forming a larger perimeter diaphragm. Air leakage across the barrier shall be corrected upon discovery, and the elevator shaft shall be checked for airborne asbestos contamination.

(iii) This system shall be smoke tested daily.

(4) Elevator shafts shall not be used as waste chutes for asbestos-containing waste material.

(p) Adequate toilet facilities shall be provided in the vicinity of the clean room external to the work place. Where such facilities do not exist, portable service shall be provided.

§1-126 ACM Procedures: Order of Work. If ACM throughout the structure is not removed prior to start of the demolition work approved by the New York City Buildings Department Demolition Permit, the following Order of Work (schedule) shall be followed for abatement activities conducted in connection with a demolition.

Only after the ACM has been completely removed from the top three floors of the structure to be demolished may the topmost floor be demolished subject to the following limitations:

(a) None of the demolition activities shall compromise in any way ACM abatement being done on lower floors.

(b) None of the chutes or other procedures used to remove the demolition debris shall be routed through areas which are in the process of having ACM removed, or have been prepared for abatement of ACM.

(c) Demolition workers shall proceed through uncontaminated areas when approaching and leaving the areas where demolition is being performed. If the demolition workers must pass through the work area, passage-ways with appropriate air locks, through the area where ACM is being abated shall be provided to allow the demolition workers to approach and leave the area where demolition is being conducted.

(d) As ACM is removed from succeeding floors, additional floors may be demolished as long as ACM abatement is always maintained at least two floors below the level at which demolition is being conducted, until all the ACM has been removed.

(e) Removal of ACM from levels below street level may be done simultaneously with ACM removal from upper floors. However, when below street level abatement is conducted, ACM shall always be removed from the lowest floor first before ACM is removed from higher elevation floors.

(f) The street level floor shall be the last floor from which ACM is removed.

§1-127 Lockdown Encapsulation Procedures. The following procedures shall be followed to seal in nonvisible residue while conducting lockdown encapsulation on all surfaces from which ACM removed:

(a) Only encapsulants rated as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating requirements developed under the 1978 USEPA contract shall be used for lockdown encapsulation.

(b) The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon unless reviewed and approved by DEP.

(c) Latex paint with solids content greater than 15 percent shall be considered a lockdown sealant for coating all non-metallic surfaces.

(d) Encapsulants shall be applied using airless spray equipment. Spraying is to occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.

§1-128 Clean-up Procedures during Abatement. The following clean-up procedures shall be followed during conduct of pre-demolition abatement:

(a) (1) Visible accumulations of loose asbestos-containing waste material shall be cleaned up:

(i) whenever sufficient asbestos-containing waste material to fill a single leak-tight container of the type commensurate with the properties of asbestos-containing waste material has been removed, or

(ii) at the end of each work shift whichever shall occur first. Visible material shall be maintained wet until cleaned up.

(2) Visible accumulations of asbestos-containing waste material may be containerized utilizing rubber dust pans and rubber squeegees or HEPA vacuums. Metal shovels may also be used EXCEPT in the vicinity of isolation or surface barriers which could be perforated by these tools.

(b) Accumulations of dust shall be cleaned off all surfaces of the work area on a daily basis, using HEPA vacuum or wet cleaning methods.

(c) The waste decontamination enclosure system shall be wet cleaned twice using wet cleaning methods upon completion of waste removal. When the worker decontamination enclosure shower room alternates as a waste container wash room, the shower room shall be washed immediately with cloths or mops saturated with a detergent solution prior to wet cleaning.

(d) The worker decontamination enclosure system shall be wet cleaned/HEPA vacuumed, as appropriate, after each shift change and meal break.

(e) Excessive water accumulation or flooding in the area shall require work to stop until the water is collected and disposed of properly.

(f) Spillage of asbestos-containing waste material in an operating elevator shaft shall require:

- (1) immediate evacuation, shut down and isolation of all elevators in the affected elevator bank, and
- (2) containerization of all spilled visible accumulation of asbestos-containing waste material from within the elevator car and shaft, and
- (3) HEPA vacuuming/wet cleaning of the contaminated surfaces in the elevator car and shaft in repetitive cycles until clearance air levels are achieved, and
- (4) one air sample to be taken at each terminus of the shaft to be analyzed by PCM on a continuing basis until clearance air levels are achieved.

§1-129 Clean-up Procedures: Preparation for Clearance Air Monitoring. The following final clean-up procedures for pre-demolition abatement shall be performed prior to commencement of clearance air monitoring:

(a) All visible accumulations of asbestos-containing waste material shall be removed and containerized. Metal shovels may be used to pick up or move accumulated waste EXCEPT in the vicinity of plastic sheet isolation and surface barriers which could be perforated by these tools. The areas around the plastic sheet isolation barriers shall be cleaned of visible accumulations utilizing rubber dust pans and rubber squeegees. To pick up excess water and gross wet debris, a wet-dry shop HEPA vacuum dedicated to asbestos abatement may be used.

(b) All containerized waste shall be removed from the work area through the decontamination enclosures and the holding area.

(c) All surfaces in the work area shall be wet cleaned using rags or mops. After allowing sufficient time for drying of the work area, HEPA vacuums shall be used to thoroughly clean all surfaces after gross clean-up.

(d) Where porous construction materials or cinder block-like materials have been plasticized for surface barrier containment, the plastic sheeting shall be cleaned as in subdivision (c) above, then sprayed with an encapsulant and removed when dry.

(e) All surfaces in the work area shall be sprayed with an encapsulant, which upon

drying will not dissolve upon rewetting. Sufficient time for drying shall be allowed.

(f) All tools and equipment shall be removed from the work area and decontaminated in the equipment decontamination enclosure system.

(g) After successful clearance air monitoring (see §1-71 et seq.) the isolation barriers shall be removed in conjunction with the use of a HEPA vacuum.

**Large Asbestos Project
(Small Asbestos Project Option)
Worker Decontamination Enclosure System**

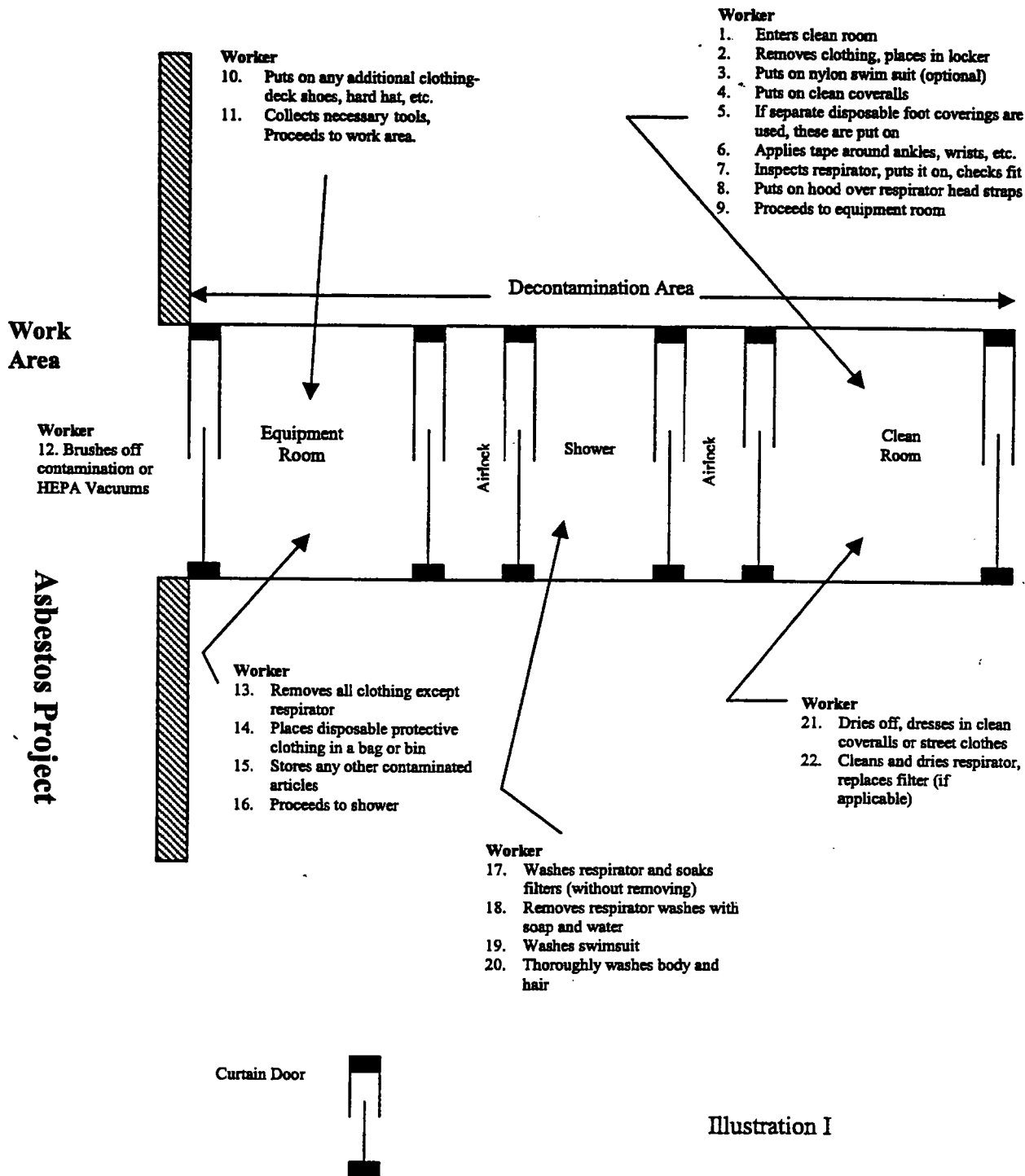
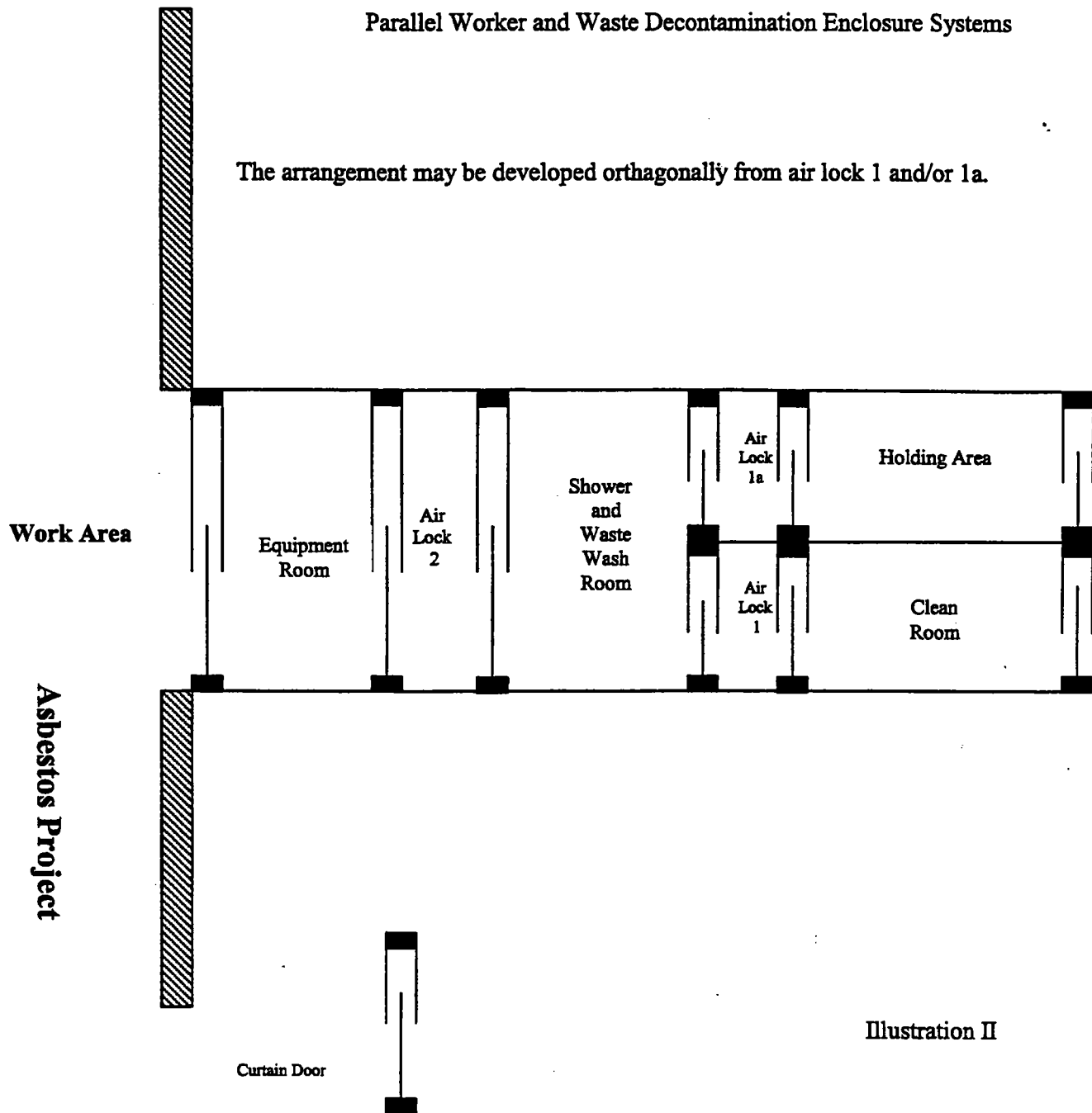


Illustration I

Large Asbestos Project

Parallel Worker and Waste Decontamination Enclosure Systems

The arrangement may be developed orthogonally from air lock 1 and/or 1a.



Large Asbestos Project
(Small Asbestos Project Option)
Waste Decontamination Enclosure System

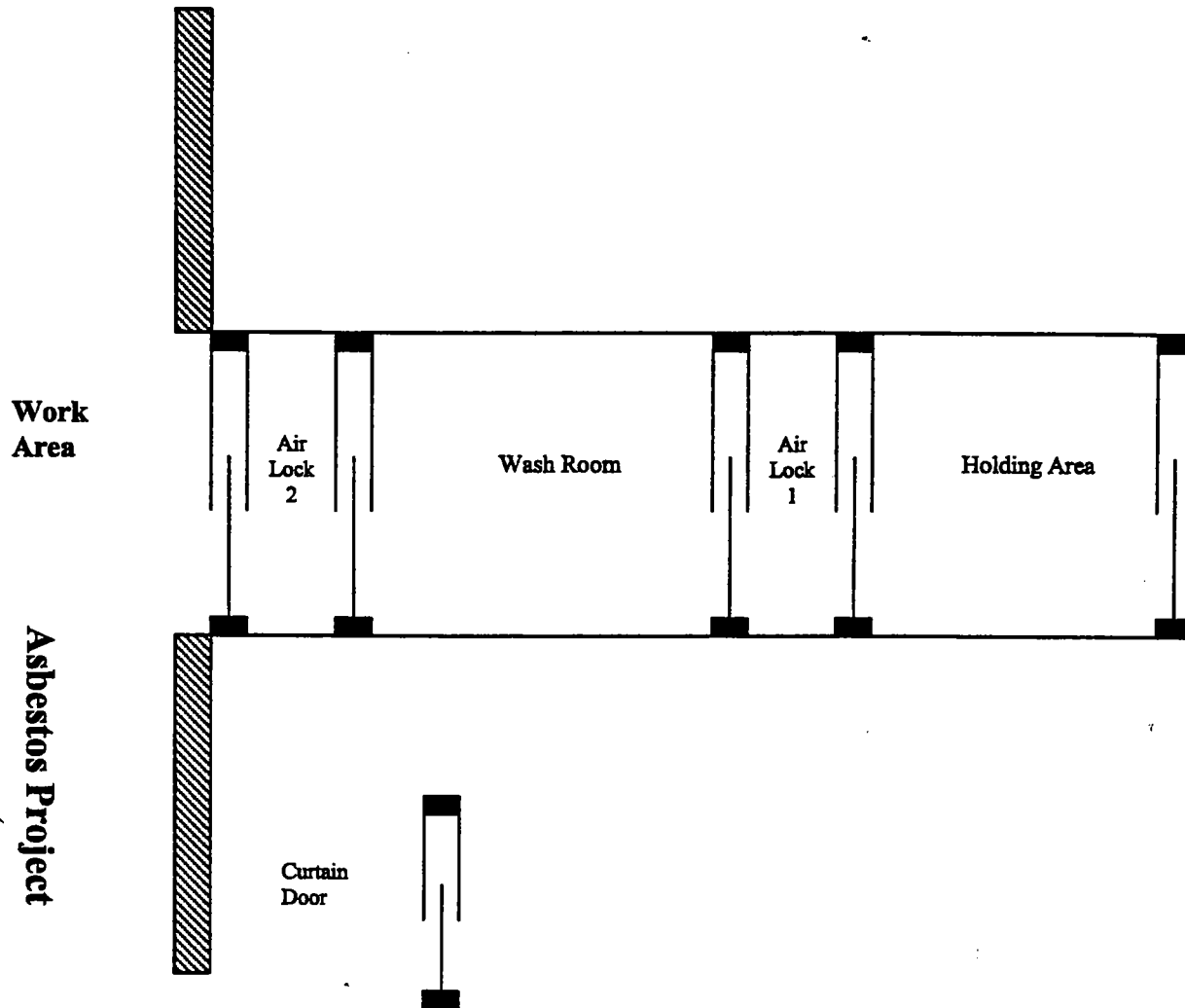
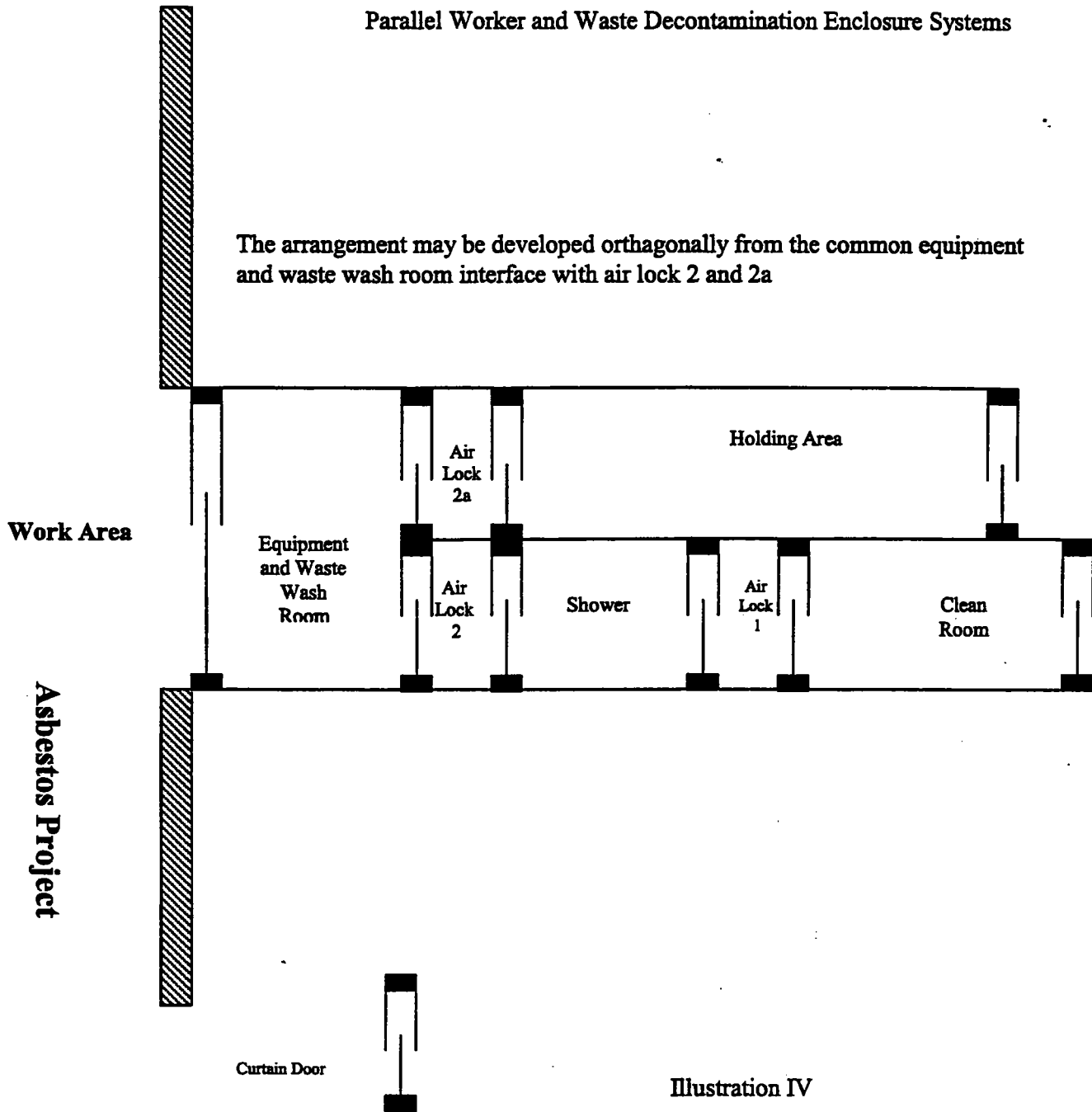


Illustration III

Large Asbestos Project
(Small Asbestos Project Option)

Parallel Worker and Waste Decontamination Enclosure Systems

The arrangement may be developed orthogonally from the common equipment and waste wash room interface with air lock 2 and 2a



NEW YORK ENVIRONMENTAL LAW & JUSTICE PROJECT

Member of the Clean Water Network, National Coalition Against the Misuse of Pesticides, National Lawyers Guild

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Kimberly Flynn, Policy Analyst
Diane Van Dyke, Office Coordinator

web: www.nyenvirolaw.org

Re:

DOCUMENTS (partial)
OBTAINED FROM
FREEDOM OF INFORMATION LAW (FOIL) REQUEST
from
NYC Department of
Environmental Protection

Requested : September 24, 2002
- Procured in person on February 5, 2003 -

Please contact JOEL R. KUPFERMAN
for preliminary analysis
February 10, 2003

NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
(212) 627-3900 www.nycosh.org



**Department of
Environmental
Protection**

59-17 Junction Boulevard
Corona, New York
11368-5107

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

**Robert C. Avaltroni
Deputy Commissioner**

**Bureau of
Environmental Compliance**
Tel (718) 595-4418
Fax (718) 595-4422

February 12, 2002

West Chamson Corp. c/o Andrews Building Corp.
666 Broadway
New York, NY 10012

Subject: 139 CHAMBERS STREET
141 Chambers St

ONE HUDSON STREET

Dear Sir/ Madam:

In September 2001, the New York City Department and Environmental Protection (NYC DEP) and the Department of Health (NYC DOH) advised building owners regarding building maintenance and re-occupancy issues following the collapse of the World Trade Center. The steps included the professional assessment of building contamination for possible hazardous components, including asbestos, and a retrospective filing, as required, if applicable.

The NYC DEP is hereby requesting copies of the environmental hazard assessments including bulk sample results and air monitoring results and a summary of clean-up activities at the above referenced site. Please forward the requested documents to our offices within FIVE BUSINESS DAYS. They may be faxed to (718) 595-3744 or sent to the NYC DEP Asbestos Control Program at 59-17 Junction Boulevard, 8th floor, Corona, New York 11373-5108.

Please be advised building owners are responsible for the cleaning of building exteriors, grounds, and common areas. Due to changing conditions and continued activity at Ground Zero, building owners should periodically assess the condition of building exteriors and air conditioning systems for cleanliness and may have to periodically re-clean areas. Adherence to proper cleaning methods is important for the protection of public health and the environment. DEP inspectors will be following up on this matter.

If you have any questions, you may reach the Department at (718) 595-3682 during office hours or the 24-hour Help Center at (718) DEP-HELP. DEP staff is available to provide guidance and technical assistance.

Sincerely,

R. Radhakrishnan
R. Radhakrishnan, P.E.
Director
Asbestos Control Program



(718) DEP-HELP



Department of
Environmental
Protection

59-17 Junction Boulevard
Corona, New York
11373-5107

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

February 23, 2002

NYC BOE

Subject: 292 GREENWICH STREET
PS234M
Second Notice

Dear Sir/ Madam:

This is a follow-up to the NYC DEP request for copies of the environmental hazard assessments including bulk sample results and air monitoring results and a summary of clean-up activities at the above referenced site. To date, our office has not received the requested documents and information. They may be faxed to (718) 595-3744 or sent to the NYC DEP Asbestos Control Program at 59-17 Junction Boulevard, 8th floor, Corona, New York 11373-5108.

Please be advised building owners are responsible for the cleaning of building exteriors, grounds, and common areas. Due to changing conditions and continued activity at Ground Zero, building owners should periodically assess the condition of building exteriors and air conditioning systems for cleanliness and may have to periodically re-clean areas. Adherence to proper cleaning methods is important for the protection of public health and the environment. DEP inspectors will be following up on this matter.

If you have any questions, you may reach the Department at (718) 595-3682 during office hours or the 24-hour Help Center at (718) DEP-HELP. DEP staff is available to provide guidance and technical assistance.

Sincerely,

R. Radhakrishnan, P.E.
Director
Asbestos Control Program



FAIR: DEP-HELP

Asbestos Air and Bulk Sampling Results Submitted by Building Owners

ADDRESS	AKAs	Building Owner	Bulk (-)	Bulk (+)	PCM 50.01 l/cc	PCM 0.01 l/cc	TEM 570 s/min	TEM 70 s/min
15 MAIDEN LANE	28 Gold Street	Federal Reserve Bank	Yes	8	0	0	11	0
101 MAIDEN LANE	201-203 Pearl Street	Collins ABR as Agent for 101 Maiden LLC, Attn: Caroline Malloy	Yes	8	0	0	11	0
180 MAIDEN LANE	90-100 Pine St, 71 South St., 73 South St.	Maiden Lane LP c/o Paramount Group Inc.	Yes	7	1	25	0	0
17 MURRAY STREET	9 - 16 Murray Street	Murray Street Realty Associates LTD. c/o Kellogg Prop Inc.				66	0	5
19 MURRAY STREET		Refier Properties c/o Sara Weiss	Yes	5	0	0	4	0
59 MURRAY STREET	61 15 West Broadway, 100 Rector St., 82 Rector St., 78 West Broadway, 97 Murray Street	Murray Warren Associates LLC c/o Mr. Palestine	Yes	8	6	49	0	19
71 MURRAY STREET		69 Murray Housing Corp.	Yes	8	6	49	0	19
77 MURRAY STREET		Gallmar Property Management	Yes	8	6	49	0	19
156 NASSAU STREET		New York City Transit Authority	Yes	53	0			25
105 NASSAU STREET	53 Maiden Lane, 29-39 Maiden Lane/32-40 John St, 1 Federal Reserve Plaza	Miles LLC c/o Andrews Building Corporation	Yes	4	1	Yes	11	0
124 NASSAU STREET	29 Ann Street	Mr. Arnold Schwartz c/o Franc-Men Realty Co.	Yes	9	0			117
154 NASSAU STREET	1 Pace Plaza/1-41 Spruce St/87-103 Gold	Pace University c/o Compitrolers	Yes	4	0			0
1 NORTH END AVENUE	4 River Terrace, 60 Vesey Street	Battery Park City						
102 NORTH END AVENUE	Embassy Suites	BPC HOTEL LLC	Yes	26	0	Yes	0	40
450 NORTH END AVENUE	Tribeca Bridge Tower	Fribess North End LLC c/o Glenwood Management Corp.	Yes	5	0			0
19 PARK PLACE	The Landmark	Department of Business Services c/o Bob Henning, Director of Engineering, The National	Yes	5	0			0
22 PARK PLACE	16 Murray Street	Lee Tal Enterprises USA Ltd. c/o Kenneth N. DeFilippo	Yes	59	10	Yes	162	150
33 PARK PLACE	WOODWORTH BLDG.	233 Broadway Owners LLC	Yes	72	8	Yes	602	9
53 PARK PLACE	110 Church Street, 50 Murray Street	Lionhead 110 Development LLC	Yes	4	3	Yes	3	0
1 PARK ROW	60-62 Murray Street/41-51 West Broadway	53 Park Place LLC c/o ZAR Realty Mgmt. Corp.	Yes	4	4	Yes	12	0
23 PARK ROW	1-11 Ann St	Building Owner/Management	Yes	4	4	Yes	18	5 PCM f/u
29 PARK ROW	5 Theater Alley	Rachel Friedensohn	Yes	4	2	Yes	10	0
31 PARK ROW	7 Theater Alley	Weinstein & Holtzman, Inc.	Yes	4	4	Yes	10	0
33 PARK ROW	32 Park Row, 9 Theater Alley	J & R Electronics Inc.	Yes	4	4	Yes	10	0
41 PARK ROW		Shorvorn Assoc. Inc. c/o Mr. Allen Steinberg	Yes	4	4	Yes	10	0
41 PARK ROW		Pace University c/o Compitrolers	Yes	4	4	Yes	10	0
1 PECK SLIP	1 Pace Plaza	Pace University c/o Compitrolers	Yes	4	4	Yes	10	0
99 PINE STREET	Pack Slip Post Office, 1-19 Peck Slip	US Postal Service	Yes	4	4	Yes	11	0
200 RECTOR PLACE	135-153 Water St, 136-154 Front St, 138-144 Maiden Lane	Orient Overseas Assoc. c/o Cushman & Wakefield, Inc.	Yes	15	2	Yes	116	0
225 RECTOR PLACE	Liberty Court	Milford Management Corp.	Yes	8	3	Yes	0	9
260 RECTOR PLACE	210 South End Avenue	Battery Park City Alhry	Yes	5	1	Yes	169	4
333 RECTOR PLACE	295 West Thomas Street, The Soundings	Soundings Condominiums c/o Brown Harris, Stevens Management	Yes	5	1	Yes	4	85
377 RECTOR PLACE	213-315 South End Avenue, 327 Rector Place	Rockrose Dlpmnt Corp	Yes	7	0	Yes	230	0
380 RECTOR PLACE	Liberty House	Milford Management Corp.	Yes	9	1	Yes	0	8
2 RECTOR STREET	56-66 Trinity Place, 91-101 Greenwich St	Liberty Terrace Condo	Yes	3	0	Yes	74	0
19 RECTOR STREET	88 Greenwich St., 82-92 Greenwich Street, 67-97 Washington St	Rector Trinity Associates c/o Stellar Mgmt. Co.	Yes	4	0	Yes	0	300
		Black Diamonds LLC	Yes	4	0	Yes	2	0

Asbestos Air and Bulk Sampling Results Submitted by Building Owners

2

ADDRESS	AKAS	Building Owner	Bulk (+)	Bulk (-)	Bulk (+)	PCM >0.01 f/cc	PCM <0.01 f/cc	TEM <70 f/min	TEM >70 f/min
79 BROADWAY		Cedar Management Corp.	Yes	2	0	Yes	5	0	0
92 BROADWAY		Colligate Church Corp.	Yes	30	4	Yes	0	0	15
96 BROADWAY		118 NYC Real Estate LLC c/o Gary Trimarchi	Yes			Yes	0	0	0
98 BROADWAY		Colligate Church Corp.	Yes			Yes	0	0	0
104 BROADWAY		Colligate Church Corp.	Yes			Yes	0	0	0
117 BROADWAY		Columbus Properties Inc.	Yes			Yes	0	0	0
125 BROADWAY		225 Broadway Associates	Yes			Yes	0	0	0
133 BROADWAY		233 Broadway Owners LLC	Yes			Yes	0	0	0
140 BROADWAY		250 Broadway Associates Corp. Attn: Nathan Abel	Yes			Yes	0	0	0
150 BROADWAY		270 Broadway Associates	Yes			Yes	0	0	0
170 BROADWAY		299 Broadway LLC c/o Gimstead Properties Inc.	Yes			Yes	0	0	0
185 BROADWAY		District Counsel 37B	Yes			Yes	0	0	0
188 BROADWAY		R. Schwinmer	Yes			Yes	0	0	0
195 BROADWAY		Dedertan Export Corp. Attn: Paul Esposito	Yes			Yes	0	0	0
201 BROADWAY		West Chanson Corp. c/o Andrews Building Corp.	Yes			Yes	0	0	0
207 BROADWAY		Almark Holding Co.	Yes			Yes	0	0	0
211 BROADWAY		Eastlite Corp. c/o Arnold S. Warwick & Co., Ltd	Yes			Yes	0	0	0
215 BROADWAY		CUNY	Yes			Yes	0	0	0
219 BROADWAY		New York City Board of Education c/o Bernie Oden, Dir. Em. Health & Safety	Yes			Yes	0	0	0
223 BROADWAY		Related Management Company, L.P.	Yes			Yes	0	0	0
227 BROADWAY		Century 21 Inc.	Yes			Yes	0	0	0
231 BROADWAY		Boston Properties	Yes			Yes	0	0	0
235 BROADWAY		100 Church LLC, ZAR Realty Mgmt.	Yes			Yes	0	0	0
239 BROADWAY		Moody's Investment Services	Yes			Yes	0	0	0
243 BROADWAY		New York Law School	Yes			Yes	0	0	0
247 BROADWAY		50 Fulton Associates c/o Balwin Realities	Yes			Yes	0	0	0
251 BROADWAY		Murray Hill Properties c/o Abe New, Building Manager	Yes			Yes	0	0	0
255 BROADWAY		Sakelo Brothers, LLC	Yes			Yes	0	0	0
259 BROADWAY		CDL (NY) Limited LP DBA The Millenium Hillion	Yes			Yes	0	0	0
263 BROADWAY		Tribeca Equity Partners LP c/o Related Management Company, L.P.	Yes			Yes	0	0	0
267 BROADWAY		Building Owner/Management	Yes			Yes	0	0	0
271 BROADWAY		Old Slip Associates LP	Yes			Yes	0	0	0
275 BROADWAY		St. Margaret's House	Yes			Yes	0	0	0
279 BROADWAY		G & K Properties	Yes			Yes	0	0	0
283 BROADWAY		Pace University	Yes			Yes	0	0	0
287 BROADWAY		Wall Street Suites LLC	Yes			Yes	0	0	0
291 BROADWAY		Colligate Church Corp. Attn: D. Rivnar	Yes			Yes	0	0	0
295 BROADWAY		Southbridge Towers Inc. c/o PRC Management	Yes			Yes	0	0	0

obtained by NY ENV. LAW JUSTICE PROJECT.

Asbestos Air and Bulk Sampling Results Submitted by Building Owners

ADDRESS	AKAS	Building Owner	Bulk (c)	Bulk (+)	Alt	PCM ≤0.01 f/cc	PCM >0.01 f/cc	TEM ≤70 f/min	TEM >70 f/min
10 GOLD STREET	50 Beekman Street, Building #7	Southbridge Towers Inc. c/o PRC Management	Yes	3	0	Yes			0
10 GOLD STREET	100 Beekman Street, Building #9	Southbridge Towers Inc. c/o PRC Management	Yes	3	0	Yes			0
10 GOLD STREET	Building #1	Southbridge Towers Inc. c/o PRC Management	Yes	3	0	Yes			0
10 GOLD STREET	280 Pearl Street, Building #2	Southbridge Towers Inc. c/o PRC Management	Yes	3	0	Yes			0
10 GOLD STREET	77 Follen Street, Building #2	Southbridge Towers Inc. c/o PRC Management	Yes	3	0	Yes			0
10 GOLD STREET	60 Gold Street, Building #3	Southbridge Towers Inc. c/o PRC Management	Yes	3	0	Yes			0
10 GOLD STREET	60 Beekman Street, Building #3	Southbridge Towers Inc. c/o PRC Management	Yes	3	0	Yes			0
10 GOLD STREET	332 Pearl Street, Building #8	Southbridge Towers Inc. c/o PRC Management	Yes	3	0	Yes			0
33 GREENWICH STREET	42-48 Trinity Place	Southbridge Towers Inc. c/o PRC Management	Yes	3	0	Yes			0
102 GREENWICH STREET	104 Greenwich Street	102-104 Greenwich Street	Yes	1	11	Yes	32	1	12
110 GREENWICH STREET	2 Carlisle St	110 Greenwich St Assoc., LLC c/o Lakobson Properties, LLC	Yes	1	11	Yes	174	1	10
114 GREENWICH STREET	2 Albany St, 1 Carlisle St, 114-120 Greenwich St	120 Greenwich Development Associates, LLC	Yes	8	0	Yes	16	2	0
126 GREENWICH STREET	18-22 Thomas Street, 129 Greenwich St	American Stock Exchange Inc.	Yes	15	0	Yes	0	0	13
282 GREENWICH STREET	PR234M, 292 Greenwich Street	New York City Board of Education c/o Denise Orfan, Dir. Env. Health & Safety	Yes	15	0	Yes	0	0	85
310 GREENWICH STREET	80 North Moore Street/Independence Plaza	Hudson River Management LLC							0
310 GREENWICH STREET	40 Harrison Street/Independence Plaza	Hudson River Management LLC							0
310 GREENWICH STREET	Independence Plaza	Hudson River Management LLC							0
310 GREENWICH STREET	PS150M	Hudson River Management LLC							0
51 HARRISON STREET	Independence Plaza	New York City Board of Education c/o Denise Orfan, Dir. Env. Health & Safety							0
17 JOHN STREET	17 John Street LLC c/o Metro	17 John Street LLC c/o Metro							0
45 JOHN STREET	1-5 Dutch Street	Collegiate Church							0
60 JOHN STREET	59 Maiden Lane, 41-65 Maiden Lane/ 85-105 William Street	59 Maiden Lane Associates c/o Newmark & Co. Real Estate							0
80 JOHN STREET	19-25 Gold Street, 25-27 Platt Street	WSA Equities LLC c/o Fredric Oliver							0
85 JOHN STREET	27-31 Gold Street	Henry 85 LLC c/o Kibai Management	Yes	5	0	Yes	0	0	10
100 JOHN STREET	15-23 Platt Street, 20-24 Gold Street	Mazal Group A Limited LIA Co. c/o General Real Estate Co.	Yes	5	0	Yes	92	6	20
99 JOHN STREET		Rockrose Development Corp.							0
101 JOHN STREET	111 John Street, 103-119 John St, 239-241 Pearl St, 2-16 Cliff St	111 John Realty Corp.							0
116 JOHN STREET	1 Platt St, 114-120 John Street	MacLands Inter/ Etc. c/o Williamson, Pickett, Gross, Inc.							0
127 JOHN STREET	200 Water Street, 240-266 Pearl St, 182-202 Water St, 32	127 John Street Realty LLC A Singer c/o Rockrose	Yes	95	0	Yes	174	0	0
LIBERTY PLAZA	309 Broadway, 149-171 Broadway, 1-15 Church St, 1-27 Cordans	WFP One Liberty Plaza Co LP	Yes	87	0	Yes	216	0	54
13 LIBERTY STREET	44 Maiden Lane, 28-42 Maiden Lane, 42-54 Nassau St, 79-83 William Street	Federal Reserve Bank	Yes	9	0	Yes	12	0	0
57 LIBERTY STREET		Pennegranate Properties, Inc. c/o Ron Shostany	Yes	9	0	Yes			0
125 LIBERTY STREET	125 Cedar Street	120 LIBERTY ST. LLC	Yes	23	3	Yes			0
200 LIBERTY STREET	1 World Financial Center	WFP Tower A Co LP c/o Olympia & York	Yes	218	1	Yes	898	369	1315
125 LIBERTY STREET	2 World Financial Center	Olympia & York Tower B Company	Yes	20	3	Yes	61980	20	31975
15 MAIDEN LANE	18 John Street	Relide Realty Co. c/o Heller Properties	Yes	32	2	Yes			0
75 MAIDEN LANE	9-11 Gold Street	75 Maiden Lane LLC c/o Jack Constantine							0
80 MAIDEN LANE	13-27 Cedar Street	80 Maiden Lane LLC c/o The Wilkoff Group							0

Asbestos Air and Bulk Sampling Results Submitted by Building Owners

ADDRESS	AKAs	Building Owner	Bulk (-)	Bulk (+)	PCM 50.01 f/cc	PCM 0.01 f/cc	TEM 570 u/min	TEM >70 u/min
10 RECTOR STREET	30-40 Rector Street, 94-106 Washington St., 57-69 West Street	40 Rector Holdings LLC c/o Phillips Int'l Holding Corp.				349	0	0
12 RIVER TERRACE	Park Place, Warren Street	Rockrose Development Corp. c/o Mr. Scott Walsh				33	0	0
11 RIVER TERRACE	399 Chambers Street	Rockrose Development Corp. c/o Mr. Scott Walsh				0	0	0
11 SOUTH END AVENUE		Cora Club Condo c/o Cooper Square Realty, Inc.	Yes	2	0	0	14	0
11 SOUTH END AVENUE		Brown, Harris, Stevens Residential Management, LLC	Yes	5	1	4	35	0
150 SOUTH END AVENUE	300-390 South Thomas Street, The Regatta	Hudson View Condominium c/o RY Management Co. Inc.	Yes	46	0	8	116	0
145 SOUTH END AVENUE	Hudson View East Condominium	Marina Towers Assoc.	Yes	40	0	12	120	0
145 SOUTH END AVENUE	385 South End Avenue, Building #500	Marina Towers Assoc.	Yes	6	0	0	110	0
145 SOUTH END AVENUE	345 South End Avenue, Building #100	Marina Towers Assoc.	Yes	157	0	0	281	0
145 SOUTH END AVENUE	385 South End Avenue, Building #300	Marina Towers Assoc.	Yes	199	0	0	324	0
145 SOUTH END AVENUE	385 South End Avenue, Building #400	Marina Towers Assoc.	Yes	128	25	30	505	0
145 SOUTH END AVENUE	385 South End Avenue, 200 Gateway Plaza	Marina Towers Assoc.	Yes	128	25	30	15	0
145 SOUTH END AVENUE	385 South End Ave, Building #600	Marina Towers Assoc.	Yes	34	0	0	0	0
145 SOUTH END AVENUE	Parking Garage	Marina Towers Assoc.	Yes	0	0	0	0	0
1 SOUTH STREET	Staten Island Ferry Terminal	NYC Department of Transportation	Yes	10	0	0	52	3
10 SOUTH STREET	Staten Island Ferry Terminal	NYC Department of Transportation	Yes	18	2	20	5	0
21 SOUTH WILLIAM STREET	23 South William St., 45-47 Stone Street	Block Hall Development Co. LLC	Yes	0	0	0	26	0
12 THAVES STREET	American Stock Exchange	American Stock Exchange Inc.	Yes	0	0	0	25	0
18 TRINITY PLACE	103-107 Greenwich Street	Parish of Trinity Church	Yes	0	0	0	25	0
74 TRINITY PLACE		Trinity Church Corp.	Yes	0	0	0	0	0
16 TRINITY PLACE	American Stock Exchange, 113-123 Greenwich St	American Stock Exchange Inc.	Yes	0	0	0	0	0
100 TRINITY PLACE	HS of Economics and Finance	New York City Board of Education c/o Bantle Offen, Dir. Env. Health & Safety	Yes	9	0	0	19	0
250 VESEY PLACE	HS of Economics and Finance	School Construction Authority	Yes	18	0	12	0	0
12 VESEY STREET	4 World Financial Center	Brookland	Yes	0	0	0	0	0
20 VESEY STREET	14 Vesey St	NY City Lawyers Association	Yes	9	0	0	0	0
200 VESEY STREET	Garrison Building (Old NY Evening Post Building)	Castro 20 Vesey St	Yes	0	0	36	0	0
14 WALL STREET	3 World Financial Center	Lehman Brothers and American Express Represented by Brook & Loria	Yes	3	0	5	0	0
37 WALL STREET	1-11 Nassau St, 7-15 Pine St, 8-20 Wall St	W12/14 Wall Acquisitions c/o Stellar Management	Yes	7	0	33	0	0
44 WALL STREET	43-49 Exchange Place, 43 Exchange Place	Morgan Guaranty Trust Co. Attn Facilities Management	Yes	24	0	24	0	0
48 WALL STREET	43-49 William Street, 41-45 Pine Street	44 Wall Street, VEF IV, LLC c/o Oushman & Wakefield	Yes	38	0	30	0	0
60 WALL STREET	46-40 William Street	48 Wall LLC c/o Swig Burris Equities LLC	Yes	4	0	0	4	0
82 WALL STREET	95-95 Beaver Street, 153 Pearl Street	Dagi Deutsche Gesellschaft c/o DEGI Funds, Schlange Brothers	Yes	4	0	0	0	0
100 WALL STREET	154-158 Pearl Street, 78 Wall Street	The Otto Gerdau Co.	Yes	33	0	5	0	0
99 WALL STREET	119-133 Water Street, 118-134 Front St	The Otto Gerdau Co.	Yes	3	0	42	0	0
107 WALL STREET	107-111 Wall St., 95-113 Front Street, 50-56 South Street	Schlange Bros. & Co. Inc. Real Estate Management	Yes	3	0	4	0	0
120 WALL STREET	97 Pine St., 59 South St., 61 South St.	Clitbank N A c/o Oushman & Wakefield, Inc.	Yes	0	0	0	0	0
17 WARREN STREET		Silverstein Properties, Inc.	Yes	5	0	0	8	0
		17 Warren Street Tenants Corp.	Yes	0	0	0	0	0

Asbestos Air and Bulk Sampling Results Submitted by Building Owners

ADDRESS	AKAs	Building Owner	Bulk Yes	BULK (+)	BULK (-)	Air (+)	PCM 90.01 l/cc	PCM >0.01 l/cc	TEM ≤70 μ/min²	TEM >70 μ/min²
37 WARREN STREET	132-138 Church St., 116 Church St.	Heiler Properties	Yes	3	0	0	0	0	0	0
38 WARREN STREET	38-42 Warren St/144 Church St/140 Church St.	East Tribeca Associates, LLC c/o Alchemy Properties	Yes	28	1	1	0	0	0	0
39 WARREN STREET		Promethium Realty Corporation	Yes	3	0	0	0	0	0	0
40 WARREN STREET	120 Chambers St	Building Owner/Management	Yes	6	0	0	0	0	0	0
41 WARREN STREET	80-84 West Broadway	Mr. & Mrs. Irving Jaffe	Yes	2	0	0	0	0	0	0
42 WARREN STREET	85 West Broadway	B. Jaffe Real Estate Co.	Yes	1	0	0	0	0	0	0
43 WARREN STREET	72 Warren/88 West Broadway	B. Jaffe Real Estate Co.	Yes	3	0	0	0	0	0	0
44 WARREN STREET	74 Warren St	B. Jaffe Real Estate Co.	Yes	2	0	0	0	0	0	0
45 WARREN STREET	82 West Broadway, 84 West Broadway	B. Jaffe Real Estate Co.	Yes	2	0	0	0	0	0	0
46 WARREN STREET		92-94 Warren St. Inc c/o Buchbinder & Warren LLC	Yes	3	0	0	0	0	0	0
47 WARREN STREET		92-94 Warren St. Inc c/o Buchbinder & Warren LLC	Yes	3	0	0	0	0	0	0
48 WARREN STREET		New York City Board of Education c/o Barbra Orian, Dr. Eric Health & Safety	Yes	89	6	6	5	5	0	0
49 WARREN STREET	15 89, 75 89	Sheng Yen Lu Corporation	Yes	32	0	0	0	0	0	0
50 WARREN STREET		Maverick Management Corp.	Yes	34	0	0	0	0	0	0
51 WARREN STREET		Term Washington St. Garage Corp.	Yes	34	0	0	0	0	0	0
52 WARREN STREET	78-94 Front Street, 20-26 Old Slip	Water Street Fee LLC c/o William Kaufman	Yes	105	2	2	15	15	2	170
53 WARREN STREET	78-94 Front Street, 20-26 Old Slip	GUIN	Yes	1	2	2	0	0	0	0
54 WARREN STREET	5000 Emerson, 81-91 Barclay St, 235-247 Greenwich St, 82-104 Park St	Resnick Murry St. Associates, Kanwal Viridi	Yes	1	4	0	0	0	0	0
55 WARREN STREET	59-75 Park Place, 253-267 Greenwich St, 64-84 Murray St	Gerken Building Corp.	Yes	6	0	0	0	0	0	0
56 WARREN STREET	138-142 Chambers Street	Andrass Building Corporation	Yes	3	0	0	99	99	3	6
57 WARREN STREET		Millennium Partners	Yes	3	0	0	0	0	0	0
58 WARREN STREET	BATTERY PARK CITY, 25 Battery Place, Ritz Carlton Downtown	West Eden LLC c/o Rose Associates, Inc.	Yes	15	0	0	0	0	0	0
59 WARREN STREET	11-21 Morris Street, 34-38 Washington Street	West Street Equities c/o Francis Greenburg	Yes	4	0	0	0	0	0	0
60 WARREN STREET	50 West Street	West Street Equities c/o Francis Greenburg	Yes	34	0	0	0	0	0	0
61 WARREN STREET	74-80 Washington St	West Street Equities c/o Francis Greenburg	Yes	1	3	3	0	0	0	0
62 WARREN STREET	47-49 West St	West Street Equities c/o Francis Greenburg	Yes	1	5	5	0	0	0	0
63 WARREN STREET	70 West St, 72 West Street, 74 West St, 110 Washington St	Will Leonard A., J. Hill Associates	Yes	15	0	0	150	150	0	94
64 WARREN STREET	48 West Street, 47-49 West Street, 16-22 Albany Street, 18-22 Washington Street	CCMH Fin Center LLC c/o Chris Services Corporation alth. Carolyn Bailey	Yes	4	0	0	9607	9607	326	336
65 WARREN STREET	Verdant, 90-110 Barclay St, 88-110 Vesey St, 208-222 Washington St	Bell Atlantic Property Tax Dept.	Yes	4	0	0	0	0	0	0
66 WARREN STREET	West Thimmes Park located in Battery Park City	Battery Park City Parks Conservancy (BPCPC)	Yes	34	0	0	36	36	0	0
67 WARREN STREET	1 State Street Plaza, 18-22 Pearl St, 1 State St.	One State Street LLC	Yes	1	3	3	4	4	0	0
68 WARREN STREET	1-3 South William St, 63-67 Stone St	Banca Comm Italiana	Yes	5	0	0	0	0	0	0
69 WARREN STREET	Financial District Associates, LLC c/o Masterworks Development Corp.	Financial District Associates LLC c/o Masterworks Dev. Corp.	Yes	6	0	0	0	0	0	0
70 WARREN STREET	48 Pine Street	Our Lady of Victory Church, Attention: Rev. Msgr. Edward J. Mitty	Yes	6	0	0	0	0	0	0
71 WARREN STREET	72-78 John St, 29-35 Platt Street	Lighthouse Realty, 100 William	Yes	6	0	0	0	0	0	0
72 WARREN STREET	69-81 John Street	TrizecHahn Regional Pooling LLC c/o TrizecHahn Office Properties	Yes	3	0	0	0	0	0	0
73 WARREN STREET	100 Fulton Street	135 William Street Associates	Yes	3	0	0	16	16	0	4
74 WARREN STREET	51-55 Beekman St, 73-85 Ann Street	156 William Street LLC c/o C & K Realty	Yes	3	0	0	0	0	0	0
75 WARREN STREET	47-49 Worth Street, 53-55 North Street, 33 North Street	NY Law School	Yes	3	0	0	0	0	0	0

7

Asbestos Air and Bulk Sampling Results Submitted by Building Owners

DRESS	AKAs	Building Owner	Bulk	BULK (-)	BULK (+)	Air	PCM <0.01 f/cc	PCM >0.01 f/cc	TEM ≤70 p/mm ³	TEM >70 p/mm ³
WORTH STREET	230-234 Church Street	New York Law School	Yes	4	0	Yes	0	0	0	0
WORTH STREET	88 Worth Street	Viner Realty Corporation								

Lee/Dalland
Owner/ Occupant
27 Oliver St.
NYC 10038

May 06, 2002

FAX TO:
NYC DEP Asbestos Control Program
59-17 Junction Blvd. 8th flr
Corona, NY 11373-5108
Fax: 718 595 3744

Dear Sir/Madam:

We received a DEP notice dated May 1, 2002 regarding the assessment of environmental conditions after the events of Sept. 11, 2001. This is the first and only request for assessment we have received.

Residents in our area did not relocate and took no debris or ash on or after 9/11. As a result, we have taken no action.

I have spoken with an associate of Mr. Radhakrishnan, who requested we report the above.

Sincerely, H.S. Lee



RECEIVED

NYC DOB EXEC 2

Fax: (212) 312-8096

May 7 '02 11:10 P 01

Department of Environmental Protection
59-17 Junction Boulevard, 8th Fl.
Corona, New York 11373-5108

May 7, 2002

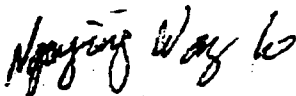
Subject: Environmental Hazard Assessments for 37 James Street NY, NY 10038

To Whom It May Concern:

I, Ngar Ying Wong-Lo, am the owner of 37 James Street, New York, NY 10038. I am writing this letter to reply to your request for an environmental hazard assessment report. I did not do any test to the building because no damaged was found. The building was not located near World Trade Center, and it was not affected by the collapse of WTC. No debris or asbestos was found in the building or the façade and side-walk the building.

As owner of the building, I know I am responsible for the cleaning of the building exteriors, ground and common areas. If you need more information, please contact me at the below address or call me at (212) 732-0387.

Yours Sincerely,



Ngar Ying Wong-Lo
110-58 63rd Ave. 1st Fl.
Forest Hills, New York 11375

37 MADISON ST.

ENTERED

Kochan and Associates

7 Harrison St apt 2D

N.Y.C. - N.Y. 10013

Tel 212 9661504

Fax 212 334 6798

cell. 917 9411081

The N.Y.C. Dept. of Environmental Protection

59-17 Junction Blvd.

Corona, N.Y. 11368

RE: 146 Chambers St

BL137 LT 33

R. Radhakrishnan
Dear ~~Simon~~ :

I am writing to inform you that during the 9/11 attack, all the windows in the building were closed. Consequently there was a maximum of penetration and infiltration of dust into the building, which was greatly hampering the communications.

Thank you.

Sincerely,
Marley Kachur co-owner

Address:

181 Broadway

Bulk Samples
PLM

Yes

No

Number of Negative ($\leq 1\%$) Samples _____

Number of Positive ($> 1\%$) Samples _____

Air Samples

Yes

No

PCM

Number of Samples Collected (≤ 0.01 f/cc) _____

Number of Samples Collected (> 0.01 f/cc) _____

TEM

Number of Samples Collected (≤ 70 s/mm²) _____

Number of Samples Collected (> 70 s/mm²) _____

INDICATED THAT CLEANING DONE

THE RIESE ORGANIZATION
560-5TH AVENUE
NEW YORK, NEW YORK 10036
212-868-9290

April 18, 2002

BY FAX# 1-718-595-3744

R. Radharkrishnan, P.E.
Director
Asbestos Control Program
The City of New York
Department of Environmental Protection
59-17 Junction Boulevard
Corona, New York 11368

Re: 196 Broadway

Dear Mr. Radharkrishnan

Please find attached asbestos report for the above location. We are obtaining bids to have the asbestos removed from the roof and to conduct a quality air inspection.

In addition, we are still waiting for the results of the asbestos inspection for 47 Broadway.

I will keep you updated.

Respectfully,


Lisa Seay-Yarbrough
Violation/Permit Department

Enclosure: 10 pages

Cc: Mr. Gary Trimarchi - 212-613-1964
Mr. Renzo Mayorga - 212-613-1928

ENTERED

104-108 Reade Street Condominium

108 Reade Street
New York, New York 10013

May 03, 2002

NYC DEP Asbestos Control Program
59-17 Junction Boulevard, 8th Floor
Corona, NY 11373-5108

Dear Sir/Madam:

I have received your notice, dated May 01, 2002, requesting information regarding cleanup of our building after the events of September 11, 2001. However, I did not receive any information from NYC DEP and NYC DOH prior to the notice dated May 01, 2002. I am glad to provide any information requested.

I am the President of the Board of Managers of 104-108 Reade Street Condominium. We are a small building with nine residential units. We are self-managed through the efforts of our Board of Managers.

After the collapse of the World Trade Towers and WTC 7, there was debris on the facade of our building as well as in the building's common areas--elevator, lobbies, halls, and stairwells. Our Condominium Board of Managers engaged three different professional cleaning companies in hopes of removing the debris as safely as possible.


- 1) American Fire Restoration Company cleaned the interior common spaces of the building at the end of September, 2001.
- 2) Servpro of Lower Manhattan & Midtown Manhattan pressure washed the facade of the building on January 5, 2002, and returned to clean the plumbing vents on the roof of the building on January 12, 2002.
- 3) Morgan Elevator Company cleaned the elevator and elevator shaft in January 2002.

Our building does not have a central HVAC system, but the Board of Managers did encourage all residents in the building to have any air conditioning window units appropriately cleaned before using them.

The Board of Managers also posted information that was distributed by the office of City Council Member Kathryn Freed in the first months after the disaster advising people how to best clean up the debris. However, individual unit owners were responsible for actually cleaning within their own apartments.

If you require any further information, please contact me at 212-406-5514.

Sincerely,


Kelly Adams
President
104-108 Reade Street Condominium

RECEIVED

PARAMOUNT
GROUP, INC.

PROGRESS REPORT

PARAMOUNT GROUP, INC

180 MAIDEN LANE

To: Mike Versace, N. Bellion

From: Paul Neira

Date: September 22, 2001

Subject: Clean up of fresh air intakes & plenums.

At approximately 6pm, I met with Robert from AI/AA and made a preliminary walkthrough of the work area and work to be performed. We coordinated with security and after inspection of the vehicle and equipment I issued temporary passes to the following individuals:

German Torres [REDACTED]

Hector Vindel [REDACTED]

Jose Rendon [REDACTED]

Gonzalo Arias [REDACTED]

Rodolfo Sabillon [REDACTED]

Miguel Palomeque [REDACTED]

Juan Palomeque [REDACTED]

Ismael Nunez [REDACTED]

Laila Velez [REDACTED]

Pablo Palomeque [REDACTED]

Edgar Asmal [REDACTED]

All equipment and personnel were then moved to the 5th floor and primary containment was setup between fans 2 & 3. AA/AI Supervisor briefed workers as to the work to be performed, while engineering notified tenants of HVAC shutdown. I spoke with the supervisor regarding concerns I had on protecting the fan intakes, removal of the pigeon grating and the louver, slope cleaning process.



Engineering assisted AI/AA with power and water hook ups, provided pressure washer and instructed personnel on procedures for filter removal. Secured freight elevator for transportation of dirty filters to loading dock. Engineering also had to snake one of the drains in the plenum for water removal, for all other areas the floors were vacuumed.

NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION

Asbestos Control Program

59-17 Junction Boulevard, 8th Floor, Corona, NY 11368-5107

Rev 1482Mw01
Building Dept. or TRU Not
FOR OFFICIAL USE ONLY

ONLY
TYPEWRITTEN
FORMS WILL BE
ACCEPTED



ASBESTOS PROJECT NOTIFICATION
(ASBESTOS INSPECTION REPORT)

1. 1,200.00

EMERGENCY
ER 150/01

When submitting this form at the NYC Department of Buildings, the original form and three (3) copies with original signatures are required. Submittal at the NYCDEP requires one copy of the form with original signatures. This form must be submitted to the NYC DEP not less than one week in advance of the start of abatement activities.

I. FACILITY

2. Address 22 Cortlandt Street Borough Manhattan Zip 10007

AKA _____ 3. Block 63 4. Lot 3

5. Type of Facility _____ 6. Name of Building _____

II. BUILDING OWNER

7. Name Murray Hill Properties 8. Contact Person Abe New

9. Tel. # (212) 587-8580 Fax # (212) 587-8495

10. Address 22 Cortlandt Street City New York, NY State NY Zip 10007

III. GENERAL CONTRACTOR

11. Name _____ Tel. # _____

IV. ASBESTOS ABATEMENT CONTRACTOR

12. Name 192 Branch Interior Services, Inc. 13. Contact Person Paul Napolitano

14. Federal Employer ID. # 11-2352067 15. Tel. # (631) 563-7300 Fax # (631) 563-7389

16. Address 101-2 Colin Drive City Holbrook State NY Zip 11741

V. THIRD PARTY AIR MONITOR

17. Name Hillman Environmental Group 18. Contact Person Craig Downs

19. Federal Employer ID. # 22-3619619 20. Tel. # (518) 392-8660 Fax # (518) 392-8663

21. Address 32 Main Street City Chatham State NY Zip 12037

22. Sample Analysis Laboratory Hillman Environmental 23. NYS DOH ELAP # 10926

VI. PROJECT INFORMATION

24. Starting date for this portion of work 10/19/01 Projected completion date 11/15/01 2/20/01 12/14/01

Asbestos work schedule ☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday ☒ Friday ☒ Saturday ☐ Sunday

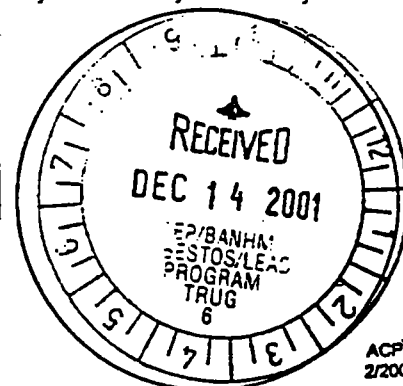
Shift from: 8:00 am ☐ pm to 6:00 am ☒ pm

If other,
specify _____

Access to inspect the premises must be provided during the work schedule indicated in this item.

25. Total amount of asbestos-containing material to be abated during this work

92,500 Square Feet, and/or 0 Linear Feet



ACF 7
2/2001

ASBESTOS INSPECTION REPORT (continued)

 26. Asbestos Hauler ATC NYS DEC Permit # 1A-371 TEL# (631)924-5050

 Disposal Site(s) Southern Alleghenies Disposal Services Road 3 Box 310 Valleyview Hollsopple, PA 15935

27. This asbestos abatement is part of a (Item a through e requires filing of this form with NYC Department of Buildings)

- a) ☐ Demolition b) ☐ Boiler Replacement c) ☐ Sprinkler Replacement d) ☐ Renovation/Alteration
 e) ☐ Fireproofing Replacement f) ☒ Other (Describe) Asbestos Containing Dust

28. TYPE OF ABATEMENT (Check all appropriate boxes)

- ☐ Removal ☐ Enclosure ☐ Encapsulation ☐ Repair ☒ Clean up

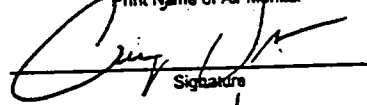
29. ABATEMENT PROCEDURE (Check all appropriate boxes)

- ☒ Full Containment ☐ Glovebag ☐ Tent ☐ DEP Variance Application

30. LOCATIONS OF ABATEMENT

Floor(s)	DESCRIBE SECTION OF FLOOR (e.g. entire, east wing, room #, boiler room, lobby, etc.)	AFFECTED SURFACES CONTAINING ACM (e.g. Pipe lagging, ceiling, plenum ducts, storage tanks, decking, etc.)	AMOUNT OF ACM SQUARE FEET LINEAR FEET	DESCRIPTION OF WORK BEING PERFORMED (e.g. running cable, installing fire sprinklers, removing and replacing boilers, etc.)
5th	Entire	Ceiling, floors, walls & contents	3,750	Cleaning of ACM
6th	Entire	Ceiling, floors, walls & contents	1,000	Cleaning of ACM
8th	Entire	Ceiling, floors, walls & contents	15,000	Cleaning of ACM
9th	Entire	Ceiling, floors, walls & contents	15,000	Cleaning of ACM
10th	Entire	Ceiling, floors, walls & contents	15,000	Cleaning of ACM
11th	Entire	Ceiling, floors, walls & contents	6,000	Cleaning of ACM
12th	Entire	Ceiling, floors, walls & contents	6,500	Cleaning of ACM
14th	Entire	Ceiling, floors, walls & contents	6,500	Cleaning of ACM
16th	Entire	Ceiling, floors, walls & contents	2,500	Cleaning of ACM
18th	Entire	Ceiling, floors, walls & contents	625	Cleaning of ACM

31. I hereby declare that the information provided herein is true and complete to the best of my knowledge. I am familiar with Federal, State and NYC laws and regulations applicable to asbestos related work.

<u>Craig Downs</u> Print Name of Air Monitor  Signature <u>10/19/01</u> Date	<u>Melanie L. Accardi</u> Print Name of Asbestos Contractor <u>Melanie L. Accardi</u> Signature <u>10/19/01</u> Date	<u>Melanie L. Accardi</u> Print Name of Applicant (if other than Owner) <u>Melanie L. Accardi</u> Signature <u>10/19/01</u> Date
--	---	---

32. I understand that as the owner of a building where asbestos abatement activity occurs, I am responsible for the performance of the asbestos abatement activities in accordance with the Asbestos Control Program Rules. I have contracted the third party air monitor who is completely independent of all parties involved in the asbestos project. I hereby declare that I have authorized the filing of this notification for the work specified herein.

MOSHE DRIZOW Melanie L. Accardi 10/24/01
 Print Name of Owner Signature Date

A STAMPED COPY OF THIS FORM INCLUDING AMENDMENTS MUST BE AVAILABLE AT THE WORK SITE.

Any modification of information provided on this form must be reported immediately in writing directly to the NYC DEP ACP.

The requirements of the Asbestos Control Program Rules may not be lawfully avoided or lessened through the performance of work in incremental or piecemeal fashion.

New York Lab

307 West 38th Street, New York, NY 10018

Phone: 212-290-0051 Fax: 212-290-0058 Email:

EMSL

Attn: Mr Robert Puorro / Mr Edward Namath
Advanced Environmental Corp.
347 Fifth Avenue
Suite 404
New York, NY 10016

Fax: (212) 545-0757 Phone: 212-545-1855
Project: 1015-028 Silverstein 140 Broadway

Customer ID: ADVA57
Customer PO:
Received: 09/13/01 2:29 PM

EMSL Order: 030104195
EMSL Project ID:
Analysis Date: 9/13/2001

Asbestos Analysis of Bulk Materials by PLM via the NY State ELAP 198.1 Method

Sample	Location	Appearance	Treatment	Non-Asbestos		Asbestos
				% Fibrous	% Non-Fibrous	% Type
031301RP01 030104195-0001	Debris-Lobby adjacent security desk	Gray Fibrous Heterogeneous	Teased	25.00% Min. Wool 20.00% Cellulose	43.62% Non-fibrous (other) 10.00% CA Carbonite	1.38% Chrysotile <1% Amosite
031301RP02 030104195-0002	Debris-Lobby adj elevator bank 21- 27	Tan Fibrous Heterogeneous	Teased	35.00% Min. Wool 10.00% Cellulose	25.00% Non-fibrous (other) 20.00% Matrix 10.00% CA Carbonite	<1% Chrysotile
031301RP03 030104195-0003	Debris-Lobby Cedar St side adj revolving dr	Tan/Gray Fibrous Heterogeneous	Teased	35.00% Min. Wool 15.00% Cellulose	25.00% Non-fibrous (other) 15.00% Matrix 10.00% CA Carbonite	<1% Chrysotile
031301RP04 030104195-0004	Debris-Lobby adjacent elevator bank 1-10	Gray Fibrous Heterogeneous	Teased	35.00% Min. Wool 10.00% Cellulose	25.00% Non-fibrous (other) 15.00% Matrix 15.00% CA Carbonite	<1% Chrysotile
031301RP05 030104195-0005	Debris-Lobby corner Nassau/Cedar St	Gray Fibrous Heterogeneous	Teased	30.00% Min. Wool 15.00% Cellulose	25.00% Non-fibrous (other) 20.00% Matrix 10.00% CA Carbonite	<1% Chrysotile
031301RP06 030104195-0006	Debris-Lobby Cedar St side adjacent doors	Gray/Tan Fibrous Heterogeneous	Teased	25.00% Min. Wool 10.00% Cellulose	30.00% Non-fibrous (other) 20.00% Matrix 15.00% CA Carbonite	<1% Chrysotile
031301RP07 030104195-0007	Debris-Lobby within convenience store	Gray Fibrous Heterogeneous	Teased	30.00% Min. Wool 10.00% Cellulose	25.00% Non-fibrous (other) 25.00% Matrix 10.00% CA Carbonite	<1% Chrysotile

Gulam Machhiwala

Analyst



Laboratory Manager
or other approved signatory

PLM has been known to miss asbestos in a small percentage of samples which contain asbestos. Negative PLM results cannot be guaranteed. Samples reported as <1% or none detected should be tested with TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. The above test must not be used by the client to claim product endorsement by NVLAP nor any agency of the United States Government. Analysis performed by EMSL Manhattan (NVLAP #101045-B), NY ELAP 1150E

PLM Print Count: 1

Hygienetics Environmental

Hygienetics Environmental Services, Inc.

1 West 34th Street
7th Floor
New York, NY 10001

Phone: (212) 244-3443
Fax: (212) 244-8505

September 21, 2001

Ms. Peggy Nash
General Manager
Jones Lang LaSalle
170 Broadway
New York, NY 10038

Sent Via Facsimile
(212) 791-9839

**RE: Recommendations for Post Clean-Up Re-Occupancy -
170 Broadway, New York, NY**

Dear Ms. Nash:

Hygienetics Environmental Services, Inc. (Hygienetics) offers the following recommendations regarding general building operations and recommended tenant activity restrictions upon re-opening of the building for general tenant use:

In order to minimize tracking in of dirt and debris from the building exterior, deploy entry way mats at both the Broadway and Maiden Lane entrances to the building. Optimally, deploy an entry mat between the outside and inside entry doors at each of these entrances. These mats should be periodically *lightly* misted with water, to maximize removal of dirt and debris from tenants' shoes. Additional (dry) mats should be installed inside both entryways to the building, as well as throughout the elevator lobby, to maximize capture of tracked-in dirt.

These mats should be cleaned as necessary, using a High Efficiency Particulate Air (HEPA) filtered vacuum, to capture any residual asbestos fibers and any other fine particulate matter tracked into the building. (In accordance with Jones Lang LaSalle's "Hands Off" policy with respect to asbestos-containing materials, coordination of these HEPA vacuuming activities with a NYS Licensed asbestos contractor may be appropriate).

Similarly, all elevator cars should also be HEPA vacuumed on an as-needed basis, to minimize any spread of tracked in dirt.

Stairwell doors should be kept closed throughout the building, to minimize movement of building air from floor to floor.

All Package HVAC units throughout the building should have their outside air dampers manually shut/scaled, with linkages either disconnected or locked in the closed position, to preclude

Ms. Peggy Nash
September 21, 2001
Page 2

drawing in of any airborne contaminants (i.e., particulate matter, smoke & odors) from outside the building. Any HVAC equipment operating should be in a 100% recirculating mode.

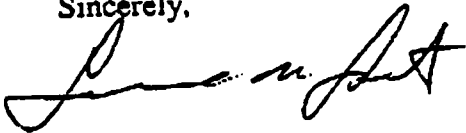
Tenants should be directed to keep all windows closed throughout their tenant spaces, as well as in all common areas of the building.

Tenants should also be directed *not* to operate any window or sleeve mounted "residential type" Air Conditioning Units, as these units often draw in a small quantity of outside air during their operation, even when set to "closed" position.

Any accumulation of dust or dirt (suspected to be from the building exterior) noted inside the building should be cleaned up using wet methods and/or HEPA vacuuming techniques. No dry sweeping or conventional vacuums should be used for these purposes.

Should you have any questions regarding these recommendations, please feel free to contact me at (212) 244-3443.

Sincerely,



Laurence M. Jaret
Project Director

Cc: Mr. Troy G. Baydala - (AMG)

2060.033

CEDAR MANAGEMENT CORP.

212-732-7653
FAX: 212-962-1825

REAL ESTATE MANAGEMENT
20 VESEY STREET
NEW YORK, N.Y. 10007-2966

February 19, 2002

The City of New York
Dept. of Environmental Protection
Asbestos Control Program
59-17 Junction Boulevard - 8th Floor
Corona, N.Y. 11373-5108

Re: 181 Broadway

To Whom it May Concern:


The following is a summary of the clean-up activities that took place at the above building. Our offices are located at 20 Vesey Street and we were displaced from our building for over 6 weeks. Since we could not get to our offices we immediately contacted our insurance adjuster who recommended a restoration company for the clean-up of the building. We hired All City Restoration, whose address is 265 Wilson Avenue Westbury, N.Y. 11590. The person I spoke with was Ron Marchand, Jr. and his phone number is (800) 257-6128. They cleaned the roof, cleaned the common areas of the building (lobby and public halls) and cleaned the facades of the building. In addition, we had our a/c tower flushed and cleaned.

Since we tested 20 Vesey Street (the closest property we have to ground zero) and the dust samples and air monitoring tests for 20 Vesey Street were more than satisfactory, we did not do any additional testing specifically for this property.

If you have any additional questions regarding the above building, please contact me at your earliest convenience.

Very truly yours,

Cedar Management Corp.

By: 
Richard Rubel - Pres.

EC Advanced Environmental Corp.

September 14, 2001

RECEIVED
OCT 01 2001

Mr. William R. Dacunto
Managing Director of Operations
Silverstein Properties
140 Broadway
New York, NY 10005

BY:.....

Re: 140 Broadway- Bulk Sample Analysis Results- Lobby Floor Surface- Dust Material

Dear Mr. Dacunto:

On September 13, 2001 Advanced Environmental Corp (AEC) collected and analyzed eleven (11) bulk samples of the dust material located throughout the lobby of 140 Broadway. This dust was created by the World Trade Center collapse.

The purpose of this analysis was to determine if this dust material contained asbestos. The samples were analyzed by the EPA recommended Polarized Light Microscopy with Dispersion Staining method (PLM/DS).

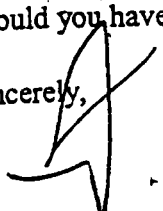
The samples were initially analyzed by EMSL Analytical. The samples were then re-analyzed for asbestos content by Scientific Laboratories.

Please be advised that via PLM/DS, three (3) of the samples proved positive for asbestos content by each laboratory.

Attached are the laboratory analysis data sheets.

Should you have any further questions please call me at (212) 545-1855.

Sincerely,


Robert Puorro
Principal

Jbsurvey\Cpqserver\data\AEC\Clients\Silverstein\140 Bway\lobby dust WTCbulk.doc

NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
(212) 627-3900
www.nycosh.org

REPORT OF FINDINGS: BUILDING AIR QUALITY ASSESSMENT

[REDACTED]
[REDACTED] Building
New York, NY

Date: August 22, 2002

Prepared for: [REDACTED]

Prepared by: [REDACTED]

Written By: [REDACTED]

Ph.D., CIH

Laboratories & Consultants

Industrial Hygiene • Toxicology • Environmental Sciences

Phone: [REDACTED]
Facsimile: [REDACTED]

Table 2 – Micro Vacuum sampling of surfaces with testing for asbestos contamination
(see Appendix B, SciLab Report [REDACTED])

Sample Number	Location	TEM Result (str/cm ²)
[REDACTED] VAC-071802-01	11 th floor, north side, NNE area, from floor	7,111
[REDACTED] VAC-071802-02	11 th floor, north side, NNE area, from fan coil unit	10,667
[REDACTED] VAC-071802-03	11 th floor, north side, NNE area, from window sill/casing	202,691
[REDACTED] VAC-071802-04	11 th floor, north side, NNE area, from vertical column	<888
[REDACTED] VAC-071802-05	11 th floor, south side, central, from floor	128,015
[REDACTED] VAC-071802-06	11 th floor, south side, central, from fan coil unit	368,045
[REDACTED] VAC-071802-07	11 th floor, south side, central, from window sill/casing	16,890
[REDACTED] VAC-071802-08	11 th floor, south side, central, from vertical column	<888
[REDACTED] VAC-071802-09	11 th floor, south side, south side mechanical room, from external filter	<888
[REDACTED] VAC-071802-10	11 th floor, south side, south side mechanical room, from AHU unit	6,222
[REDACTED] VAC-071802-11	11 th floor, south side, outside mechanical room, at chase w/ exposed TSI, from floor	4,444
[REDACTED] VAC-071802-12	11 th floor, north side, mechanical room, from external filter	888
[REDACTED] VAC-071802-13	6 th floor, north side, NE corner, from floor	128,015
[REDACTED] VAC-071802-14	6 th floor, north side, NE corner, from window sill/casing	92,132
[REDACTED] VAC-071802-15	6 th floor, north side, NE corner, from vertical column	8,000
[REDACTED] VAC-071802-16	6 th floor, south side, central, from floor	94,072
[REDACTED] VAC-071802-17	6 th floor, south side, central, from window sill/casing	<969
[REDACTED] VAC-071802-18	6 th floor, south side, central, from vertical column	<888
[REDACTED] VAC-071802-19	6 th floor, south side, mechanical room, from external filter	2,666
[REDACTED] VAC-071802-20	6 th floor, south side, mechanical room, from AHU	<888
[REDACTED] VAC-071802-21	6 th floor, south side, SW corner, from intake louver	45,581
[REDACTED] VAC-071802-22	6 th floor, north side mechanical room, from external filter	8,000
[REDACTED] VAC-071802-23	6 th floor, north side, mechanical room, from AHU	6,788
[REDACTED] VAC-071802-24	6 th floor, NE corner, exterior window sill	38,792
[REDACTED] VAC-071802-25	3 rd floor, X-ray room, from floor	<888
[REDACTED] VAC-071802-26	3 rd floor, X-ray room, from top of computer	888

Table 3 – Air tests for asbestos
(see Appendix B, SciLab Report [REDACTED])

Sample Number	Location	TEM Result (str/cc)
[REDACTED]-AIR-071802-01	11 th floor, north side, NE area	NSD
[REDACTED]-AIR-071802-02	11 th floor, south side, SW area, near stair "C"	NSD
[REDACTED]-AIR-071802-03	6 th floor, north side, NE area	NSD
[REDACTED]-AIR-071802-04	6 th floor, south side, central	NSD
[REDACTED]-AIR-071802-05	3 rd floor, X-ray room, central	NSD
[REDACTED]-AIR-071802-06	13 th floor, east side, central, at copy machine	NSD
[REDACTED]-AIR-071802-07	14 th floor, north side, at employee sign in/out bench	NSD
[REDACTED]-AIR-071802-08	15 th floor, south side, SW area, on file cabinet	NSD
[REDACTED]-AIR-071802-09	16 th floor, north side, NE area, on file cabinet	NSD

Lead in Paint

Samples of paint were collected on 7/18/02 and 8/7/02. Data from these samples are presented in tables 4 and 5 below. Certificates of Laboratory Analysis are presented as Appendix C. Photographs showing examples of painted surfaces are presented as Appendix E.

Table 4 – Bulk sample results for lead-based paint (Collected on 7/18/02)
(Samples containing lead-based paint are in bold face type)
(see Appendix C, [REDACTED] Report #024806)

Sample Number	Location	% Lead
[REDACTED]-071802-01Pb	11th floor, SW freights elevator wall (exterior) paint (white)	1.5
[REDACTED]-071802-02Pb	11 th floor, SW Semotair window unit cover paint (white)	<0.1
[REDACTED]-071802-03Pb	11 th floor, SW, ceiling paint (white)	<0.1
[REDACTED]-071802-04Pb	11th floor, SW, ceiling paint (orange)	2.6
[REDACTED]-071802-05Pb	11 th floor, elevator lobby area, wall paint (green)	0.23
[REDACTED]-071802-06Pb	11 th floor, NW, exterior wall paint (white)	0.14
[REDACTED]-071802-07Pb	11th floor, NE window frame paint (yellow)	2.0
[REDACTED]-071802-08Pb	11 th floor, east, center ceiling paint (yellow)	<0.1
[REDACTED]-071802-09Pb	6 th floor, elevator lobby wall paint (grey)	8.5
[REDACTED]-071802-10Pb	6 th floor, south, ceiling paint (white)	<0.1

1
 2
 3
 4
 5
 6
 7
 8

[REDACTED]



NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
(212) 627-3900 www.nycosh.org

REPORT OF FINDINGS: BUILDING AIR QUALITY ASSESSMENT

[REDACTED]
[REDACTED] Building
New York, NY

Date: November 26, 2001

Prepared for: [REDACTED]

Prepared by: [REDACTED]

Written By: [REDACTED] Ph.D., CIH

Phone: [REDACTED]
Facsimile: [REDACTED]

Asbestos.

Asbestos content was measured in bulk residue recovered from exterior areas of the [REDACTED] Building, from micro-vacuum sample of surfaces within [REDACTED] occupied areas, and in the air of [REDACTED] occupied areas. The data from each of these measurements is presented in tables 5, 6 & 7 below. Laboratory Certificates of Analysis are provided in Appendix B of this report.

Table 5 – Asbestos content of settled residue on the exterior of the [REDACTED] Building.

Sample Number	Location	NY ELAP Method	TEM
[REDACTED]-Bulk-110101-01	16 th floor, east side, exterior window ledge	Chrysotile=1.8%	Trace
[REDACTED]-Bulk-110101-02	15 th floor, east side, exterior window ledge	Chrysotile=3.0%	Not Performed
[REDACTED]-Bulk-110101-03	14 th floor, east side, exterior window ledge	Chrysotile=2.5%	Trace
[REDACTED]-Bulk-110101-04	13 th floor, east side, exterior window ledge	Chrysotile=2.0%	Not Performed
[REDACTED]-PLM-110201-01	13 th floor, south, exterior window ledge	Chrysotile=1.8%	Not Performed
[REDACTED]-PLM-110201-02	14 th floor, southwest, exterior window ledge	Chrysotile=1.8%	Trace
[REDACTED]-PLM-110201-03	15 th floor, southeast, exterior window ledge	Chrysotile=2.0%	Trace
[REDACTED]-PLM-110201-04	16 th floor, south, exterior window ledge	Chrysotile=2.0%	Not Performed

Table 6 – Micro Vacuum sampling of surfaces with testing for asbestos contamination.

Sample Number	Location	TEM Result (str/cm ²)
VAC-110101-01	15 th floor, north side, soffit for lights	11,734
VAC-110101-02	15 th floor, north side, carpet	<888
VAC-110101-03	15 th floor, north side, inside supply air terminus	1,066
VAC-110101-04	15 th floor, SE corner, on surface, on top of hanging light fixtures	<888
VAC-110101-05	15 th floor, SE, surface on top of hanging exit sign	888
VAC-110101-06	16 th floor, north corner, top surface of suspended HVAC duct	2,133
VAC-110101-07	16 th floor, north corner, carpet	1,777
VAC-110101-08	16 th floor, south corner, inside supply air terminus	888
VAC-110101-09	16 th floor, south corner, carpet	888
VAC-110201-01	16 th floor, mechanical room, north side, from air filter	85,343
VAC-110201-02	15 th floor, mechanical unit, north side, from inside ledge, upstream of coils, post filter	24,002
VAC-110201-03	15 th floor, mechanical unit, south side, from inside ledge, upstream of coils, post filter	20,446
VAC-110201-04	15 th floor, mechanical room, south side, inside ledge of outdoor air intake	59,740
VAC-110201-05	14 th floor, mechanical unit, south side, from inside ledge, upstream of coils, post filter	2,666
VAC-110201-06	14 th floor, mechanical room, south side, inside ledge of outdoor air intake	32,003
VAC-110201-07	14 th floor, mechanical room, north side, inside ledge of outdoor air intake	64,007
VAC-110201-08	13 th floor, mechanical unit, north side, from inside ledge, upstream of coils, post filter	8,000
VAC-110201-09	13 th floor, mechanical room, north side, inside ledge of outdoor air intake	21,335
VAC-110201-10	13 th floor, mechanical unit, south side, from inside ledge, upstream of coils, post filter	39,471
VAC-110201-11	14 th floor, northeast, inside supply air terminus	16,001
VAC-110201-12	14 th floor, NW, top surface of exit sign	<888
VAC-110201-13	14 th floor, NW, carpeting	1,777
VAC-110201-14	14 th floor, SW supply air duct interior	12,445
VAC-110201-15	14 th floor, SE, surface on top of hanging light fixture	4,444
VAC-110201-16	13 th floor, east, light soffit	53,339
VAC-110201-17	13 th floor, east, carpet	9,778
VAC-110201-18	13 th floor, NE supply air duct terminus, interior	10,667
VAC-110201-19	13 th floor, SW, light soffit	34,670
VAC-110201-20	13 th floor, SW, carpet	2,666

Table 7 – Air tests for asbestos.

Sample Number	Location	TEM Result (str/cc)
ASB110101-01	16 th floor, SW side	<0.0071
ASB110101-02	15 th floor, SE side	<0.0067
ASB110101-03	14 th floor, west side	<0.0075
ASB110101-04	13 th floor, NW side	<0.0094
ASB110101-05	15 th floor, north side	<0.0081
ASB110101-06	Elevator, west side #3	<0.0076
ASB110101-07	1 st floor, lobby, center, by directory	<0.0067
ASB110101-08	Outside of building, train side	<0.0089
ASB110101-09	Outside of building, WTC side	<0.0095
ASB110101-10	14 th floor, east side	<0.0089
ASB110101-11	13 th floor, SE side	<0.0092
ASB110201-01	15 th floor, south side	<0.0060
ASB110201-02	15 th floor, NW side	<0.0064
ASB110201-03	14 th floor, south side	<0.0059
ASB110201-04	14 th floor, north side	<0.0059
ASB110201-05	16 th floor, north side	<0.0061
ASB110201-06	16 th floor, east side	<0.0061
ASB110201-07	13 th floor, NE side	<0.0060
ASB110201-08	13 th floor, SW side	<0.0061
ASB110201-09	Outside of building, NE train station	<0.0072

DISCUSSION/CONCLUSIONS

The goal of this investigation was to (1) reduce uncertainty about the quality of the new office environment by providing scientific environmental data on indoor and outdoor pollution within or near the new offices and (2) provide a basis for estimating personnel exposures to relevant air pollutants. The data presented in this report advances the overall effort to achieve our goal and provide building specific information from which meaningful estimates of human exposure to air pollutants can be derived. Although in most cases it is possible to compare the presented data directly to public health standards and guidelines, the following discussion will attempt to expand upon these agency derived criteria and provide additional perspective on the building and ambient environment.

Metals in air, including lead, cadmium and chromium, have not been detected above background concentrations, either indoors or outdoors. Additionally, lead and copper concentrations in drinking water are below all federal and state drinking water criteria. Carbon monoxide, although reported to be detected at elevated levels at the WTC recovery site in close proximity to work activities employing gasoline powered devices, there is no indication that elevated

Client Contacts:		Laboratory Contacts:	
Contacts:	S. I.	Contacts:	[REDACTED]
Phone:	[REDACTED]	Phone:	[REDACTED]
Fax:	* Please indicate on your COC [REDACTED]	Fax:	[REDACTED]
E-Mail:	[REDACTED]	E-Mail:	[REDACTED]

Chain of Custody:			
Samples Taken in Field:	SI	Date:	01/29/2003 Time:
Samples Rec'd at Laboratory:	CS	Date:	01/31/2003 Time: 16.00
Samples Analyzed:	BR/CL	Date:	02/03/2003 Time: 15.30
Preliminary Results Faxed:	CJD	Date:	02/03/2003 Time: 16.00
Preliminary Results E-Mail:		Date:	Time:

Summary Data

**ASTM D5755-95 Standard Method for Microvacuum Sampling
and Indirect Analysis of Asbestos in Settled Dust by TEM (Concentration)**

Client Sample ID #	IATL Sample ID #	Area Sampled (cm2)	Aliquot (ml)	Comments	Results s/mm2	Results s/cm2
12901	1652394	100	1.0	Chrysotile	1770.0	85000.0
12902	1652395	100	1.0	Chrysotile	76.9	37000.0
12903	1652396	100	1.0	Chrysotile	76.9	37000.0
12904	1652397	100	5.0	Chrysotile	38.5	3700.0
12905	1652398	100	1.0	Chrysotile	15.4	7400.0
12906	1652399	100	5.0	Chrysotile	96.2	9250.0
12907	1652400	100	5.0	Chrysotile	23.1	2220.0
12908	1652401	100	5.0	Chrysotile	288.0	27800.0
12909	1652402	100	1.0	Chrysotile	154.0	74000.0
12909DUP	1652402DUP	100	1.0	Chrysotile	211.0	102000.0
12910	1652403	100	1.5	Chrysotile	269.0	86300.0
12911	1652404	100	1.5	Chrysotile	577.0	185000.0
12912	1652405	100	5.0	Chrysotile	385.0	37000.0
12913	Bulk Debris Sample by PLM					
12914		Field Blank		Sample Not Submitted		
12915		Field Blank		Sample Not Submitted		
Internal	Lab Blank	Lab Blank	50.0	None Detected	<7.7	NA

Several publications and resources are available for the interpretation of Asbestos in Settled Dust by ASTM D5755. The method is highly dependent on field sampling protocol.

Requested TurnAround Time:

RUSH / 6 hr	2 Day
24 hour	X 3-5 Day

These preliminary results are issued by IATL to expedite procedures by the clients based upon the above data. IATL assumes that all of the sampling methods and data upon which these results are based, has been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificate of Analysis will follow these preliminary results. The signed COA is to be considered the official results. All EPA, HUD, and NJDEP conditions apply.

Page 1 of 4

233 B'way - 01/29/03

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New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
(212) 627-3900 www.nycosh.org



The [REDACTED] Consulting Group, Inc.
Certified Health and Safety Professionals

January 15, 2002

Mr. [REDACTED]
Director, Facility Management
[REDACTED]
[REDACTED]

NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
(212) 627-3900
www.nycosh.org

Re: Level C Protection - [REDACTED] Floor Data Center - [REDACTED] World Financial Center -
New York, NY

Dear Mr. Appel:

On January 13, 2002, final clearance AHERA air monitoring was performed in the Data Center located on the [REDACTED] floor. The AHERA air samples were collected after using a leaf blower to aggressively disturb the residual surface dust in the Data Center. The final clearance test results indicated an airborne asbestos concentration between 0.0026 fibers/cc and 0.3414 fibers/cc in air during a 2-hour sampling period.

Since several test results were above the OSHA maximum permissible exposure limit (PEL) of 0.1 fiber/cc for time period sampled, we have recommended that all personnel working in the Data Center wear Level C protection. Level C protection includes, but not limited to, half- or full-face air purifying respirator with P-100 filter media or cartridges and disposable protective clothing that covers the shoes/boots and head.

A personal decontamination chamber should be constructed to properly remove the asbestos-contaminated protective clothing, clean the reusable respirators, and wash their face and hands before eating, drinking, or smoking. Space should be provided for storing their street clothes away from any potentially contaminated protective clothing. All asbestos-containing debris and protective clothing should be placed in labeled bags for proper disposal.

Although the ambient air concentration of asbestos fibers may have settled out on various building surfaces over the past few days, Level C protection should be used until we can collect additional air samples to evaluate the ambient atmospheric concentration. Air filtration devices should be used to reduce the ambient asbestos concentration in the air. In addition, all workers should be properly trained regarding the health hazards of asbestos and understand the elements of the federal OSHA asbestos standard and the New York City Administrative Code regarding asbestos exposure.

Signs should be posted at every entrance to warn unauthorized personnel of the potential asbestos airborne exposure and the need to wear protective clothing and equipment while inside the Data Center. Workers wearing respiratory protection should be medically qualified to wear the respirator. Workers also should be fit-tested and trained in the use of their respiratory protection. An end-of-service-life determination should be made by a qualified person to determine when to replace the high-efficiency filter media or cartridges. As required by federal OSHA, several workers should be monitored for their personal exposure to asbestos fibers while working in the Data Center.

If anyone has questions concerning any of these recommendations, feel free to call my office at your convenience.

Sincerely,

A large black rectangular redaction box covering the signature of the sender.

, CIH, CSP
President

A small black rectangular redaction box covering the contact information.

December 10, 2002

Mr. [REDACTED]
Project Manager

New York, NY [REDACTED]

Re: [REDACTED] - Lead Inspection

Dear Mr. [REDACTED]

On November 21, 2002, [REDACTED] attended a meeting at [REDACTED]

[REDACTED] with you, [REDACTED] and [REDACTED]. The purpose of the meeting was to discuss lead dust sampling reports and associated analytical data generated by [REDACTED] and [REDACTED]. At the conclusion of our meeting, it was decided that additional testing was warranted due to the various discrepancies between the reported analytical data generated by the aforementioned consultants. Based on our discussions, a proposal was generated to perform limited lead dust sampling in various air-handling units (AHU) throughout [REDACTED] in order to determine the accuracy of previously sampled areas.

This report details the lead dust results of the sampling performed on December 4, 2002 at the subject site. Sampling was performed by Senior Project Manager, [REDACTED], a licensed U.S. Environmental Protection Agency (EPA) Lead Inspector/Risk Assessor.

The lead dust sampling was performed in nineteen AHUs with an equivalent number of samples obtained. The samples were collected in the outside air intakes (OAI) on accessible louvers. Sampling was performed utilizing ASTM 1728 - 02: Standards for Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination. Samples were collected using Ghost Wipes for Surface Lead which meet the ASTM 1792 standard requirements. All samples were submitted to EMSL Analytical, Inc. for analysis by EPA Method SW 846-7420.

All though no specific standard is available for lead dust in Heating Ventilation and Air Conditioning (HVAC) systems the EPA - Housing and Urban Development (HUD) Technical Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing are often utilized for to compare levels identified on other surfaces. According to HUD, these clearance levels are used following a lead abatement/cleanup activity:

- 40 $\mu\text{g}/\text{ft}^2$ - floors
- 250 $\mu\text{g}/\text{ft}^2$ - interior window sills
- 400 $\mu\text{g}/\text{ft}^2$ - window troughs

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[REDACTED]

Of the nineteen samples collected in the air-handling units, eighteen were above regulatory standards. Based on the test results, [REDACTED] concludes that [REDACTED] data is more accurate than the [REDACTED] data. However, [REDACTED] was not able to determine the exact sampling locations of either consulting company.

The testing results are provided in Appendix A - Table I: Comparison of Lead Inspection Data and Table II: Summary of Lead Inspection Data. Laboratory analytical data can be found in Appendix B of this report.

If you have any questions or require additional testing, please contact [REDACTED] or [REDACTED]. Thank you.

Sincerely,
[REDACTED]
[REDACTED]
[REDACTED]

Senior Project Manager

C: [REDACTED]

files

APPENDIX A

**TABLE I - COMPARISON OF LEAD INSPECTION
DATA FOR [REDACTED]**

and

**TABLE II - SUMMARY OF LEAD INSPECTION DATA
FOR [REDACTED]**

TABLE I
COMPARISON OF LEAD INSPECTION DATA
FOR [REDACTED]

CLIENT: [REDACTED]
PROJECT: [REDACTED]

TABLE I: Comparison of Lead Inspection Data for [REDACTED]

Air Handling Unit	Surface Type	Company		
		[REDACTED]	[REDACTED]	[REDACTED]
AHU - 3	Outside Air Intake	660 $\mu\text{g}/\text{ft}^2$	660 $\mu\text{g}/\text{ft}^2$	180 $\mu\text{g}/\text{ft}^2$
AHU - 4	"	1,400 $\mu\text{g}/\text{ft}^2$	4,000 $\mu\text{g}/\text{ft}^2$	220 $\mu\text{g}/\text{ft}^2$
AHU - 32	"	660 $\mu\text{g}/\text{ft}^2$	620 $\mu\text{g}/\text{ft}^2$	See data for AHU - 4
AHU - 1	"	1,000 $\mu\text{g}/\text{ft}^2$	300 $\mu\text{g}/\text{ft}^2$	32 $\mu\text{g}/\text{ft}^2$
AHU - 5	"	630 $\mu\text{g}/\text{ft}^2$	150 $\mu\text{g}/\text{ft}^2$	21 $\mu\text{g}/\text{ft}^2$
AHU - 2	"	260 $\mu\text{g}/\text{ft}^2$	89 $\mu\text{g}/\text{ft}^2$	<10 $\mu\text{g}/\text{ft}^2$
AHU - HV5	"	1,600 $\mu\text{g}/\text{ft}^2$	1,700 $\mu\text{g}/\text{ft}^2$	<10 $\mu\text{g}/\text{ft}^2$
AHU - 17	"	1,300 $\mu\text{g}/\text{ft}^2$	1,800 $\mu\text{g}/\text{ft}^2$	78 $\mu\text{g}/\text{ft}^2$
AHU - 18	"	830 $\mu\text{g}/\text{ft}^2$	1,400 $\mu\text{g}/\text{ft}^2$	<10 $\mu\text{g}/\text{ft}^2$
AHU - 19	"	550 $\mu\text{g}/\text{ft}^2$	710 $\mu\text{g}/\text{ft}^2$	<10 $\mu\text{g}/\text{ft}^2$
AHU - 30	"	<60 $\mu\text{g}/\text{ft}^2$	NS	130 $\mu\text{g}/\text{ft}^2$
AHU - 20	"	2,400 $\mu\text{g}/\text{ft}^2$	3,300 $\mu\text{g}/\text{ft}^2$	70 $\mu\text{g}/\text{ft}^2$
AHU - 21	"	3,000 $\mu\text{g}/\text{ft}^2$	1,200 $\mu\text{g}/\text{ft}^2$	62 $\mu\text{g}/\text{ft}^2$
AHU - 22	"	2,100 $\mu\text{g}/\text{ft}^2$	<32 $\mu\text{g}/\text{ft}^2$	61 $\mu\text{g}/\text{ft}^2$
AHU - 23	"	1,100 $\mu\text{g}/\text{ft}^2$	2,900 $\mu\text{g}/\text{ft}^2$	86 $\mu\text{g}/\text{ft}^2$
AHU - 24	"	1,100 $\mu\text{g}/\text{ft}^2$	3,600 $\mu\text{g}/\text{ft}^2$	11 $\mu\text{g}/\text{ft}^2$
AHU - 25	"	1,700 $\mu\text{g}/\text{ft}^2$	<30 $\mu\text{g}/\text{ft}^2$	59 $\mu\text{g}/\text{ft}^2$
AHU - 27	"	420 $\mu\text{g}/\text{ft}^2$	NS	33 $\mu\text{g}/\text{ft}^2$
AHU - 26	"	1,000 $\mu\text{g}/\text{ft}^2$	NS	82 $\mu\text{g}/\text{ft}^2$

Notes:

NS - Not Sampled

TABLE II
SUMMARY OF LEAD INSPECTION DATA FOR
[REDACTED]

CLIENT: [REDACTED]
PROJECT: [REDACTED]

TABLE II: Summary of Lead Inspection Data for [REDACTED]

Company	Sample ID No.	Air Handling Unit (AHU)	Area Description/Sample Location/Room Number	Surface Type (Outside Air Intake (OAI), OAI - Interior Louver, Return Duct etc.)	Lead Concentration ($\mu\text{g}/\text{ft}^2$)
[REDACTED]	[REDACTED] 01				
[REDACTED]	N/A	N/A	N/A	N/A	N/A
[REDACTED]	N/A	N/A	N/A	N/A	N/A
[REDACTED]	[REDACTED] 02	AHU - 3	MER N117C	OAI - Interior Louver	660 $\mu\text{g}/\text{ft}^2$
[REDACTED]	62602-B14	"	"	OAI	660 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-02	"	"	OAI	180 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED] 03	AHU - 4	MER N117C	OAI - Interior Louver	1,400 $\mu\text{g}/\text{ft}^2$
[REDACTED]	62602-B17	"	"	OAI	4,000 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-03	AHU - 4/32	"	OAI	220 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED] 04	AHU - 32	MER N117C	OAI - Interior Louver	640 $\mu\text{g}/\text{ft}^2$
[REDACTED]	7302-44	"	"	OAI	620 $\mu\text{g}/\text{ft}^2$
[REDACTED]	See Pb-03 Testing Data		"	OAI	N/A
[REDACTED]	[REDACTED] 05	AHU - 1	MER N117A	OAI - Interior Louver	1,000 $\mu\text{g}/\text{ft}^2$
[REDACTED]	62602-B20	"	"	OAI	300 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-11	"	"	OAI	32 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED] 06	AHU - 5	MER N117A	OAI - Interior Louver	630 $\mu\text{g}/\text{ft}^2$
[REDACTED]	7302-47	"	"	OAI	150 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-14	"	"	OAI	21 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED] 07	AHU - 2	MER N117A	OAI - Interior Louver	260 $\mu\text{g}/\text{ft}^2$
[REDACTED]	62602-B23	"	"	OAI	89 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-17	"	"	OAI	<10 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED] 08	AHU - HV5	MER N117A	OAI - Interior Louver	1,600 $\mu\text{g}/\text{ft}^2$
[REDACTED]	7302-50	"	"	OAI	1,700 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-20	"	"	OAI	<10 $\mu\text{g}/\text{ft}^2$

CLIENT: [REDACTED]
PROJECT: [REDACTED]

TABLE II: Summary of Lead Inspection Data for [REDACTED]

Company	Sample ID No.	Air Handling Unit (AHU)	Area Description/Sample Location/Room Number	Surface Type (Outside Air Intake (OAI), OAI - Interior Louver, Return Duct etc.)	Lead Concentration ($\mu\text{g}/\text{ft}^2$)
[REDACTED]	[REDACTED]	AHU - 17	8th Floor - NB - Penthouse	OAI - Interior Louver	1,300 $\mu\text{g}/\text{ft}^2$
[REDACTED]	7302-28	"	Roof - North MER	OAI	1,800 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-24	"	8th Floor - NB - Penthouse	OAI	78 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED]	AHU - 18	8th Floor - NB - Penthouse	OAI - Interior Louver	830 $\mu\text{g}/\text{ft}^2$
[REDACTED]	62602-B1	"	Roof - North MER	OAI	1,400 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-27	"	8th Floor - NB - Penthouse	OAI	<10 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED]	AHU - 19	8th Floor - NB - Penthouse	OAI - Interior Louver	550 $\mu\text{g}/\text{ft}^2$
[REDACTED]	62602-B4	"	Roof - North MER	OAI	710 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-30	"	8th Floor - NB - Penthouse	OAI	<10 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED]	AHU - 30	8th Floor - NB - Penthouse	OAI - Interior Louver	<60 $\mu\text{g}/\text{ft}^2$
[REDACTED]	N/A	"	Not Sampled		
[REDACTED]	Pb-33	"	8th Floor - NB - Penthouse	OAI	130 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED]	AHU - 20	8th Floor - SB - Penthouse	OAI - Interior Louver	2,400 $\mu\text{g}/\text{ft}^2$
[REDACTED]	7302-40	"	Roof - South MER	OAI	3,300 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-35	"	8th Floor - SB - Penthouse	OAI	70 $\mu\text{g}/\text{ft}^2$
[REDACTED]	[REDACTED]	AHU - 21	8th Floor - SB - Penthouse	OAI - Interior Louver	3,000 $\mu\text{g}/\text{ft}^2$
[REDACTED]	62602-B7	"	Roof - South MER	OAI	1,200 $\mu\text{g}/\text{ft}^2$
[REDACTED]	Pb-38	"	8th Floor - SB - Penthouse	OAI	62 $\mu\text{g}/\text{ft}^2$

CLIENT:

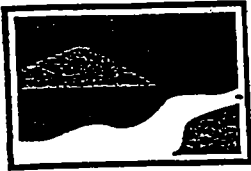
PROJECT:

TABLE II: Summary of Lead Inspection Data for

Company	Sample ID No.	Air Handling Unit (AHU)	Area Description/Sample Location/Room Number	Surface Type (Outside Air Intake (OAI), OAI - Interior Louver, Return Duct etc.)	Lead Concentration ($\mu\text{g}/\text{ft}^2$)
	15	AHU - 22	Penthouse	OAI - Interior Louver	2,100 $\mu\text{g}/\text{ft}^2$
	62602-B10	"	Roof - South MER	OAI	<32 $\mu\text{g}/\text{ft}^2$
	Pb-41	"	8th Floor - SB - Penthouse	OAI	61 $\mu\text{g}/\text{ft}^2$
	16	AHU - 23	8th Floor - SB - Penthouse	OAI - Interior Louver	1,100 $\mu\text{g}/\text{ft}^2$
	7302-37	"	Roof - South MER	OAI	2,900 $\mu\text{g}/\text{ft}^2$
	Pb-44	"	8th Floor - SB - Penthouse	OAI	86 $\mu\text{g}/\text{ft}^2$
	17	AHU - 24	8th Floor - SB - Penthouse	OAI - Interior Louver	1,100 $\mu\text{g}/\text{ft}^2$
	7302-34	"	Roof - South MER	OAI	3,600 $\mu\text{g}/\text{ft}^2$
	Pb-47	"	8th Floor - SB - Penthouse	OAI	11 $\mu\text{g}/\text{ft}^2$
	18	AHU - 25	8th Floor - SB - Penthouse	OAI - Interior Louver	1,700 $\mu\text{g}/\text{ft}^2$
	7302-31	"	Roof - South MER	OAI	<30 $\mu\text{g}/\text{ft}^2$
	Pb-50	"	8th Floor - SB - Penthouse	OAI	59 $\mu\text{g}/\text{ft}^2$
	19	AHU - 27	5th Floor - NB	OAI - Interior Louver	420 $\mu\text{g}/\text{ft}^2$
	N/A	"	Not Sampled		
	Pb-53	"	5th Floor - NB	OAI	33 $\mu\text{g}/\text{ft}^2$
	20	AHU - 26	5th Floor - SB	OAI - Interior Louver	1,000 $\mu\text{g}/\text{ft}^2$
	N/A	"	Not Sampled		
	Pb-56	"	5th Floor - SB	OAI	82 $\mu\text{g}/\text{ft}^2$
	21				
	22				

Notes:

N/A - not applicable



EMTEQUE

November 12, 2001

NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
(212) 627-3900
www.nycosh.org

Re.: [REDACTED] Church Street, Environmental Dust and Debris Sampling and Evaluation
Interim Site Assessment Report
EMTEQUE Project Number [REDACTED]

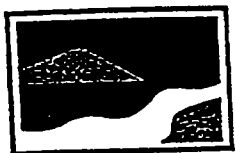
Dear Mr. [REDACTED]

As per the discussions, meetings and EMTEQUE Corporation (EMTEQUE) proposal dated October 5, 2001 (revised October 7, 2001), EMTEQUE conducted the proposed sampling of the above referenced property on Saturday, October 13, 2001. Sampling was conducted within the 5th through 12th floors, areas occupied by [REDACTED] until September 11, 2001. The sampling was conducted by Messrs. Eric Telemaque, Ramon Henriquez, Juan Salcedo and Neil Feldscher. Representatives of [REDACTED] and Property Management Unit accompanied and observed all sampling. The Ambient Group, Inc., [REDACTED] accompanied the sampling team during the initial portion (i.e., 12th floor only) of the sampling. Personnel from the Ambient Group, Inc. reportedly took samples similar in quantity and method to the EMTEQUE sampling. EMTEQUE only observed the asbestos portion of the Ambient Group, Inc.'s sampling.

Due to the September 11, 2001 World Trade Center (WTC) tragedy, large quantities of dust and debris associated with the WTC complex entered the subject building through open windows and through windows that were broken during the collapse and subsequent fires. Fires occurred on the 5th, 6th, 8th and 9th (small localized fire on the 9th floor) floors of the subject building. The fires were generally located within the southwest corner of the subject property. Based upon the EPA's on-going study of contaminants along with EMTEQUE's information from other local sites, sampling was conducted for the following contaminants:

- Asbestos
- Metals
- Silica
- Polychlorinated biphenyls
- Polycyclic aromatic hydrocarbons
- Dioxin

While this list is not intended to be all inclusive of every possible contaminant present as a result of the WTC disaster, it is intended to provide good indicators of the current condition of the subject building and the potential industrial hygiene issues as related to that condition. EMTEQUE compared results of the sampling to the New York State



EMTEQUE

[REDACTED]
November 12, 2001
Page 2

Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum (TAGM) Soil Cleanup Levels. While the TAGM levels do not apply except in soil contamination, these standards provide a risk-based standard for contamination in bulk material, allowing a means of comparison. The sampling was designed and conducted as a preliminary assessment to determine the presence and extent of contaminants within the dust and debris present within the formerly occupied space. These contaminants are suspected to exist due to the collapse of the World Trade Centers and the associated fires both outside and within the subject property. The intent of determining the extent and levels of contamination, if present, was to make initial recommendations concerning the removal and recovery of files, paperwork, computer equipment, personal items, etc.

In discussing the issues of contamination and potential cleanup, EMTEQUE has relied heavily on general industrial hygiene practices, professional experience, and standards that, in our opinion, most closely relate to the current subject matter.

Sampling for all contaminants was conducted throughout the floors. Bulk and wipe sampling was conducted based upon the level of dust or debris present at each sampling location; bulk sampling was conducted where sufficient material was able to be collected for laboratory analysis. The sampling was conducted in order to determine if contamination was localized or distributed throughout the floors. As such, sampling was conducted in the dirty and clean areas (based upon physical appearance) and then in the areas showing the tapering off of dust and debris.

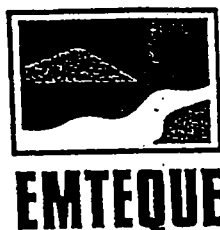
A summary of all sampling results is included as Attachment A to this report. Copies of drawings showing all sampling locations are included within Attachment B to this report. Copies of all analytical results are included within Attachment C to this report.

Asbestos

A mixture of bulk and wipe samples were obtained for analysis for asbestos. Analysis for asbestos was conducted by EMSL Analytical, Inc. EMSL is an independent American Industrial Hygiene Association (AIHA) and New York State Department of Health Environmental Laboratory Accredited Program (ELAP) laboratory. Analysis was conducted utilizing Polarized Light Microscopy (PLM) via dispersion staining.

A total of nine samples were collected from each floor with the exception of the three samples collected from the partially occupied 7th floor and ten samples from the 10th floor. This yielded a total of 67 samples.

Sample results indicated the presence of asbestos in 23 of the 67 samples collected. Samples indicating the presence of asbestos were observed from all floors. The asbestos analytical results appear to indicate that the dust and debris may not be homogeneous despite the material appearing homogenous from a visual observation.



[REDACTED]
November 12, 2001
Page 3

Metals

A mixture of bulk and wipe samples were obtained for analysis for metals. Analysis for metals was conducted by Philip Service Corporation (PSC). PSC is an independent AIHA and ELAP accredited laboratory. Analysis was conducted for the Environmental Protection Agency (EPA) priority pollutant metals (though mercury was only conducted in bulk samples).

Four samples were obtained from each floor with the exception of the 8th floor where EMTEQUE obtained five samples. This yielded a total of 33 samples. Based upon EMTEQUE's initial assumption that contamination would be localized to the southwest quadrant, sampling was broken down with four samples from the dirtiest area (southwest corner – one sample), cleanest area (usually the northwest – one sample), and the tapering off areas (two samples).

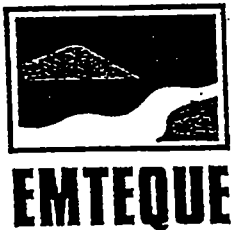
A review of the metals analysis revealed elevated presence of metals within all 33 samples of the dust and debris. Metals levels fluctuated within a single order of magnitude within the debris samples. Levels of beryllium, cadmium, chromium, copper and zinc within the bulk samples were generally above the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance -- Memorandum (TAGM) Soil Cleanup Levels. All bulk samples analyzed for mercury were above the TAGM standards. While the TAGM levels do not apply except in soil contamination, these standards provide a risk-based standard for contamination in bulk material, allowing a means of comparison.

Wipe samples from within those areas lightly covered (or not covered) with dust revealed the presence of metals, though in generally lower levels than in the bulk debris. Twenty-five percent (25%) of the wipe samples taken revealed levels of lead greater than the standard established for the lead clearance criteria by the Department of Housing and Urban Development (HUD). It should be noted that metals were consistently present throughout the dust samples taken. Levels of metals appeared to be relatively consistent with the level of dust present.

Polychlorinated Biphenyls

A mixture of bulk and wipe samples were obtained for analysis for polychlorinated biphenyls (PCBs). Analysis for PCBs was conducted by PSC.

One sample was obtained from each floor with the exception of the 5th and 6th floors from which EMTEQUE obtained three samples and the 8th floor from which two samples were taken. The additional samples were taken from each of the floors and areas that had fire damage. A total of 13 samples were taken for PCBs. This limited sampling was based upon EMTEQUE's initial assumption that PCBs would not be present within the inspected spaces.



November 12, 2001
Page 4

Detectable levels of PCBs were identified in 10 of the 13 samples. Results from the 6th floor revealed relatively low levels at the fire location (62 ppb) and below detection level away from the fire. Levels on the 5th floor ranged from 150 to 360 ppb near the fire to non-detected away from the fire. Levels on the 8th floor ranged from 290 ppb at the fire location to non-detect away from the location. Samples from the remaining floors (without fire damage) ranged from 130 to 1,400 ppb. For comparison purposes, only the sample from the 10th floor exceeded the TAGM soil cleanup objective (and the USEPA health based standard) of 1 ppm. A summary of samples above the TAGM standard is listed in Table 1.

TABLE 1 POLYCHLORINATED BIPHENYLS			
Sample #/Location	Compound(s)	Concentration (ppm)	TAGM Standard (ppm)
PCB-10-01 10 th Floor – Southwest corner	Aroclor 1254	1.4	1

Polycyclic Aromatic Hydrocarbons

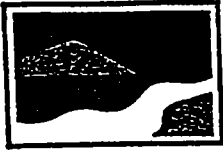
A mixture of bulk and wipe samples were obtained for analysis for polycyclic aromatic hydrocarbons (PAHs)/polynuclear aromatics (PNAs). Analysis for PAHs was conducted by PSC.

One sample was obtained from each floor with the exception of the 5th and 6th floors from which EMTEQUE obtained three samples and the 8th floor from which two samples were taken. Additional samples were taken from each of the floors and areas that had fire damage. A total of 13 samples were taken for PAHs. This limited sampling was based upon EMTEQUE's initial assumption that PAHs would not be present within the inspected spaces.

Detectable levels of PAHs were identified in 10 of the 13 samples. Samples among the non-fire damaged floors appeared relatively consistent. All sample results were below the TAGM Soil Cleanup Objective. Sample results from the fire damaged floors also appeared relatively consistent though slightly higher in concentration than the levels from the other floors. One sample from the fifth floor, located at a secretary's desk in the southwest corner, exceeded the TAGM Recommended Soil Cleanup Objective for chrysene. A summary of samples above the TAGM standard is listed in Table 2.

Silica

A mixture of bulk and wipe samples were obtained for analysis for silica. Analysis for silica was conducted by the RJ Lee Group, Inc. (RJ Lee). RJ Lee is an independent AIHA accredited laboratory.



EMTEQUE

November 12, 2001
Page 5

TABLE 2 POLYCYCLIC AROMATIC HYDROCARBONS			
Sample #/Location	Compound(s)	Concentration (ppm)	TAGM Standard (ppm)
PNA-5-02 5 th Floor – South wall toward SW corner (3 offices from end)	Chrysene	0.7	0.4

Four samples were obtained from each floor with the exception of the 8th floor where EMTEQUE obtained five samples. A total of 33 samples were obtained. Based upon EMTEQUE's initial assumption that contamination would be localized to the southwest quadrant, sampling was broken down with four samples from the dirtiest area (southwest corner – one sample), cleanest area (usually the northwest – one sample), and the tapering off areas (two samples).

Detectable levels of silica were observed within all 33 samples. Sample results ranged from 1.1 to 12.0 percent quartz by weight.

Dioxins

Only bulk samples were obtained for analysis for dioxins. Analysis for dioxin was conducted by PSC. One sample was obtained from each of the subject floors that did not have fire damage. One sample was obtained from the eighth floor, two samples from the fifth floor and three samples were taken from the sixth floor. A total of 11 samples were obtained.

All 11 samples obtained revealed detectable levels of dioxin compounds. In order to review the data, EMTEQUE utilized the World Health Organization (WHO) dioxin equivalency factors (1997). These factors are intended to allow correlation from a level of each dioxin compound to the concentration of 2,3,7,8-Cl₄-Dibenzo-p-dioxin (TCDD). 2,3,7,8-TCDD is considered the most hazardous of the dioxin compounds and each of the other dioxin compounds are compared to this toxicity. After correlation with 2,3,7,8-TCDD, the levels are added to generate a total equivalent concentration. This level was then compared to the TAGM standard of 600 parts per trillion (ppt). Sample results from the fire damaged floors, specifically the 5th and 6th floors were higher in concentration than the levels from the other floors. One sample from each of the fifth and sixth floors were above the TAGM standard. Observed concentrations did not appear completely consistent with the locations of the fires since much higher levels were identified in the two samples away from the fire on the 6th floor rather than the sample at the fire location. The two samples from the 5th floor away from the fire location appeared consistent with the samples away from the fire on the 6th floor. A summary of samples above the TAGM standard is listed in Table 3.



November 12, 2001
Page 6

TABLE 3 DIOXIN			
Sample #/Location	Equivalent Concentration (ppt)	TAGM Standard (ppt)	EPA Superfund Standard (ppt)
D-5-02 5 th Floor – South wall toward SW corner (3 offices from end)	972	600	1,000
D-6-03 6 th Floor – Toward western wall, second cubicle row from southern wall	1098	600	1,000

Due to the nature and hazards associated with dioxins, various groups have recommended that all avoidable exposures be reduced. The EPA and NIOSH have done significant studies on dioxin. Various exposure limits have been proposed but no limits have been established. NIOSH's policy has been that when a threshold for carcinogens that would protect 100% of the population has not been identified then NIOSH usually recommended that occupational exposures to carcinogens be limited to the lowest feasible concentration.

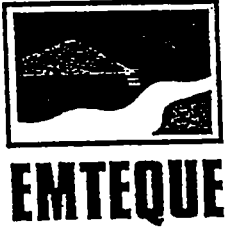
Conclusions and Recommendations

The initial intent of this preliminary assessment was to determine whether potential environmental hazards exist. Based upon the sampling conducted and analytical results obtained, environmental hazards have been identified within the subject space. Based upon the analytical results obtained, EMTEQUE presents the following conclusions:

- Asbestos appears to be present in the debris and settled dust throughout the building.
- Metals and silica were observed to be present throughout the dust and debris. The levels appear relatively consistent and appear dependent upon the amount of dust present.
- Polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) were detected in debris within the building.
- Dioxins were detected within debris in the building.
- Based upon the concentrations identified during the sampling, EMTEQUE concludes that contamination is present throughout the inspected space.

Based upon the identified conclusions, EMTEQUE presents the following recommendations:

- Due to the presence of mercury containing dust that has settled on papers on throughout the space, EMTEQUE has a concern that the mercury may bind itself to the organic fibers within the paper. As such, EMTEQUE recommended sampling paper after it was cleaned by the restoration contractor in order to



[REDACTED]
November 12, 2001
Page 7

ensure that the mercury could be completely removed. On Saturday November 3, 2001, EMTEQUE conducted sampling of a single piece of paper that had been covered with heavy levels of dust since September 11, 2001. A second piece of paper was obtained from an area considered to have a medium level of dust. A third piece of paper was obtained from within a file cabinet that had some dust infiltration. A fourth piece of paper was obtained from an unopened ream of paper to serve as a control sample. Belfour conducted all cleaning of the paper products.

- Due to the levels of dioxins, PCBs, PAHs and mercury observed (with the realization that none of these contaminants would typically be expected to be found in an office environment – or most other environments), EMTEQUE recommends that porous materials (i.e., carpeting, cubicle dividers, ceiling tiles, etc.) be disposed. EMTEQUE's recommendation is based on the fact that it may be difficult (or perhaps impossible) to clean these items. Though EMTEQUE anticipates that cleaning may provide a small cost savings over replacement, the issues of attempting to clean these materials, ensuring their cleanliness at the completion, and ensuring employees' satisfaction with those materials will at least be very difficult. If an attempt is made to perform cleaning of porous materials, EMTEQUE recommends that a pilot study be performed to ensure that any cleaning performed will be sufficient and successful prior to starting a complete cleaning program.
- Recommendations for access, clean-up procedures, salvage of equipment, personal protective equipment, engineering controls, training, etc. will be identified in future specifications and procedures to be drafted by EMTEQUE and approved by [REDACTED]
- Due to the concentrations detected in the sampling for PCBs, PAHs and dioxins, EMTEQUE recommended additional sampling. This work was approved by [REDACTED] and conducted by EMTEQUE on Thursday and Friday, October 25 and 26, 2001. This data was not received in time to incorporate into this report though much of this data has already been incorporated into the summary tables included as an attachment to this report. This additional data will be incorporated into the text of the final site assessment report. The additional sampling was anticipated to allow EMTEQUE to characterize the dust and debris throughout the entire space. The additional sampling results for dioxin indicate that elevated dioxin levels are present in various areas throughout the various floors.

Should you have any questions or require additional information, please contact us at [REDACTED]

Submitted by,

[REDACTED]
[REDACTED] CIH, CSP
Senior Environmental Manager

Reviewed by,

[REDACTED]
[REDACTED]
President

Attachments

[REDACTED]
[REDACTED]
[REDACTED]

Environmental Sampling Report

for

[REDACTED]
[REDACTED] Harrison Street, Apartment [REDACTED]
New York, New York 10013

NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
(212) 627-3900
www.nycosh.org

Field work performed by: [REDACTED]
Dates of project: 8 November 2002

Report Prepared by: [REDACTED]
Date: 19 November 2002

Introduction:

At the request of Ms. [REDACTED] representative, [REDACTED] performed environmental sampling in apartment of [REDACTED] Harrison Street, New York, New York. The building is located a few blocks North of the former World Trade Center complex. The sampling was performed in order to determine if airborne contaminants from the collapse of the World Trade Center towers an subsequent Ground Zero clean up project had reached this building.

Summary:

After the disaster of 11 September 2001, the EPA released information regarding airborne contaminants in and around the site of the former World Trade Center. The clean up at ground zero is now complete. Based on information released by the EPA, and concerns raised, a sampling strategy was developed to examine the apartment to determine if any residual contamination may be present, and effecting the air quality in the apartment building. This apartment has not been lived in since the attacks in September of 2001.

[REDACTED] previously collected a variety of samples from the apartment. The sampling performed included the following:

Surface samples for,

Asbestos

Lead

Mercury

PCB

During the original sampling, high levels of asbestos in dust were found in the bedroom. Upon receiving those results, [REDACTED] requested that another two samples be collected for asbestos. One of these samples was collected outside on the balcony of the apartment, and one was collected inside near the window of the living room.

Results:

The following tables present the data from the sampling.

Table 1 - Asbestos Dust Samples

Sample Location	Result (str/cm ²)	Comment
Left Side of Porch	52,430	Chrysotile
Window stool by door to porch	12,840	Chrysotile

Chrysotile - Chrysotile asbestos fibers detected

Conclusions:

This survey was conducted in the apartment located in [REDACTED] Harrison Street. This site is several blocks to the North of the disaster site.

The dust samples collected on the porch, and inside window stool by the porch did detect asbestos fibers. Although much lower than the initial readings in the bedroom, these level are still higher than expected. At street level, in an urban location, an average reading of 5,000 structures per square centimeter can be expected. This apartment however, is on the 21st floor, and as such we would expect to find much lower levels.

With this elevated reading on the porch, a moderate level just inside from the porch, and the extremely high level found in the bedroom previously, it is our opinion that the collapse of the towers, and subsequent cleaning activities, has contributed to these readings.

Recommendations:

1. Given the extremely high levels of asbestos detected in the dust, a professional contractor should be retained to clean the entire apartment. As part of the cleaning they should also decontaminate the exposed surfaces for lead, and mercury also.

2. The apartment should remain unoccupied until such time as professional cleaning can be performed.

Attached here after are copies of all laboratory report.

Client Name: [REDACTED]

Table I

Summary of Transmission Electron Microscopy (TEM) Results for Asbestos (ASTM D5755 Dust Microvac)

Dand Semar; [REDACTED] Harrison Street, Apt. [REDACTED]

Scilab Sample #	Client Sample #	Surface Area Sampled (sq. cm)	Dilution Factor	Asbestos Structures Detected	* Analytical Sensitivity on Grid (Str / sq mm)	Structure Density on Grid (Str / sq mm)	* Analytical Sensitivity on Surface (Str / sq. cm)	Limit Of Detection (Str/ sq. cm)	Structure Density on Surface (Str/ sq. cm)	Type of Asbestos
01	Porch Left	100.0	0.02000	49	10	490.0	1,070	1,070	52,430	chrysotile
02	By Door Window Sill Inside	100.0	0.01000	6	10	60.0	2,140	2,140	12,840	chrysotile

* structure density represented by the detection of 1 structure
 ** not analyzed

NSD: No Asbestos Structures Detected

Reviewed By: [REDACTED]

Analyzed By: [REDACTED]

Date: 11/10/02

[REDACTED]
[REDACTED]
[REDACTED]

Environmental Sampling Report

for

[REDACTED]
[REDACTED] Harrison Street, Apartment [REDACTED]
New York, New York 10013

NYCOSH
New York Committee for Occupational Safety and Health
275 Seventh Avenue, New York, NY 10001
(212) 627-3900
www.nycosh.org

Field work performed by: [REDACTED]
Dates of project: 20 January 2003

Report Prepared by: [REDACTED]
Date: 30 January 2003

Introduction:

At the request of Ms. [REDACTED] representative, [REDACTED] performed environmental sampling in apartment [REDACTED] of [REDACTED] Harrison Street, New York, New York. The building is located a few blocks North of the former World Trade Center complex. The sampling was performed in order to determine if airborne contaminants from the collapse of the World Trade Center towers and subsequent Ground Zero clean up project had reached this building.

Summary:

After the disaster of 11 September 2001, the EPA released information regarding airborne contaminants in and around the site of the former World Trade Center. The clean up at ground zero is now complete. Based on information released by the EPA, and concerns raised, a sampling strategy was developed to examine the apartment to determine if any residual contamination may be present, and effecting the air quality in the apartment building.

[REDACTED] was contracted to collect a variety of samples from the apartment. The sampling performed included the following:

Surface samples for;

- Asbestos
- Lead
- Mercury
- PCB

Discussion of Sample Parameters:

Units - The following is an explanation of typical units used to explain the results in this report:

- ppm - parts per million.
- mg - milligram (1/1,000 of a gram)
- ug - microgram (1/1,000,000 of a gram)
- ng - nano gram (1/1,000,000,000 of a gram)
- pg - pico gram (1/1,000,000,000,000 of a gram)
- f/cc - fibers per cubic centimeter of air
- str/cm² - structures per centimeter squared
- M³ - Cubic meter of air
- M² - Square meter

Lead - Lead fumes can be expected as steel components of the Trade Center are cut with torches. These materials are known to be covered with a lead based paint to prevent them from corrosion. As the steel is cut this paint will be vaporized, releasing various components, including Lead. Lead is a heavy metal, and continuous exposure to lead has been know to induce brain damage in children, and adults.

Asbestos - Asbestos is known to have been present in the fireproofing on the steel in some areas of the Trade Center. Data collected after the disaster showed that the debris cloud generated from the collapse did carry asbestos with it for many blocks. The gross debris was cleaned up in the first couple nights by the EPA, and their contractors, but the disaster site itself still contains much debris, which contains asbestos. Until the entire demolition and removal of the debris is completed, asbestos can be disturbed, and released as a result of the activities at the site. Asbestos is known to cause a disease called asbestosis, lung cancer and mesothelioma. Asbestosis is a scarring of the lung, creating reduced lung effectiveness. Mesothelioma is a very rare form of cancer which attacks the lining of the lung. This disease is currently always fatal, and death can occur as shortly as six months from the time of diagnosis. The disease is only associated with exposure to asbestos fibers, and the current belief is that any exposure to asbestos fibers could cause it. The onset of the disease could be thirty to forty years after the exposure.

Mercury - Mercury can be found in fluorescent light bulbs, batteries, and non-electric thermostats, and thermometers. Mercury contamination can remain airborne or settle out after rains or with high humidity. Elemental mercury is most toxic in its vapor form, and can vaporize at room temperature. The vapors can absorb onto surrounding materials, and is very difficult to remove from porous substances like carpet, clothing, or furniture. The adverse health effects associated with mercury exposure include, tremors, changes in vision and hearing, insomnia, weakness, memory difficulty, headache, irritability, and dermatitis.

PCB's - PCB's (Polychlorinated Biphenyls) are chemicals that were used in many different types of products. Their main use revolved around electrical equipment due to their great insulating properties. PCB's could be found in Fluorescent light ballasts, and transformers, constructed before 1976 when their manufacturing was banned. Adverse health effects from exposure to PCB's include skin ailments called chloracne, reproductive disorders, and liver disease. PCB's are a suspected human carcinogen.

Results:

The following tables present the data from the sampling.

Table 1 - Asbestos Dust Samples

Sample Location	Result (str/cm ²)	Comment
Dinning Room Floor under Cabinet	9,630	Chrysotile
Livingroom - back of the TV	535	Chrysotile
Bedroom Top of Book Shelf	23,406	Chrysotile

NSD - No asbestos structures detected in sample; Chrysotile - Chrysotile asbestos fibers detected

Table 2 - Lead Wipe Samples

Sample Location	Result (ug/ft ²)
Dining Room - Window Sill	ND
Livingroom - Floor under book shelf	ND
Bedroom - Window Sill	107

ND - None Detected

Table 3 - Mercury Wipe Samples

Sample Location	Result (ug/ft ²)
Dinning Room - Floor in Corner	0.14
Living Room - Top of Book Shelf	0.07
Bedroom - Window Sill	0.34

ND - None Detected

Table 4 - PCB Wipe Samples

Sample Location	Result (ug/ft ²)
Dinning Room - Floor under Cabinet	ND
Living Room - Floor under Vent	ND
Bedroom - Top of AC Sleeve	ND

ND - None Detected

Conclusions:

After the events of 11 September 2001, and the subsequent clean up efforts at the site of the former World Trade Center, the news reported on several contaminants being released as a result of those events. The Federal Environmental Protection Agency, and Occupation Safety and Health Administration have conducted ongoing sampling programs in and around the area. Although they have recorded spikes now and then, a majority of the readings reported are below any level of concern.

This survey was conducted in apartment [REDACTED] located in [REDACTED] Harrison Street. This site is several blocks to the North of the disaster site.

The wipe samples for lead found low levels inside the apartment. These levels were all below the HUD guidelines for wipe samples.

The asbestos samples revealed elevated levels of dust inside the apartment. Based on the levels of asbestos found in other apartments, and in the bedroom of this apartment, it is apparent that high levels of asbestos were present in this apartment. Normal cleaning in the course of living in this apartment has reduced the levels of asbestos on interior surfaces, but has not eliminated it. This reveals that since the events of 11 September 2001, asbestos fibers have been present in this apartment, and cleaning activities have continued to move them around. As a result, those areas where dust builds up can be expected to have very high concentrations of asbestos fibers. These areas where the high levels could reasonably be expected to be are inside computers, and other electronic items, behind, and beneath appliances that are not often moved, and all porous materials such as rugs, carpeting, and upholstery covered furnishings.

The wipe samples for mercury found very low levels of mercury.

The wipe samples for PCB found no detectable levels of any PCB aroclors.

Recommendations:

1. Given the extremely high levels of asbestos detected in the dust at other locations in the building, and the obvious presence of asbestos in the dust within this apartment, a professional contractor should be retained to clean the entire apartment. As part of this cleaning, all porous materials should be discarded, and all furniture should be moved to allow the surfaces behind, and below the furniture to be cleaned. Any electronic equipment should also be opened, and cleaned on the inside.

Attached here after are copies of all laboratory reports.



Eight School Street
Weymouth, MA 02189
781-337-9334

Laboratory Report

Report Date [REDACTED]
Workorder [REDACTED]
No.

Customer: [REDACTED]
[REDACTED]
[REDACTED]

Attention: [REDACTED]

Subject [REDACTED] HARRISON ST [REDACTED] Pb WIPES

Sample: 001 LW-02: 144SQ" DINING ROOM-WINDOW SILL
Date: 01/20/2003
Matrix: WIPE

<u>Parameter</u>	<u>Method</u>	<u>Results</u>	<u>Units</u>	<u>PQL</u>	<u>Analyst</u>	<u>Analysis Date</u>	<u>Qual</u>
Lead, Wipe	7420	ND	ug/sq. ft.	10.0	JRH	01/22/2003	

Sample: 002 LW-03: 144SQ" LIVING ROOM-FLOOR UNDER BOOK SHELF
Date: 01/20/2003
Matrix: WIPE

<u>Parameter</u>	<u>Method</u>	<u>Results</u>	<u>Units</u>	<u>PQL</u>	<u>Analyst</u>	<u>Analysis Date</u>	<u>Qual</u>
Lead, Wipe	7420	ND	ug/sq. ft.	10.0	JRH	01/22/2003	

Sample: 003 LW-04: 144SQ" BEDROOM-WINDOW SILL
Date: 01/20/2003
Matrix: WIPE

<u>Parameter</u>	<u>Method</u>	<u>Results</u>	<u>Units</u>	<u>PQL</u>	<u>Analyst</u>	<u>Analysis Date</u>	<u>Qual</u>
Lead, Wipe	7420	107	ug/sq. ft.	10.0	JRH	01/22/2003	

Client Name: [REDACTED]

Table I

Summary of Transmission Electron Microscopy (TEM) Results for Asbestos (ASTM D5755 Dust Microvac)

Seilab Sample #	Client Sample #	Surface	Dilution Factor	Asbestos	* Analytical	Structure	* Analytical	Limit Of	Structure	Type of Asbestos
		Area Sampled (sq. cm)		Structures Detected	Sensitivity on Grid (Str / sq mm)	Density on Grid (Str / sq mm)	Sensitivity on Surface (Str / sq. cm)	Detection (Str/ sq. cm)	Density on Surface (Str/ sq. cm)	
01	MV-04	100.0	0.10000	18	25	450.0	535	535	9,630	chrysotile
02	Dinning Room Floor Under Cabinet									
	MV-05	100.0	0.10000	1	25	25.0	535	535	535	chrysotile
03	Livingroom Back Of TV									
	MV-06	100.0	0.08000	35	25	875.0	668	668	23,406	chrysotile
	Bedroom Top Of Book Shelf									

* structure density represented by the detection of 1 structure
 ** not analyzed

NSD: No Asbestos Structures Detected

Reviewed By: [Signature]

Analyzed By: [Signature]

Glenn F. Massey

Date: 1/22/03

Mercury Results

Client #	DCL #	Sample Area	Hg $\mu\text{g}/\text{sample}$	Hg $\mu\text{g}/\text{ft}^2$
M-4	03-02174	1 ft ²	0.14	0.14
M-5	03-02175	1 ft ²	0.07	0.07
M-6	03-02176	1 ft ²	0.34	0.34
LOD			0.05	

ND indicates not detected at or above the limit of detection (LOD)

QC Results

Blank	ND
LCS	104.
LCS duplicate	102.

LCS - Laboratory Control Sample



Stephanie Wilcox
Analyst



Reviewer



Consulting & Monitoring

- Asbestos
- Lead
- Soil
- Water
- Air Quality
- Construction

Mr. Liana Klouptz

300 Albany Street
New York, NY 10280

Re: Asbestos Air Sampling conducted for Apt. 5I

Dear Mr. Abrams:

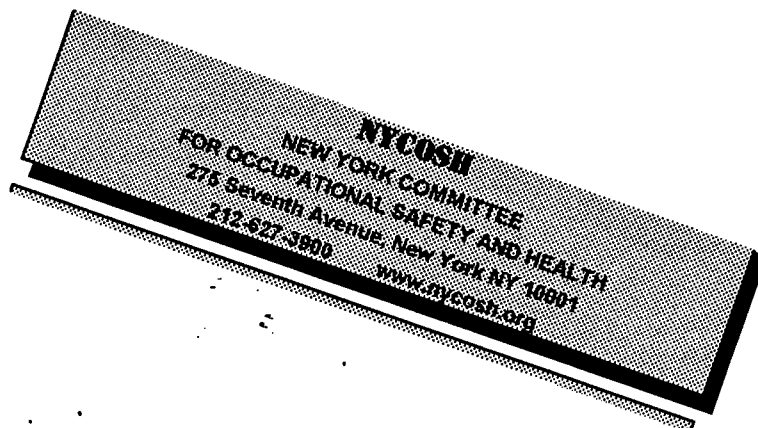
ETNY Environmental, Inc was retained by Liana Klouptz to conduct Asbestos Air Sampling in the Apt. 5I located at 300 Albany Street, New York, NY. They were performed in Apt. 5I of the above-mentioned facility.

The ambience sampling was conducted in accordance with Title 15 Chapter 1 of the New York City Department of Environmental Protection Agency "Rules and Regulations" governing asbestos abatement air sampling for the Apt. 5I. Analysis was conducted via Phase Contrast Microscopy (PCM) adhering to the NIOSH 7400 methodology for PCM analysis. Subsequent analysis of the ambience air samples revealed an airborne fiber concentration of more than 0.01 fibers per cubic centimeter in the living room.

If you should have any questions or require additional information, please contact me at (718) 784-8888.

Sincerely,
ETNY Environmental, Inc.

Francisco Farini
General Manager

13-07 37th Avenue Long Island City, New York 11101 • (718) 784-8888 • (718) 786-7061

MAR 11 '02 15:10 TO-3677356

FROM-PACK & ZIPP

T-443 P.04 F-405



AMBIENT GROUP, INC.

18 Morris Avenue, Glen Cove, NY 11542
 Phone: (516) 897-0009 • Fax: (516) 899-8771

Laboratory Report
AGL01830

Metal Profile

Client: New York Post
 Address: 1211 Avenue of the Americas
 New York, NY 10036-8790

Collected By: Client Submitted
 Collected: 02/06/2002

Lab ID: 0001830-001

Field ID: C/S-1830

Location: Dust Adjacent to the World Trade Center

Job Number: C/S-1830
 Date Received: 02/07/2002

Date Analyzed: 02/07/2002

Job Location: 300 Albee Street, Apartment 51

Matrix: BULK
 Prep Weight: 0.25

Parameter	Result	Units	LOC	Flag
Cadmium	8.0	ug/g	1.00	>LOC
Chromium	71.2	ug/g	10.0	>LOC
Copper	196	ug/g	25.0	>LOC
Iron	12700	ug/g	2,000	>LOC
Lead	158	ug/g	N/A	
Manganese	728	ug/g	N/A	
Nickel	32.8	ug/g	13.0	>LOC
Zinc	1500	ug/g	20.0	>LOC

SIGNED FOR AMBIENT GROUP, INC. BY:



AMBIENT GROUP, INC.

10 Morris Avenue, Glen Cove, NY 11542
Phone: (516) 609-0009 - Fax: (516) 609-8271

Laboratory Report
AGL02649

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP ID#101618-01 NY ELAP ID#10866

Client: Ilona Kloupts
Address: 300 Albany Street Apartment 51
New York N 10230

Job Number: C/S-2649
Date Received: 04/03/2002
Date Analyzed: 04/08/2002
Job Location: 300 Albany Street

Collected By: John Mascioli
Collected: 04/02/2002

Lab ID	Sample Location	Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0002649-001 C/S-2649	Window Sill in Livingroom	Gray, Non-homogeneous, Coarse	Yes	Chrysotile 13%	Cellulose Fiber 20% Mineral Wool 30% Non-Fibrous Material 48.7%

[Signature]
SIGNED FOR AMBIENT GROUP, INC. BY:

This report relates only to the materials tested and must not be reproduced except in full with the approval of the laboratory.
This laboratory report shall not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.
Samples are analyzed according to the EPA Test Method and are subject to the inherent limitations of Polarized Light Microscopy and interference of matrix components.

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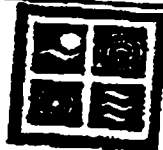
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AMBIENT GROUP, INC.

18 Morris Avenue, Glen Cove, NY 11543
Phone: (516) 894-8000 - Fax: (516) 894-8372

Laboratory Report
AGL01830

Dust Characterization Laboratory Data Report

Client: New York Post
Address: 1211 Avenue of the Americas
New York, NY 10036-8790
Collected By: Client Submitted
Collected: 02/06/2002

Job Number: C/S-1830
Date Received: 02/07/2002
Date Analyzed: 02/07/2002
Job Location: 300 Albany Street, Apartment 51

Lab ID Field ID	Sample Location	Constituents	Percent of Sample wt
0001830-001	Dust Adjacent to the World Trade Center	Carbon Particles	10
		Cellulose	20
		Concrete Dust	28
		Chrysotile	2
		Flint Glass	20
		Ground Road Dust	10
C/S-1830			100

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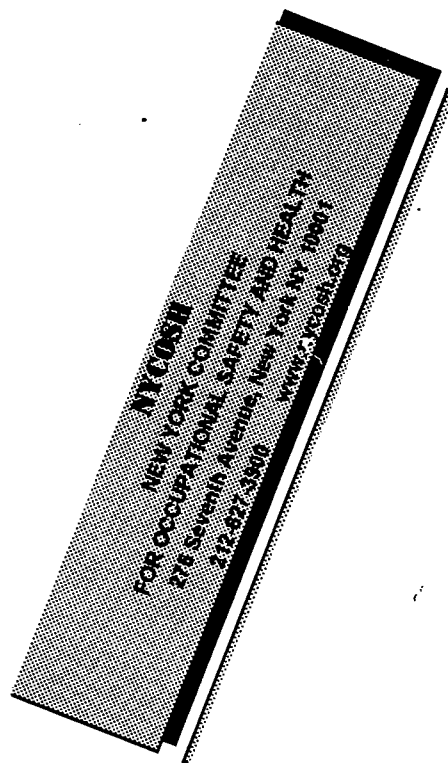
SciLab Job #: [REDACTED]
Client Name: [REDACTED]

Summary of Transmission Electron Microscopy (TEM) Results for Asbestos (ASTM D5755 Dust Microvane)

Table I

Street [REDACTED]

SciLab Sample #	Client Sample #	Surface Area Sampled (sq. cm)	Asbestos Structures Detected	* Analytical Sensitivity on Grid (Str / sq mm)	Structure Density on Grid (Str / sq mm)	* Analytical Sensitivity on Surface (Str / sq cm)	Limit Of Detection (Str / sq cm)	Structure Density on Surface (Str / sq cm)	Type of Asbestos
01	V-1	100.0	0	10	<10	4,280	4,280	<4,280	NSD
02	V-2	100.0	0	10	<10	34,240	34,240	<34,240	NSD
03	V-3	100.0	1	10	10.0	8,560	8,560	8,560	amphibole
04	V-4	20.0	0	10	<10	21,400	21,400	<21,400	NSD
05	V-7	100.0	0	10	<10	8,560	8,560	<8,560	NSD
06	V-10	100.0	1	10	10.0	4,280	4,280	4,280	chrysotile

* structure density represented by the detection of 1 structure
** not analyzed

NSD: No Asbestos Structures Detected

Reviewed By: [REDACTED]; Analyzed By: [REDACTED]

Date: 2/23/03

SciLab Job #: [REDACTED]
Client Name: [REDACTED]

Table 1

Summary of Transmission Electron Microscopy (TEM) Results for Asbestos (ASTM D5755 Dust Microvac)

		Street								
SciLab Sample #	Client Sample #	Surface Area Sampled (sq. cm)	Dilution Factor	Asbestos Structures Detected	* Analytical Sensitivity on Grid (Str / sq. mm)	Structure Density on Grid (Str / sq. mm)	* Analytical Sensitivity on Surface (Str / sq. cm)	Limit Of Detection (Str / sq. cm)	Structure Density on Surface (Str / sq. cm)	Type of Asbestos
01	V-5 Apt 8A Window Well	50.0	0.00250	4	10	40.0	17,120	17,120	68,480	chrysotile
02	V-6 Apt 8A Top Of Door	90.0	0.00000	0	10	<10	1,188	1,188	<1,188	NSD
03	V-8 Apt 8A Window Blinds	100.0	0.00250	4	10	40.0	8,560	8,560	34,240	chrysotile

* structure density represented by the detection of 1 structure
** not analyzed
NSD: No Asbestos Structures Detected

Reviewed By: [REDACTED] : Analyzed By: [REDACTED] Date: 2/23/03

Client Name: [REDACTED]

Table I

Summary of Transmission Electron Microscopy (TEM) Results for Asbestos (ASTM D5755 Dual Microvac)

SciLab Sample #	Client Sample #	Surface Area		Asbestos Structures Detected	* Analytical Sensitivity on Grid		Structure Density on Grid (Str / sq mm)	* Analytical Sensitivity on Surface		Limit Of Detection (Str/ sq. cm)	Structure Density on Surface (Str/ sq. cm)	Type of Asbestos
		Sampled (sq. cm)	Dilution Factor		(Str / sq mm)	(Str / sq. cm)						
01	V-9	100.0	0.00031	2	10	20.0	68,480	136,960	68,480	136,960	chrysotile	

Apr 5A Window WcX

* structure density extrapolated by the detection of 1 structure
as not analyzed

NSD: No Asbestos Structures Detected

Reviewed By: [REDACTED] : Analyzed By: [REDACTED] Date: 2/23/03