

DRAFT 105 Duane Street Fact Sheet

The New York City Departments of Health (DOH) and Environmental Protection (DEP) have been notified by the New York Environmental Law & Justice Project that tenants residing at 105 Duane Street are concerned that asbestos fibers, resulting from the collapse of the Twin Towers, are present within the building and its ventilation systems and pose a health concern. DOH has developed this fact sheet in order to help address these specific concerns.

What sampling has been performed for asbestos at 105 Duane Street?

- Sampling of the air in 209 locations (residential units and common areas) was performed by an environmental consultant, ATC Associates, on behalf of Related Management Company.
- Sampling of three surfaces (two residential units and one common area) within the building and one dust sample from outside of the building was performed by the United States Public Health Service (USPHS) on behalf of DOH.
- Sampling of two surfaces (a 10th floor apartment surface and common area air diffuser) was performed by Ed Olmsted, CIH, on behalf of the tenants.
- Sampling of the air in five locations within the building ventilation system that services the 10th floor common area and in five locations in the common area of the building on the 10th floor was performed by ATC Associates on behalf of and as witnessed by DEP. The DEP laboratory then analyzed these samples.

What are the sampling results?

- All of the 209 air samples collected by ATC Associates, on behalf of Related Management Company, were within the most stringent standard used for clearance in an indoor environment.
- No asbestos was detected in the surface and dust samples collected by USPHS. Results of a more detailed analysis of these samples are pending.
- Both surface samples collected by Ed Olmsted using a vacuum sampling method showed the presence of asbestos fibers.
- All of the 10 air samples collected by ATC Associates, on behalf of DEP, were within the most stringent standard used for clearance in an indoor environment.

Do these results mean I have been exposed to dangerous levels of asbestos?

No. The mere presence of asbestos does not necessarily pose a health concern. For asbestos to cause health problems it must be inhaled. All of the air samples collected at the building, including those from within the ventilation system, indicate that asbestos is not airborne in quantities that would pose a health concern.

Weren't the levels found on the supply air diffuser very high?

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NYC DOH LPPP SURV & RES

DEC-17-2001 12:09

There are no standards or guidelines to compare these results which were collected by Ed Olmstead (ASTM D-5755) by vacuum sample to and the This method used to collect and analyze the samples by Ed Olmstead (ASTM D-5755) can grossly overestimate the presence of asbestos fibers. ~~(we could also add, and recommends that a minimum of three samples be collected from the same area.)~~ Furthermore, the information on this method states that that a minimum of three samples be collected from the same area. and states that, "the user should consider these data in relationship to other available information in their evaluation." In looking at all of the sampling data collected so far, they suggest that asbestos does not pose a health threat at the building. However, the presence of asbestos in the ventilation system and concern over the cleanliness of this system does warrant its proper and safe cleaning.

How should the ventilation system be cleaned?

The ventilation system should be cleaned using procedures that will prevent the dispersion of any small particles and fibers, including asbestos, into occupied or cleaned areas of the building and ventilation system. This would involve the use of a HEPA vacuum. DEP will be present to monitor the cleaning process. DEP PLEASE Add more details. Recommend air monitoring during the process??? I think so. Discuss DEP oversight? Questions about the project to DEP?

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ACTS
ARTS, CRAFTS AND THEATER SAFETY

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Joel R. Kupferman, Esq.
Executive Director
New York Environmental Law & Justice Project
315 Broadway - Suite 200
New York NY 10007-1121

December 11, 2001

Dear Joel Kupferman,

I have reviewed the December 9, 2001 report on asbestos sampling done by Ed Olmsted, CIH, at 105 Duane Street.

I concur with Mr. Olmsted's conclusion that the sample taken from the air diffuser in the 10th floor public hallway shows levels of asbestos well above the recommended limit of 1000 structure per square centimeter.

I also concur that the finding of 555,000 asbestos structure per square centimeter is a clear indication that the ventilation system should be cleaned by a professional duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination. I would add that the work must be done by trained and certified asbestos abatement workers who can prevent contamination of other parts of the building while they work.

I also would add that this single sample should be followed up by other samples taken from other locations in the ventilation system. This sampling must be undertaken immediately because asbestos fibers in ventilation systems are likely to deposit throughout the building. The reading of 740 asbestos structures per square centimeter on the living room table top is high enough to cause concern that further deposition could be hazardous. If the cleaning is delayed until many apartments attain levels requiring abatement, the cost of cleanup will rise exponentially.

It is also likely that there are already apartments in the building in which the asbestos dust levels are much higher. These locations are most likely to be those in which the air is supplied by diffusers that are closer to the ventilation system's air intakes and filters. People living in these apartments may be at risk now.

Respectfully submitted,



Monona Rossol, M.S., M.F.A.,
industrial hygienist

105 DUANE ST

Post-It® Fax Note 7671		Date 12/17/01	# of pages 1
To Dr. J. Leighton		From KRISK	
Co./Dept. DOH		Co. DEP	
Phone #		Phone # 718-595-3718	
Fax # 212-676-6326		Fax # 718-595-3744	

Post-It® Fax Note 7671		Date 12/17/01	# of pages 1
To DR. JESSICA LEIGHTON		From P. Phedorellus	
Co./Dept. NYC DOH		Co. NYC DEP	
Phone # (212) 676-6323		Phone # (718) 595-3657	
Fax # (212) 676-6326		Fax # (718) 595-3744	

1. What sampling has been performed for asbestos at 105 Duane Street?

Replace bullet 4 with the following:

ATC Associates, on behalf of the building owner and under the direction of the DEP, performed air sampling at five locations within the common hallway of the tenth floor. One of these samples was placed directly in front of the supply air entry point (air diffuser). Another set of five samples was collected from the second floor air handling room which services the common areas.

2. What are the sampling results?

In bullet 4, replace on behalf of DEP with on behalf of the building owner.

4. Weren't the levels found on the supply air diffuser very high?

The analytical results of vacuum samples do not have an approved standard or guideline for evaluation. The assessment of the ventilation system is ongoing.

Delete: However, the presence of asbestos in the ventilation system...its proper and safe cleaning.

5. How should the ventilation system be cleaned?

The building owner has forwarded a plan for the clean up of the ventilation system to the DEP. The DEP has reviewed the plan and will inspect the site during the clean up. The assessment of the ventilation system will continue throughout the cleaning process.

CLEAN**INDOOR AIR QUALITY & MECHANICAL HYGIENE**

Mr. Peter Hoyle
November 27, 2001
Page 5 of 6

SCOPE OF WORK

1. All grilles and diffusers, either internal to apartments or in common areas, will be treated as follows:
 - a. The grille will be removed and bagged.
 - b. Each grille will be water and detergent washed.
 - c. Each grille will be sanitized with an anti-microbial agent.
 - d. The grille will be re-installed.
 - e. Access to each apartment will be required three (3) times on the day of the cleaning.
 1. The grille will be removed and the ductwork will be sealed.
 2. The horizontal ductwork will be cleaned.
 3. The grille will be re-installed and housekeeping will be done.
2. The kitchen and exhaust ductwork will be addressed as follows:
 - a. The horizontal ductwork will be cleaned using a pneumatic-powered whip.
 - b. The horizontal ductwork will be HEPA vacuumed.
 - c. The vertical risers will be cleaned with a pneumatic whip or rotating brush depending on the internal size.
 - d. Any debris will be trapped in a HEPA-filtered collection device.
 - e. The exhaust fans will be disassembled, HEPA-vacuumed and re-assembled.
 - f. All internal surfaces, from terminal ends of horizontal to the rooftop fan, will be treated with an anti-microbial agent via an airless sprayer or by a hand-wiping method (from the rooftop to the bottom of the vertical run).
3. The air-handling systems and associated ductwork will be addressed as follows:
 - a. The HVAC system will be sequentially addressed in the direction of the airflow.
 - b. The return ductwork grilles will be cleaned as discussed in Section 1.
 - c. The horizontal ductwork will be cleaned using a pneumatic whip.
 - d. Any debris will be collected in a HEPA-filtered collection unit.
 - e. If internal cross-section of the ductwork is larger than 24 inches by 24 inches, a technician will enter it and will contact-clean with a HEPA vacuum.
 - f. The outside air intake louvers will be pressure-washed or HEPA-vacuumed, as applicable.
 - g. All internal surfaces of the air-handling unit will be HEPA vacuumed to 99.97% efficiency at .3 microns.
 - h. The coils will be high-pressure water-washed or HEPA vacuumed, as applicable.
 - i. The supply ductwork will be cleaned using the same protocols described above.
 - j. All internal surfaces of the air delivery system will be treated with an anti-microbial agent via an airless sprayer or hand-wiping method.



Ambient Air Sampling

Fiberglass In Air via PCM

Twelve ambient air samples collected within the common areas lobby were analyzed for fiberglass using the Phase Contrast Microscopy (PCM) analytical method. All samples collected recorded fiber levels less than 0.01 f/cc

In the absence of a specific ambient air standard for fiberglass, ATC has selected as a criteria for acceptable ambient air sample sets, the NYCDEP re-occupancy requirement following an asbestos abatement action of an average of less than 0.01 fibers per cubic centimeter (0.01 f/cc²).

In conclusion, based upon the analytical results for fiberglass recording fiber concentrations below the NYC acceptable airborne clearance requirement following an abatement action, it is ATC's opinion that the ambient air samples collected throughout the building meet an acceptable criterion for re-occupancy

PCB's in Air

One ambient air sample collected within the lobby and analyzed for PCB's recorded analytical results less than analytical detection limit.

Indoor Air Quality

The IAQ evaluation included collection of seventy-five real-time measurements of temperature, relative humidity, carbon dioxide (CO₂), carbon monoxide (CO), respirable particulates and total volatile organic compounds (TVOC). Currently, there are no regulatory standards for indoor air quality in non-industrial buildings, such as residential units. For the real-time data collected, ATC uses the commonly accepted guidelines cited in the following publications:

- *Ventilation for Acceptable Indoor Air Quality (ASHRAE 62-1999)*, American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE);
- *Thermal Environmental Conditions for Human Occupancy (ASHRAE 55-1992)*;
- *Industrial Hygienists Guide to Indoor Air Quality Investigations (1993)*, American Industrial Hygiene Association (AIHA).

PARAMETER	TARGET LEVEL	AGENCY OR ORGANIZATION
Carbon Dioxide (CO ₂)	<700 parts per million (ppm) above background level	ASHRAE 62
Carbon Monoxide (CO)	9 ppm	USEPA NPAAQS (as cited in ASHRAE 62)
Respirable Particles (PM ₁₀)	50 micrograms per cubic meter of air (µg/m ³)	USEPA NPAAQS (as cited in ASHRAE 62)
Temperature	Summer: 73-79°F at 50% RH Winter: 68-75°F at 50% RH	ASHRAE 55
Relative Humidity	30 - 60 %	ASHRAE 55



Ambient Air Sampling

PARAMETER	TARGET LEVEL	AGENCY ORGANIZATION	OR
Total Volatile Organic Compounds (TVOC)	1 ppm	AIHA	

USEPA = United States Environmental Protection Agency
NPAAQS = National Primary Ambient-Air Quality Standard
AIHA = American Industrial Hygiene Association

All parameters measured during the IAQ assessment were within recommended guideline ranges.

PCB's in Air

One ambient air sample collected within the lobby and analyzed for PCB's recorded analytical results less than analytical detection limit.

Dioxins

Results for the one ambient air sample collected within the lobby for airborne Dioxin is pending. The limited availability of Dioxin laboratories and large backlog volume prevents an accurate estimate of return.

Airborne Metals

One common area and nine residential units were sampled for and analyzed for airborne metals (copper, lead, and chromium). All recorded analytical results were less than analytical detection limit for lead and chromium. Detectable levels of copper were detected in seven samples and were more than 1000 times lower than the best available occupational standards. There was no observed likely source recorded for the copper.

identify fibers one tenth the size of those characterized by the Phased Contrast Microscopy (PCM) method. In addition, the TEM test standard of 70 structures per square millimeter of filter surface the methodology used by school systems nationally to assure that children are protected.

3. We will provide a listing of the air test results by date and location from ATC for all the hallways and other common areas as soon as it is available from the lab.
4. We will continue to have ATC perform air sampling in random locations in the building every two weeks for at least the next two months and will provide copies of the results as available. The ATC ongoing testing will be performed on November 7th, November 21st and December 5th. You can sign up at the concierge for your apartment to be tested on those dates if you prefer.
5. We will have ATC perform air tests for heavy metals such as lead, and chromium in addition to pcb, pvc (dioxin), and volatile organic compounds. The test samples should be taken on October 25th and we will advise you of the results when available.
6. We will have ATC inspect every apartment in the building on October 24th between 9:00 a.m. and 7:30 p.m. to confirm any potential dust conditions. RMC staff will accompany ATC, and we will use our keys to access your apartment if you are not at home.
7. Contractors qualified to handle rigging according to a protocol established by ATC will be cleaning the exterior of the building. We are expecting the contractor will start at the beginning of the week of October 29th and will work on a 7 day per week schedule subject to weather conditions.
8. Our building staff is now equipped to use HEPA vacuums in common areas for isolated dust locations that you believe are concerns. Simply advise the concierge desk and they will respond.
9. If you desire, we can provide you a HEPA vacuum for you to use in your apartment. Simply sign it out at the concierge desk.
10. We will clean any a/c filter in your apartment as you request. Simply call the front desk and they will fill out a work order. Any filters cleaned will be bagged and replaced with a clean one. The filters are reusable, however, we will not wash them out in your apartment.
11. We are investigating the replacement of the a/c unit filters in your apartments with filters that take out more particles from the air. The standard filter is a wire mesh that is not very efficient at removing particles in the current environment. We are therefore reviewing the possibility of replacing them throughout the building with more efficient filters that will fit in the existing filter sleeves.
12. All the fresh air that comes into the building for common areas and is heated and/or air-conditioned for the lobby, hallways etc is currently filtered. This filtered air is provided to the lobby and hallways under a small amount of pressure and finds its way into all the apartments by design for a healthy turnover of fresh air. The circulation is continued as the air in your apartment is drawn out through the vents in your bath and kitchen areas and exhausted at the roof. We will be immediately replacing our standard filters in the common area HVAC equipment, which are rated to collect approximately 15% of particulate as small as 3 microns, with high efficiency filters that will remove 250% of the particulate of the same size as the standard filters. In addition, we will double the frequency that these filters are

Enclosed in the booklet was:

1. An article from the NY Times of Oct 11 regarding independent test results of the air quality in the area.
2. Specific information and air monitoring data regarding the air testing results of the federal EPA in the specific area of our building. (you may get ongoing information at www.epa.gov)
3. Specific information from US Environmental Protection Agency (EPA) relating to their testing of water quality
4. Frequently asked questions about the testing being performed by EPA
5. Recommendations of the NY City Department of Health (DOH) regarding steps to take on returning to your home.
6. Public health advisory from DOH regarding air quality and dust.
7. DOH fact sheet covering frequently asked questions about asbestos.

At the meeting we discussed the information that was available to us, and the decisions we made in the days after the tragedy:

1. We cleaned and shampooed all the common area carpets.
2. We turned off incremental air conditioning units in every apartment.
3. All the common area A/C units were shut down, filters changed and serviced by our a/c contractor before they were restarted.
4. We inspected approximately 20 apartments and found no indication of dust accumulations.
5. EPA and NY City Department of Environmental Protection (DEP) findings in the first weeks indicated no health risk to residents from ambient air quality in the area of the building on the basis of asbestos testing in particular. DEP guidelines specifically characterized our obligation to use wet methods and HEPA vacuums to clean up dust accumulations. However, we did not see any evidence of dust in the building or in the 20 apartments we reviewed.

Over the last 10 days in particular there have been articles written and meetings held questioning what may be in the air that is not being tested for by EPA in the immediate area of the building and this is certainly creating concern for all of us. Therefore going forward:

1. We will initiate a protocol of air testing that will be established by our licensed consultant, ATC Associates. We will be testing on all floors and common areas on Wednesday October 24th and Thursday October 25th. If you want one of the tests to be in your apartment please sign the request at the concierge desk and we will try to accommodate you subject to the schedule of ATC technicians. Be aware that one of our residents has requested that the testing be performed between midnight and 6:00 am. If so, we will limit it and will advise you in advance if there is any expected significant noise.
2. The test we will use in the building will be the Transmission Electron Microscopy (TEM) method of testing for asbestos fibers as small as 0.5 microns. This test can

- replaced, from every 6 weeks, to every 3 weeks as long as there are continuing measurable emissions from the WTC site.
13. We are working to identify a qualified contractor to clean all the air ducts that service the common areas and the apartment vents and will advise you when the work will commence.
 14. One of the residents has asked us to look into installing HEPA filters on the HVAC equipment. This is typically only done for hospital surgical and infectious disease spaces. Nevertheless, we are looking at how these filters would be installed, the impact on the equipment and of course costs associated both initially and on an ongoing basis. We will advise you of our findings.
 15. We are working through the Real Estate Board of NY to have a letter issued from the Commissioner of the NYC DEP that characterizes their efforts and the nature of the testing standards they are applying to the ambient air conditions. We hope that this letter will provide additional comfort.

Neighborhood:

We recognize and appreciate the numerous inconveniences that you are dealing with every day. Related Companies has and will continue to communicate regularly with representatives of the City government offices. We must recognize that the decisions of the Mayor and the Governor are influenced most significantly by the multiple law enforcement agencies overseeing the WTC site investigation.

We have also, as part of the booklet, provided you with a listing of local elected city, state and federal officials that you should feel free to contact to advocate on your behalf. Your multiple voices will be heard more clearly than will ours.

While we are not satisfied with the current neighborhood conditions, we must also reflect on the exceptional progress that has occurred in just the last 5 weeks to restore some of the access and convenience of downtown. Hopefully, the progress will continue expeditiously and comprehensively.

Emergency Systems:

The building is serviced by a set of battery back up emergency lights in the fire stairs. Every other lamp has the battery back up and the lamps should stay lit for approximately 90 minutes after the electricity goes out. We found that approximately 25 of these emergency lights did not perform as expected and they have been replaced. Though it meets all building code requirements for the building, we will also investigate upgrading the emergency lighting system.

A resident has questioned the posted fire safety plan, which indicates that a public address system is provided and there appeared to be none in use at the time of the tragedy. In fact, the PA system referred to in the plan is for the use of the fire department only and allows them to communicate at their stations in the building. Again, though the building meets all fire code requirements, these are times when people are more

concerned about the possibility of evacuation, and we will investigate installing some form of PA system that would be audible to all residents.

Please note in times of evacuation, the police or fire department are responsible for moving throughout the building to advise the residents to leave on the floors they feel need to.

Though we received hundreds of calls from residents at our hotline number in the days after the tragedy, there were an equal number of residents that did not call us. We tried to contact many of you at the phone numbers you had provided to us, and which were maintained at the concierge desk. However, most were not able to receive those calls. We are therefore working on ways to enter emergency and cell phone numbers for our residents, along with email addresses into our database and will be advising you in the next couple of weeks of that opportunity.

We are aware that the Federal Emergency Management Agency (FEMA) and the Red Cross may be able to help residents financially. Please contact them at:

FEMA 800.525.0321
Red Cross 800.514.5103

If any residents have information that may be of assistance to others in the building, please provide same to the management office and we will distribute to the residents at large.

Lease Issues:

We have to date tried to provide you with a number of options to address the changing needs of your families. We would not presume to suggest what decisions you should make. We believe that we have acted swiftly and carefully to restore our building to good condition and to provide for all the amenities of residency that we control. We have also tried to compensate you beyond the time you were forced to be away from your homes. We want you to stay with us for years to come.

The following should summarize our previously issued correspondence:

1. Your September rent payments have been credited for the days that ConEd was unable to provide utility services.
2. We have provided a rent concession of 25% for October and November to every resident who is current in their rent. This will be reflected on your November rent statement.

Please be advised, in order to provide you additional flexibility:

1. Any resident who transfers and signs a new one-year lease in another Related building will receive a **first full month free concession** in the new apartment. Our leasing office has a listing of all Related luxury buildings in Manhattan. Please note that our Related leasing staff will also be able to lease for early 2002 occupancy in our new Chelsea buildings, the Westminster located at 20th St and 7th Avenue (leasing

starts in December), and the Sierra located at 15th St and 7th Avenue (leasing starts in February) with a total of almost 400 apartments to chose from! Simply call the Tribeca Tower leasing office at 346-7900, call our Related Rentals hot line at 212.828.6700, or look us up at www.relatedrentals.com.

2. We will allow you an early termination of your lease if you transfer to another apartment in the Related portfolio of luxury buildings. For residents who want to transfer to another Related building but only want to make a short term commitment we can offer a one year lease and provide an early termination rider that allows you to exit with 60 days notice **with a minimum stay in the new building of 6 months**. If the new Related building is not rent stabilized, we will enter into a new lease for less than one year, but for no less than 6 months. However, in either case **you will only earn the full month concession if you fulfill a full year in the new apartment**.
3. We have requested that NY regulatory agencies allow our affordable residents preferences for transfer to other Related buildings in Manhattan, subject to eligibility and other program guidelines.
4. We will allow any resident who has lost an immediate family member in the September 11 tragedy to exit the lease at any time without penalty.

In addition, we would like any interested residents to join us at a follow up meeting at which Mr. Brodsky will again be available to update you, along with a representative of our environmental consulting firm, ATC Associates, on October 30th at 6:30 pm.

As always, thank you for your kind words regarding the commitment of our building maintenance, administrative and leasing staffs. They have been working tirelessly to try to compassionately address your needs while dealing with the tragedy themselves. We are grateful for your support.



Ambient Air Sampling

To: Related Management Company
Subject: Summary of Ambient Air Sampling to Date
Re: Tribeca Tower
From: Fred Burkhardt
Date: December 11, 2001

The following is a brief summary of the observations, real-time monitoring, and ambient air sampling performed at Tribeca Tower to date.

Apartment Visual Inspection

ATC visually inspected 406 units for accumulated dust and/or debris consistent with material that from ATC's experience emanated from the collapse of the World Trade Center Buildings. Thirty-four units were inaccessible or the occupants refused access and were not inspected.

Of the 406 units inspected, ATC did not observe any dust and/or debris accumulations that in ATC's opinion was consistent with widespread deposition of material that emanated from the collapse of the World Trade Center Buildings. However, ATC observed adjacent to open windows in four units, limited dust accumulations (no debris) although inconsistent with material that emanated from the collapse of the World Trade Center Buildings present nonetheless.

Asbestos Air Sampling via TEM

ATC collected a total of 60 common area and 149 residential unit samples to ascertain the presence or absence of airborne asbestos. All samples were collected and analyzed in accordance with the AHERA Transmission Electron Microscopy (TEM) method as set forth at 40 CFR Part 763, Subpart E, Appendix A which provides resolution down to 0.5 μ . structure size. Of the total 209 samples collected, a single asbestos structure was detectable on only two samples.

In the absence of a specific ambient air standard, ATC has selected as a criteria for acceptable ambient air sample sets, the AHERA re-occupancy requirement following an asbestos abatement action of an average of less than 70 asbestos structures per square millimeter (<70 s/mm²) per sample set. This criteria has been selected because the AHERA requirement is the most stringent reoccupancy requirement available, and has been designed to be protective of children following an asbestos abatement project.

Based upon analytical sample results for all samples recording levels well below the AHERA clearance requirement, it is ATC's opinion that the ambient air samples collected throughout the building are representative of the ambient conditions at the time of testing and that the areas tested meet an acceptable criterion for re-occupancy.

Date: October 19, 2001

To: Residents of Tribeca Tower

From: Related Management Company

We want to thank all of you who attended our resident meeting last evening. The turnout on short notice was extremely gratifying and the dialogue was extremely helpful as we continue our effort to be as responsive to your needs as possible.

All of us recognize that as hard as we listen, we may never be fully able to understand the impact the WTC tragedy had on the lives of the people living in lower Manhattan. We respect your individual reactions, perceptions and your fears. We hope to earn your respect for the steps we will be taking to address your concerns as our interests are aligned. We all want to make you as comfortable in your homes as quickly as possible.

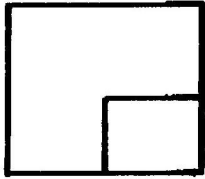
This spring we asked you for your thoughts on the building and its services and we were extremely pleased with your comments. In fact, we received 108 responses and 98% indicated that they felt they would recommend the building to a friend, that they felt at home at Tribeca Tower and that the building was professionally managed. In addition, 97% indicated that they have been promptly and clearly informed of any changes that affect them as a resident.

Nevertheless, we do not believe that we have distributed information to you either as comprehensively or as frequently as could have been done over the last 3 weeks since your return to the building and for that we **apologize**. Over the next couple of months in particular we will be distributing updates on this correspondence to every resident at their door in addition to providing copies in the mailroom or at the concierge desk. We will do our best to see that you are fully informed.

The following is a summary of the issues we presented and discussed at the meeting including suggestions that were made that we can address immediately and those that we can pursue going forward:

Air Quality:

Each resident was provided with a booklet of information that addressed air quality, the primary concern that has been reported to us over the last couple of weeks. Copies of the booklets are available in the mailroom for every resident who may not have been able to attend the meeting.

**Related Management Company, L.P.**203 East 86th Street

New York, New York 10028

212-319-1200 Fax 212-981-5060

One of the Related Companies

Fax Cover Sheet

TO: CARL LUTCHMEDAL

FROM: L. BERGENTY

RE:

DATE: 12/13/01

Total number of pages including cover: 17

**If you have any questions or concerns regarding
this fax, please call 212-319-1200**

NEW YORK ENVIRONMENTAL LAW & JUSTICE PROJECT

*member of the Clean Water Network
member of the National Lawyers Guild*

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December 11, 2001

Department of Environmental Protection
Bureau of Air, Noise and Hazardous Materials
Asbestos and Lead Control Program
59-17 Junction Blvd.
Corona, NY 11373
Tel: (718) 595-3882
Fax: (718) 595-3749

Attn: Mr. Carlstein

RE:	Asbestos Condition at 105 Duane Street, NY, NY 10007 Building Owner: Related Management Company, L.P.
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Dear Department of Environmental Protection,

This letter is a formal notification of a complaint with regards to a high level of asbestos contamination at 105 Duane Street, New York, New York. Proper asbestos methods as required by law and regulation are not being utilized¹. We require immediate action due to postpone any work on the ventilation system in that building which is to begin on Wednesday, December 12, 2001. A survey was performed on December 3rd, 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 building through the ventilation system. This survey was made to determine the level of asbestos in dust in the level of asbestos in dust in the dust in the 10th floor apartment and hallway of the building.

¹ Several residents of the building and myself noticed that the hallway air grilles were removed for cleaning. In their place, management placed plastic and paper products to supposedly provide professional protection which were applied in such a manner that many were found to have fallen off within 24 hours of application. See picture.

On December 3rd, dust samples were taken by Mr. Olmsted from the 10th floor to determine whether asbestos fibers were settled on surfaces. The results reported in fibers per square centimeter of surface tested. The following summarizes Samples E1203-2: sampled from supply air diffuser in the 10th floor public hallway. Result - 555,000 asbestos structures per square centimeter.

These samples were analyzed by: International Asbestos Testing Laboratory (IATL), 1600 Horizon Way Unit 1000 Mt. Laurel NJ 08054-NYS Department of Health Certification # ELAP 11021.

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 buildings collapsed.

The duct system should be cleaned by a profession duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination. [see attached letter]

Another Industrial Hygienist, Monona Rossol, M.S., M.F.A., concurs stating that " ... the finding of 555,000 asbestos structure per square centimeter is a clear indication that the ventilation system should be cleaned by a professional duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination. I would add that the work must be done by trained and certified asbestos abatement workers who can prevent contamination of other part of the building while they work." [see attached letter]

Further documentation will be provided shortly. Please give this matter your immediate attention and action.

Yours,


Joel R. Kupferman

Attorney for the Concerned Tenants of 105 Duane Street

cc: New York City Department of Health
New York State Department of Health
New York State Department of Environmental Conservation
United States Environmental Protection Agency Region #2-
Robert Fitzpatrick & Ken Eng
Cong. J. Nadler
NYC Councilmembers K.Freed, S. Michels
Assemblymembers Brodsky, Gottfreid, Silver, Glick
State Senator Patterson
WTC Emergency Environmental Group
Related Management Company, L.P.

Date: December 9, 2001
To: Joel Kupferman
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 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.

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:

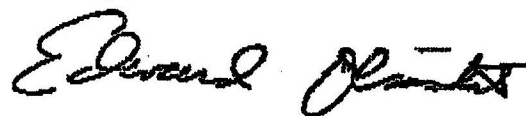
Sample C620204 sampled in living room from table top
Result- 740 asbestos structures per square centimeter

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 grills 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

ACTS
ARTS, CRAFTS AND THEATER SAFETY

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E-mail: ACTSNYC@aol.com
http://www.casweb.com/acts

Joel R. Kupferman, Esq.
Executive Director
New York Environmental Law & Justice Project
315 Broadway - Suite 200
New York NY 10007-1121

December 11, 2001

Dear Joel Kupferman,

I have reviewed the December 9, 2001 report on asbestos sampling done by Ed Olmsted, CIH, at 105 Duane Street.

I concur with Mr. Olmsted's conclusion that the sample taken from the air diffuser in the 10th floor public hallway shows levels of asbestos well above the recommended limit of 1000 structure per square centimeter.

I also concur that the finding of 555,000 asbestos structure per square centimeter is a clear indication that the ventilation system should be cleaned by a professional duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination. I would add that the work must be done by trained and certified asbestos abatement workers who can prevent contamination of other parts of the building while they work.

I also would add that this single sample should be followed up by other samples taken from other locations in the ventilation system. This sampling must be undertaken immediately because asbestos fibers in ventilation systems are likely to deposit throughout the building. The reading of 740 asbestos structures per square centimeter on the living room table top is high enough to cause concern that further deposition could be hazardous. If the cleaning is delayed until many apartments attain levels requiring abatement, the cost of cleanup will rise exponentially.

It is also likely that there are already apartments in the building in which the asbestos dust levels are much higher. These locations are most likely to be those in which the air is supplied by diffusers that are closer to the ventilation system's air intakes and filters. People living in these apartments may be at risk now.

Respectfully submitted,


Monona Rossol, M.S., M.F.A.,
industrial hygienist

December 8, 2001

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To:

Lisa Bergenty

Jeff Brodsky

Tami Caldwell-Kimble

From:

PII

Re: Duct cleaning at 105 Duane St.

On the morning of December 4 a group of tenants from 105 Duane met with Alan Harris to discuss the imminent duct cleaning. Alan explained that our inquiries should be directed to the three of you, so we are using this memo to pass on the content of our discussion and to make a specific request regarding the duct cleaning. This memo will also be posted online and accessed by various tenant groups within the building.

While it appears that Related Management is attempting to address the health and welfare concerns of its tenants, there have been serious lapses in judgement and substantial omissions in action with regard to assessing and addressing the initial and ongoing dangers posed to residents by the WTC demolition site.

These lapses and omissions have considerably eroded tenant confidence in the level of professional competency to be expected from contractors and consultants Related retains to test and cleanup 105 Duane. All testing and cleaning efforts to-date have proceeded without the scrutiny of an objective third-party, answerable to tenants, management, and state and federal health and environmental organizations.

On December 5th, the New York Board of Health held a special meeting with numerous tenants from 105 Duane in order to document residents' ongoing health concerns and to share the DOH's own efforts to quantify the continuing health risks presented by toxins continuously emitted from the WTC demolition site.

Not surprisingly, even within an organization dedicated to the maintenance of public health, there exists a great tension between making responsible determinations of safety concerning an unprecedented circumstance and casting a cloud of health-related uncertainties over the downtown area, scaring away residents, workers, and businesses.

However, one had only to hear the litany of chronic health-complaints and assess the level of anger and frustration present at this focus group to understand that significant, chronic health symptoms continue to plague residents at 105 Duane and elsewhere.

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Related Management needs to grasp the level of anger and fear which continues to grow amongst residents and workers in the downtown area and should not assume that health experts can authoritatively state that continued exposure to WTC-site toxins will not lead to chronic, life-threatening illnesses--because no one really knows.

It is only a matter of time before this groundswell of apprehension and concern receives media attention, expresses itself through community organizing, and begins to seek out responsible parties in both the public and private sector.

Here is a partial listing of the lapses and omissions which have alarmed residents:

TESTING

- failure to properly inform residents how to prepare their apartments for testing

Attached to this letter you will find (see Document 1, page 6) a "Residential Sampling Fact Sheet" distributed by the New York Department of Health, which clearly enumerates those activities residents must NOT undertake on the-day-before and the-day-of testing.

As you are probably aware, neither Related nor ATC made any effort to distribute such instructional documents to residents prior to each testing at 105 Duane. Nor did any of the onsite testing personnel suggest to their superiors (or any residents) that running a HEPA filtration unit in the presence of the testing medium (and other such violations of good testing practice) might lead to false results.

- no testing results reported to residents for any substance other than asbestos
- no testing of dust samples in apartments or common areas

The presence of asbestos would, of course, require rigorous abatement to federal standards, thereby exposing the landlord to intense regulatory scrutiny. Not surprisingly, asbestos became the priority substance to test for at 105 Duane. While Related quickly reported with some fanfare that "test results indicated there are no asbestos fibers in those apartments sampled" (bold-face in the 11/28 letter to residents), Related's reports on other toxic substances were then inexplicably delayed and have subsequently never materialized.

The complete lack of test data for fiberglass, silica, gypsum, lead, PCBs, etc. (substances of perhaps more concern to residents than asbestos) is a most provocative omission. Either the promised testing (10/29, 10/31 letters to residents) was not performed, or the results were not to Related's liking and so withheld from residents and staff.

Perhaps it is hoped that the common area testing of December 5th will produce more palatable and, therefore, more reportable results?

No one, other than Related Management personnel, has been told the date and location for every test-site, the specific substances tested for in each instance, or the results obtained. For example, which specific “common areas” were tested and on what dates? And how rigorous were the testing procedures—more rigorous than those employed in the apartment testing?

There can be no conclusive verification to-date of the presence or absence within the building of any compound or chemical substance cited in ATC’s reports, let alone the hundreds known to escape ground-zero on a daily basis. No one can be sure that any test results, whether reported in the past, present, or future, are not reflective of the flawed testing procedures noted above.

CLEANING

- failure to hire a cleaning company with professional abatement experience: using standard cleaning supplies such as Windex, not wearing gloves or respirators, etc.
- failure to protect tenants passing through common areas from exposure to any substances dislodged or agitated by the activities of cleaning personnel

Perhaps Related merely demonstrated naivete in undertaking such cleaning measures (no doubt misled by the results of ATC’s flawed testing procedures) and did not intend to misrepresent to residents the true expertise and competency of this “professional cleaning company” (11/28 letter to residents). But none of these actions has served to bolster confidence in the quality of the contractors retained, nor in the competency of their efforts and evaluations.

HVAC AND DUCT CLEANING

As you stated in your November 28th letter to residents: “the contractor was pre-qualified by our consultant.” This “consultant” (who is perhaps ATC?) and the “mechanical hygiene contractor” are answerable only to Related, not to any tenant.

After the insufficiencies and incompetencies only touched upon above, it will not surprise you to learn that substantial doubt exists concerning the competency of the contractor Related has retained to clean the HVAC and duct system at 105 Duane.

There is great apprehension that this work—if improperly done—will agitate any toxic compounds (whose presence or absence no one has documented to our satisfaction) and non-lethal irritants (mold spores, dust, etc.) present in the duct system, sending them into our homes, eyes, food, and lungs.

How can you reassure us?

By holding a meeting with four members of our tenants group, an expert representative from the duct-cleaning contractor, an expert representative from your consultant (if you so choose), and an independent industrial hygienist whom we will provide.

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The objectives of this meeting would be as follows:

- (1) verify the expertise and experience of the duct cleaning contractor
- (2) assess the merits and possible oversights of the duct cleaning contractor's intended methods for the cleaning operation and the basic steps employed in their process
- (3) clarify what tests have been or ought to be conducted on substances residing in the duct system--such findings clearly impact upon cleaning methods to be utilized
- (4) determine whether further independent supervision is warranted, and if so, specify the manner of our industrial hygienist's participatory supervision and the subsequent reporting back to tenants and Related
- (5) agree on the testing parameters (substances, locations, media) to be performed at the end of this cleaning process, in order to certify for all concerned parties that appropriate decontamination has been achieved

This independent industrial hygienist should play a limited role in monitoring the cleaning process. This role could be established during the initial meeting. We do not want to interfere with the cleaning process, only to insure that it is properly conceived and conducted.

The resultant findings from this meeting (or the failure to hold such a meeting) will be posted online and available to all 105 Duane residents and workers.

Tenants have held extensive discussions with Joel Kupferman of the New York Environmental Law Project and are participating in the efforts of his firm and other organizations to assess the health treats posed by the WTC site. These groups seek to assess and track the remedial actions (or lack thereof) taken by landlords, business owners, city, state, and federal agencies in response to this crisis, and to press for revised legal standards.

The New York Environmental Law Project has put tenants in contact with an industrial hygienist whom we feel would be an excellent candidate to evaluate the competency of the duct contractor's methods and plans for cleaning the ventilation system.

Such verification is no doubt in Related's best interests, as well, since it will ensure that the duct system is in no way damaged by these procedures and an objective presence could also resolve the question of "sick building" syndrome. Duct cleaners we have spoken with (via the National Association of Duct Cleaners) suggested that the black residue emanating from electrical fixtures and duct work in the apartments and common areas could be evidence of a sick building, incubating potentially toxic mold growth.

We look forward to speaking with one or all of you at your earliest possible convenience. We know that the duct cleaning is scheduled to begin very shortly, and would therefore like to follow up with you via phone or a face-to-face meeting as soon as possible. As a first step, we recommend that you call [REDACTED] PII to follow up on this letter. She can be reached at 718.270.2567, between the hours of 9AM and 5PM.

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If we hear nothing from you within five business days (12/14), we will assume you are not planning to respond to our concerns and we will then proceed with other options.

Thank you

cc: Kathryn Freed, NYC Council Representative
U. S. Senator Hillary Clinton
U. S. Congressman Jerrold Nadler
Manhattan Borough President Virginia Fields
NYS Assembly Speaker Sheldon Silver
NYS Senator Martin Connor
NYS Senator Tom Duane
NYC Council Member Elect Alan Gerson
NYC Council Member Margarita Lopez
NYC Community Board 1 Chairperson Madelyn Wils
NYC Mayor Rudy Giuliani
NYC Mayor Elect Mike Bloomberg

December 8, 2001

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Document 1

THE CITY OF NEW YORK DEPARTMENT OF HEALTH RESIDENTIAL SAMPLING FACT SHEET

What will be checked for in the samples from your home?

We will be checking the air and dust of your home for:

- Asbestos
- Calcite
- crystalline silica
- fiberglass
- pH
- gypsum
- mica

Instructions for Those Whose Homes Will Be Sampled

Sampling will take from about 9 am to about 5 pm. Make sure you are available during this time on the date you have arranged. If you must leave for any period of time, please make arrangements with the sampling team to secure your home.

What do I need to do on the day before my home is sampled?

Do not smoke inside, use a fireplace, candles, or incense.

What do I need to do on the day my home is sampled?

1. Do not smoke inside.
2. Do not use a fireplace, candles, or incense.
3. Do not fry or deep-fry any foods.
4. Do not sweep, dust, or vacuum.
5. Do not run a HEPA room air purifier.
6. Do not do any remodeling, hobbies, or activities, which might raise dust.
7. Run your heating, ventilation, or air-conditioning system with the fan on continuously and the air recirculating.

DRAFT 105 Duane Street Fact Sheet

The New York City Departments of Health (DOH) and Environmental Protection (DEP) have been notified by the New York Environmental Law & Justice Project that tenants residing at 105 Duane Street are concerned that asbestos fibers, resulting from the collapse of the Twin Towers, are present within the building and its ventilation systems and pose a health concern. DOH has developed this fact sheet in order to help address these specific concerns.

What sampling has been performed for asbestos at 105 Duane Street?

- Sampling of the air in 209 locations (residential units and common areas) was performed by an environmental consultant, ATC Associates, on behalf of Related Management Company.
- Sampling of three surfaces (two residential units and one common area) within the building and one dust sample from outside of the building was performed by the United States Public Health Service (USPHS) on behalf of DOH.
- Sampling of two surfaces (a 10th floor apartment surface and common area air diffuser) was performed by Ed Olmsted, CIH, on behalf of the tenants.
- Sampling of the air in five locations within the building ventilation system that ^{in the} services the 10th floor common area and in five locations in the common area of the building on the 10th floor was performed by ATC Associates on behalf of and as witnessed by DEP. ~~The DEP laboratory then analyzed these samples.~~ ^{2nd floor air handling unit space}

What are the sampling results?

- All of the 209 air samples collected by ATC Associates, on behalf of Related Management Company, were within the most stringent standard used for clearance in an indoor environment.
- No asbestos was detected in the surface and dust samples collected by USPHS. Results of a more detailed analysis of these samples are pending.
- Both surface samples collected by Ed Olmstead using a vacuum sampling method showed the presence of asbestos fibers.
- ^(B) All of the 10 air samples collected by ATC Associates, on behalf of ^{owners} DEP, were within the most stringent standard used for clearance in an indoor environment.

Do these results mean I have been exposed to dangerous levels of asbestos?

No. The mere presence of asbestos does not necessarily pose a health concern. For asbestos to cause health problems it must be inhaled. All of the air samples collected at the building, including those from within the ventilation system, indicate that asbestos is not airborne in quantities that would pose a health concern.

Weren't the levels found on the supply air diffuser very high?

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How should the ventilation system be cleaned?

The ventilation system should be cleaned using procedures that will prevent the dispersion of any small particles and fibers, including asbestos, into occupied or cleaned areas of the building and ventilation system. This would involve the use of a HEPA vacuum. DEP will be present to monitor the cleaning process. DEP PLEASE Add more details. Recommend air monitoring during the process??? I think so. ~~Discuss DEP oversight? Questions about the project to DEP?~~

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NEW YORK CITY DEPARTMENT OF HEALTH
LEAD POISONING PREVENTION PROGRAM
253 BROADWAY (12TH FLOOR) - BOX CN58
NEW YORK, NY 10013

FAX TRANSMITTAL SHEET

From the Desk of Jessica Leighton, PhD.

Fax No: (212) 676-6326

Tel. No: (212) 676-6323

COMMENTS: Please review and add
info as needed. Thanks!

DATE: _____

TO: Mike Gilsenan

NAME OF AGENCY: _____

FAX NO.: (718) 595 - 4544 **TEL. NO.:** () _____

No. Of Pages (including transmittal sheet): _____

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Then we are assuming that the sampling is acceptable?

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system is being inspected

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Miriam Songster

PII

New York, NY 10007

2002-0224

February 2, 2002

Mayor Michael R. Bloomberg
City Hall
New York, NY 10007

826-7
envir-enc.com

Dear Mayor Bloomberg,

Yesterday I attended a news conference held by the EPA Ombudsman and the NY Environmental Law Project. After hearing from Congressman Nadler, who has been doing his job and paying attention to the concerns of local citizens, the Ombudsman has started looking into the EPA's performance following the WTC disaster. He appears to be finding out what local residents already know - that the EPA, DEP, and DOH all have done a terrible disservice to the residents and workers of lower Manhattan.

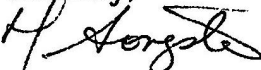
Testing has been inadequate. Some test results have been suppressed while others have been misrepresented to the public. WTC clean-up crews were not protected. Residents were not informed of hazards and were in fact told that air quality was fine when the EPA appears to have known that this was completely untrue.

So where does this leave all of us who live or work downtown? Many of us are suffering from health effects. We are often trapped in our buildings by leases that landlords refuse to cancel. Clean-up is not happening because EPA, DEP, and DOH have been completely lax - even in enforcing the standards that they have, never mind attempting to actually deal creatively with this unprecedented situation. In fact I myself have experienced the indifference of the DEP and DOH first hand when they reluctantly sent inspectors to 105 Duane St. It seemed that the inspectors believed that they were doing us a big favor by even showing up. They made it quite clear that they thought the residents were wasting their time.

This indifference on the part of City officials has continued, despite the results of independent testing that have confirmed the presence of toxic materials in our building. This testing was initiated by residents who hired several independent industrial hygienists and structural engineers to test their apartments for toxic materials. Both asbestos and fiberglass, the latter in consistently alarming levels, have been found.

I would like to encourage you to work with Federal, State and local officials and agencies, as well as residents and workers, to come up with a solution to lower Manhattan's toxicity problems. This will undoubtedly take a great deal of effort and not a small amount of creativity, as the problems are large and unlike anything the City government has dealt with previously. However, I believe that solutions can be found - ones that are not merely covering things up so that landlords and businesses do not lose money!

Sincerely,



Miriam Songster

105 Duane Street

ATC LABS

Total TEM Samples = 209

Total Negatives = 209

Total Positives = 0

Samples collected by
Edward Olmstead in apartment

using ASTM method.

PII

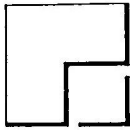
Sample C620204 collected in living
room

Result - 740 asbestos structures per
square centimeter.

Sample E1203-2 from supply air diffu-
ser in the 10th floor

Result = 550,000 asbestos structures
per square centimeters.

2001-3591



Related Management Company, L.P.
203 East 86th Street
New York, New York 10028
212-319-1200 Fax 212-593-5793
One of The Related Companies

December 13, 2001

Mr. Joel A. Miele Sr., P.E.
Commissioner
The City of New York Department of Environmental Protection
59-17 Junction Boulevard
Corona, New York 11368-5107

Re: 105 Duane Street

Dear Commissioner Miele,

We respectfully request that your office issue a letter confirming the appropriateness of the steps that we as owners of the above building have taken to address air quality concerns of our residents in the shadow of the September 11th attacks. Your letter will help put our residents at ease. We believe that we have not only strictly satisfied all regulatory obligations, but have also gone beyond our legal obligations to help provide comfort to the many residents who have ongoing questions.

Individual residents, the New York Environmental Law & Justice Project (NYELJP), and Channel 4 News have all mischaracterized the air quality in the building in the last few days. They have indicated that the building has a "high concentration of asbestos contamination" and by questioning DEP approved testing methods on the basis of a single ASTM 5755-95 surface sample performed by Ed Olmsted, CIH, CSP for Mr. Joel Kupferman, Esq., Executive Director of NYELJP.

The building facts follow:

- There was no indication of dust accumulations inside the building in the days after September 11th.

In order to put residents at ease we have:

- Hired ATC Associates as our environmental consulting firm.
- Provided extensive written updates to every resident dated October 19th, 29th and 31st, November 28th, and December 13th. Note the sections on Air Quality in every update that fully describe the commitments we have made and met.
- Provided a booklet of air quality information to all residents that included documents and web information from EPA and NYCDOH.
- Had all the hallways and common areas cleaned using wet methods and hepa vacuums according to a protocol established by ATC and supervised by ATC.
- Had all the common area hvac equipment cleaned and filters replaced before they were restarted after September 11th, and upgraded the filters as to filtration efficiency
- Ordered and installed (as received) new custom-made higher efficiency filters for all through wall apartment incremental units
- Held a resident meeting, which allowed the residents to ask questions directly of the ATC representative.
- Had ATC visually inspect 100% of the apartments that they were given access to, 406 of the 440 in the building, for dust accumulations. ATC "did not observe any dust and/or debris ____"

accumulations that in ATC's opinion was consistent with widespread deposition of material that emanated from the collapse of the World Trade Center Buildings."

- Taken over 200 TEM asbestos air tests (by ATC) in apartments and common areas, including any apartment requested by a resident, over a period of months with outstanding results. 207 of the 209 tests had ZERO asbestos structures and the other 2 had only 1 structure each.
- Provided copies of the air test results to the residents
- Had ATC perform indoor air quality tests in a common area and found no indoor air quality issues based on testing for fiberglass, pcb, CO, CO2, volatile organic compounds, respirable particles, copper, lead and chromium.
- Hired a firm to perform an exterior building cleaning including hepa vacuuming and wash down according to an ATC established protocol.
- Hired Techclean to perform a duct and vent cleaning using wet methods and hepa vacuums according to a protocol by ATC and with their oversight. Said cleaning was stopped soon after the start due to the "publicity" and the request of some residents that they have an "expert representative" present to discuss and oversee the cleaning methods for the ducts.
- Had ATC perform TEM tests on the night of December 12th on the same floor as that referenced by the Olmsted test, under the supervision of a DEP representative and NO asbestos was found.

A representative of your agency, Mr. Carl Lutchmedia (cell number 917.324.0746) has been to the building a number of times and supervised the most recent air testing that was performed last evening.

Note that the Channel 4 reporter either misstated or neglected to mention the following information that I provided to him verbally:

(I faxed him and he acknowledged receipt of your agency's September 26th memo to building owners which in part indicated that "Wipe sampling and/or micro-vacuuming sampling are not recognized methods for asbestos sampling and should not be used". He also received the ATC December 11th Summary of Ambient Air Sampling to Date which is one of the attachments to this letter.)

The Channel 4 report claimed that:

- Many apartments were covered with dust on 9/11. *Simply not true.*
- Vents were sealed of in an apparent attempt to keep the building from becoming contaminated.. *They were sealed off only as part of the duct cleaning protocol, and appropriately so.*
- Asbestos levels were well above the recommended limit set by ASTM. *As you well know, there is no recommended limit for this test and indeed the 1000 structures per square centimeter is a detection limit!*
- Quoted me as characterizing the resident test as "irresponsible". *This is also untrue. In fact I stated that taking a single test, using a method that was not approved by DEP and publishing the result on a web site as indicating a high level of asbestos contamination in the building, was irresponsible.*

I had also told the reporter that Mr. Olmsted had advised Mr Kupferman of 1- the limits of the usefulness of the test method, 2- that DEP did not recognize the method and 3- that the test result doesn't correlate with any level of asbestos exposure.

The reporter also indicated that he was well versed in the specific issues of air quality downtown. I advised him of all the steps we had taken, including the clean air test results. He then advised me that "then it's an issue of your test vs. their test".

Thank you for taking the time to review our request.

Sincerely,



Jeff Brodsky

Cc: Jeff Blau

Attached you will find copies of the following:

1. Five resident updates from RMC
2. ASTM test method 5755-95
3. Memo from Ed Olmsted, CIH, CSP dated December 9, which is addressed to Joel Kupferman. Mr. Olmsted performed the single dust sample ASTM test and provided the results to Mr. Kupferman of NYELJP. Mr. Olmsted's memo clearly indicates that "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". He also indicates that "The duct system should be cleaned by a professional duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination." We had already contracted to have the ducts cleaned using exactly those methods when the test was taken.
4. Formal notification of complaint dated December 11th, filed with your office by the NYELJP under the signature of Joel Kupferman and copied to numerous local state and federal agencies and elected officials. The complaint alleges a "high level of asbestos contamination at 105 Duane Street.
5. Summary of Ambient Air Sampling to Date memo from ATC Associates Inc, our environmental consultant, dated December 11, 2001 and distributed to every resident in the building today December 13, 2001. Bottom line on asbestos, 209 samples taken to date using TEM over a period of months in apartments and common areas an NO ASBESTOS found in 207 samples and 1 structure in the other 2 samples. Also no indoor air quality issues at all based on testing for fiberglass, pcb, CO, CO2, volatile organic compounds, respirable particles, copper, lead and chromium.
6. Web site of NYELJP dated today which indicates **"EMERGENCY!!! DEC. 11: Residents of 105 Duane Street (TRIBECA TOWER) – Your building has come up with a high level of asbestos contamination. Industrial Hygenist Report!! And Our letter To Various City, State, and Federal Agencies Who Are Coming to the Building on Wednesday December 12th in the Morning (DEP HAXMAT Team & Department of Health"**
7. Memo from ATC dated December 13th confirming the clean results from the TEM tests that were performed last evening at the request of and supervised by a DEP representative.

Date: October 29, 2001

To: Residents of Tribeca Tower

From: Related Management Company

In keeping with our promise and commitment to keep you fully informed and updated on our efforts to address your concerns and questions, please see the information below. We will continue to provide more information as specifics and details become available to us.

AIR QUALITY:

Our licensed consultant, ATC Associates, who will be in attendance at our follow-up meeting this Tuesday, October 30, at 6:30pm, visited the building on October 24th and 25th to perform hallway testing in all corridors and all apartments who requested it using the Transmission Electron Microscopy (TEM) method of testing for asbestos fibers as small as 0.5 microns. As we mentioned in our last memo, this test can identify fibers one tenth the size of those characterized by the Phased Contrast Microscopy (PCM) method and is the methodology used by school systems nationally to assure that children are protected.

We will provide a listing of the air test results at the meeting on Tuesday. However, we are very pleased to report that 110 apartment air tests and approximately 52 hallway and lobby air tests were performed and 161 out of 162 tests reflected **ZERO (0)** asbestos structures! The other single test indicated 14 structures per square millimeter, far below the action level of 70.

In addition, today ATC is performing tests for hydrocarbons, (volatile organic compounds or VOC's), heavy metals (lead and chromium) and airborne pcb's. Those results will be available next week. Our consultant will be testing for dioxins as soon as the test medium is available.

Visual inspections of 100% of all apartments, assuming we have access through our master key system, will be performed today and tomorrow. To date, 10 apartments have been inspected with no indication to date of dust accumulation.

As promised, we will continue to have ATC perform air testing every two weeks, in random locations and in any apartment who signs up for it in advance of their visits. The next test dates are November 7, November 21 and December 5th. Sign-up sheets are available at the concierge desk.

Our vendors have begun the exterior rigging of the scaffolds and will begin cleaning the façade and windows of the building this week.

All common area HVAC filters have been changed with a high efficiency, pleated filters which are more effective in removing smaller particles from the air. The standard filters used prior to this change were rated to collect approximately 15% of particulate as small as 3 microns. The filters we have installed are rated to remove 40% of 3 micron particulate. In addition, our contractor has put us on a rotation for filter changes every three weeks, instead of the standard 6 week changeover to further improve filtering efficiency.

Our HVAC contractor also visited the building last week to try several alternative incremental unit filters on the sleeves of the HVAC units in our apartments. Unfortunately, he was so far unable to find one which successfully fit the unit's sleeve. We are, however, investigating with a filter manufacturer the possibility of having custom made filters manufactured in volume just for our buildings. We will work diligently to ensure that if this is possible, it is performed timely. We have not found any information to indicate that HEPA filters can be added to the wall incremental units, though we continue to look for alternatives.

We are still anticipating a letter to be forthcoming from NYC DEP Commissioner Miele's office regarding air quality in the area. As soon as we receive it, we will forward it on to you.

Our consultants have indicated that we can all do our part by using the revolving doors whenever possible at the building entrance.

We are, this week, speaking to vendors who have the ability to clean out air duct systems and will advise you as we schedule the work.

EMERGENCY SYSTEMS:

We have met with our existing intercom contractor (Casey Systems) to investigate upgrading our intercom system to a full PA system that would work throughout the building. Unfortunately, the system cannot be upgraded in its' current form, so we are pursuing other avenues with various other vendors and manufacturers of this type of equipment.

In the next few days, we will have data entry sheets available at the concierge for you to provide us updated emergency contact information.

All emergency lights in the stairwells have been replaced and are confirmed operational. We are still investigating our options to further upgrade our emergency light system.

LEASING ISSUES:

As we have stated many times, we value your residency and want you to stay with us for many years to come. In the spirit of that commitment, we would like to offer you an additional discount of 25% off your December rent. Please understand that this additional discount will only be available to those residents who are current in their rent payments.

We are pleased to have been able to address the needs of over 40 residents at our downtown buildings who have transferred to alternate Related apartments throughout Manhattan.

We have also requested the New York City Housing Development Corporation to advise us on whether those residents, under the affordable housing program, may transfer to another Related Management building. They are considering this request and we will continue to follow-up with them for their final decision.

We look forward to continuing to answer your questions and give you some peace of mind regarding the concerns you voiced to us at our last meeting. We hope to see many of you on Tuesday, October 30th at 6:30 in the management office.

Date: November 28, 2001

To: Residents of Tribeca Tower

From: Related Management Company

In keeping with our promise to provide you with written updates on where we are with ongoing building projects and concerns, we provide the following:

1. Additional testing was performed in the common areas for metal, lead, dioxins, PCB's, voc's, chromium, fiberglass and asbestos. The results received to date are for lead, asbestos and fiberglass, of which none were found in the building. The remaining test results should be in by early next week. In addition, a sampling of apartments were tested for asbestos and/or metals. So far, **test results indicate there are no asbestos fibers in those apartments** sampled and we are hopeful that the metal results will be in by the end of this week as well. Air testing will continue for those apartments who request it and we will continue to provide the results as timely as possible.
2. A professional cleaning company was hired to clean the lobby, fitness center, laundry room and all corridors, including wallpaper, and the work has been completed.
3. RMC staff is continuing to remove all apartment HVAC units and, using wet methods, will clean behind the sleeves and backside of the units, including filters. We have just recently started receiving shipments of the new custom made HVAC filters we informed you in our previous correspondence we would look into and have begun installing them as they come in. These filters are made of antimicrobial, non-carcinogenic polyester media and have a frictional efficiency of 75% for particles of 2 microns and approximately 50% for 1-micron particles. The first delivery has been installed in apartments that had been specifically requested by residents, and the balance will be now installed from the top of the building and down until complete.
4. We have hired a mechanical hygiene contractor who will begin cleaning the air ducts and vent lines in the building. The contractor was pre-qualified by our consultant. The scope of work will require the contractor to be in every apartment 3 times and potentially more in those apartments with 2 bathrooms. The first time will be to remove the vent grills and to place a poly covering over the opening. The grills will be bagged and cleaned in the basement areas. The duct horizontal connections to the vertical vents will then be cleaned starting at the top of the building and working down, or from the bottom up depending on the stack design. The vertical stacks will then be cleaned from the top down, followed by a final fine cleaning of the horizontal connections and reinstallation of the vent grills. The contractor will also be using the same protocol to clean all common area ducts and equipment.

5. Due to the need to access every apartment for the work to be beneficial, we will consider this a critical maintenance condition to the extent that we will let the contractor staff into each apartment if you are not home. We will of course keep you informed of the approximate schedule of units to be addressed so you may arrange to be home if that is your preference.
6. The contractor will use hepa vacuums, pneumatic brushes, surfactant wipes and airless antibacterial sprays in the process. The work will commence late next week and will proceed on a vertical line basis on a 6 day per week schedule for a period that may take up to 4 weeks. We will distribute a more detailed schedule early next week.
7. The exterior cleaning of the building continues. We estimate completion to be by the end of December.

We will continue to update you on the above issues and others as they present themselves. If you have any questions that you feel require more information than is available from our building staff, do not hesitate to contact us at the following email addresses:

Lisa Bergenty	District Manager	lbergenty@related.com
Tami Caldwell-Kimble	Regional VP	tkimble@related.com
Jeff Brodsky	President	jbrodsky@related.com

Once again, thank you for your patience and cooperation.

Date: October 31, 2001

To: Residents of Tribeca Tower

From: Related Management Company

We would like to thank those of you who attended last night's resident meeting. The discussion, in our opinion, was very productive and, hopefully, informative to all in attendance.

In keeping with our promise to keep you fully informed, the following is a further update to the issues presented and the commitments we have made.

Air Quality:

1. Mr. Fred Burkhardt of ATC Associates Inc was present to discuss the qualifications of his organization and the status of their visual inspection and air test findings to date.
2. ATC is a national leader in the environmental consulting field. They employ over 1,600 experts in 75 offices throughout the United States. Their clients include private owners, corporations and city, state and federal agencies. They maintain total capability for conducting air quality management programs.
3. Visual inspections of 123 apartments for evidence of dust have been completed as of yesterday evening. The remainder of the apartments will be inspected today and tomorrow.
4. Of the 123 apartments visually inspected, 2 had evidence of dust from the masonry work we started last week, and one bedroom in one apartment had an ultra-light dust accumulation that would be similar to not cleaning an apartment for 3 weeks under normal circumstances. The remaining 120 apartments showed **no evidence of dust accumulation.**
5. ATC was able to air test every apartment that you gave us permission to test for asbestos using the TEM method. In total, 110 apartments were tested. Not only were the results under the AHERA standard of 70 structures per square millimeter, there was absolutely **no evidence of airborne asbestos in the apartments tested.**

6. Any resident that wishes to have their apartment air tested on November 7, November 21 or December 5th can sign up at the concierge desk.
7. Additional testing for metals, VOC's, pcb was started yesterday.
8. We agreed to provide additional metal testing in a sampling of apartments
9. We will add fiberglass testing to the list of materials already being test for.
10. A professional cleaning company will be hired to clean all corridors, including wallpaper. The contractor will start late this week or early next week and should finish in a few days.
11. Though we have not seen any indication of dust accumulations in these areas, building staff will remove all apartment HVAC units and, using wet methods, will clean behind the sleeves and backside of the units, including filters. You will receive notice of the timing of this work for each floor.
12. We have identified a qualified contractor to perform the duct cleaning and will provide you updates on the timing and process as they become available.
13. The exterior of the building is being cleaned both with HEPA vacuums, which is under way and power washing, which will start in a few days.
14. As a reminder, while the masonry work and exterior cleaning of the building is being performed, it is important that all windows be closed to ensure that dust from the repair work and/or water from the cleaning do not enter your apartments.

We will continue to provide updates as new information is available

Date: October 19, 2001

To: Residents of Tribeca Tower

From: Related Management Company

We want to thank all of you who attended our resident meeting last evening. The turnout on short notice was extremely gratifying and the dialogue was extremely helpful as we continue our effort to be as responsive to your needs as possible.

All of us recognize that as hard as we listen, we may never be fully able to understand the impact the WTC tragedy had on the lives of the people living in lower Manhattan. We respect your individual reactions, perceptions and your fears. We hope to earn your respect for the steps we will be taking to address your concerns as our interests are aligned. We all want to make you as comfortable in your homes as quickly as possible.

This spring we asked you for your thoughts on the building and its services and we were extremely pleased with your comments. In fact, we received 108 responses and 98% indicated that they felt they would recommend the building to a friend, that they felt at home at Tribeca Tower and that the building was professionally managed. In addition, 97% indicated that they have been promptly and clearly informed of any changes that affect them as a resident.

Nevertheless, we do not believe that we have distributed information to you either as comprehensively or as frequently as could have been done over the last 3 weeks since your return to the building and for that **we apologize**. Over the next couple of months in particular we will be distributing updates on this correspondence to every resident at their door in addition to providing copies in the mailroom or at the concierge desk. We will do our best to see that you are fully informed.

The following is a summary of the issues we presented and discussed at the meeting including suggestions that were made that we can address immediately and those that we can pursue going forward:

Air Quality:

Each resident was provided with a booklet of information that addressed air quality, the primary concern that has been reported to us over the last couple of weeks. Copies of the booklets are available in the mailroom for every resident who may not have been able to attend the meeting.

Enclosed in the booklet was:

1. An article from the NY Times of Oct 11 regarding independent test results of the air quality in the area.
2. Specific information and air monitoring data regarding the air testing results of the federal EPA in the specific area of our building. (you may get ongoing information at www.epa.gov)
3. Specific information from US Environmental Protection Agency (EPA) relating to their testing of water quality
4. Frequently asked questions about the testing being performed by EPA
5. Recommendations of the NY City Department of Health (DOH) regarding steps to take on returning to your home.
6. Public health advisory from DOH regarding air quality and dust.
7. DOH fact sheet covering frequently asked questions about asbestos.

At the meeting we discussed the information that was available to us, and the decisions we made in the days after the tragedy:

1. We cleaned and shampooed all the common area carpets.
2. We turned off incremental air conditioning units in every apartment.
3. All the common area A/C units were shut down, filters changed and serviced by our a/c contractor before they were restarted.
4. We inspected approximately 20 apartments and found no indication of dust accumulations.
5. EPA and NY City Department of Environmental Protection (DEP) findings in the first weeks indicated no health risk to residents from ambient air quality in the area of the building on the basis of asbestos testing in particular. DEP guidelines specifically characterized our obligation to use wet methods and HEPA vacuums to clean up dust accumulations. However, we did not see any evidence of dust in the building or in the 20 apartments we reviewed.

Over the last 10 days in particular there have been articles written and meetings held questioning what may be in the air that is not being tested for by EPA in the immediate area of the building and this is certainly creating concern for all of us. Therefore going forward:

1. We will initiate a protocol of air testing that will be established by our licensed consultant, ATC Associates. We will be testing on all floors and common areas on Wednesday October 24th and Thursday October 25th. If you want one of the tests to be in your apartment please sign the request at the concierge desk and we will try to accommodate you subject to the schedule of ATC technicians. Be aware that one of our residents has requested that the testing be performed between midnight and 6:00 am. If so, we will limit it and will advise you in advance if there is any expected significant noise.
2. The test we will use in the building will be the Transmission Electron Microscopy (TEM) method of testing for asbestos fibers as small as 0.5 microns. This test can

identify fibers one tenth the size of those characterized by the Phased Contrast Microscopy (PCM) method. In addition, the TEM test standard of 70 structures per square millimeter of filter surface the methodology used by school systems nationally to assure that children are protected.

3. We will provide a listing of the air test results by date and location from ATC for all the hallways and other common areas as soon as it is available from the lab.
4. We will continue to have ATC perform air sampling in random locations in the building every two weeks for at least the next two months and will provide copies of the results as available. The ATC ongoing testing will be performed on November 7th, November 21st and December 5th. You can sign up at the concierge for your apartment to be tested on those dates if you prefer.
5. We will have ATC perform air tests for heavy metals such as lead, and chromium in addition to pcb, pvc (dioxin), and volatile organic compounds. The test samples should be taken on October 25th and we will advise you of the results when available.
6. We will have ATC inspect every apartment in the building on October 24th between 9:00 a.m. and 7:30 p.m. to confirm any potential dust conditions. RMC staff will accompany ATC, and we will use our keys to access your apartment if you are not at home.
7. Contractors qualified to handle rigging according to a protocol established by ATC will be cleaning the exterior of the building. We are expecting the contractor will start at the beginning of the week of October 29th and will work on a 7 day per week schedule subject to weather conditions.
8. Our building staff is now equipped to use HEPA vacuums in common areas for isolated dust locations that you believe are concerns. Simply advise the concierge desk and they will respond.
9. If you desire, we can provide you a HEPA vacuum for you to use in your apartment. Simply sign it out at the concierge desk.
10. We will clean any a/c filter in your apartment as you request. Simply call the front desk and they will fill out a work order. Any filters cleaned will be bagged and replaced with a clean one. The filters are reusable, however, we will not wash them out in your apartment.
11. We are investigating the replacement of the a/c unit filters in your apartments with filters that take out more particles from the air. The standard filter is a wire mesh that is not very efficient at removing particles in the current environment. We are therefore reviewing the possibility of replacing them throughout the building with more efficient filters that will fit in the existing filter sleeves.
12. All the fresh air that comes into the building for common areas and is heated and/or air-conditioned for the lobby, hallways etc is currently filtered. This filtered air is provided to the lobby and hallways under a small amount of pressure and finds its way into all the apartments by design for a healthy turnover of fresh air. The circulation is continued as the air in your apartment is drawn out through the vents in your bath and kitchen areas and exhausted at the roof. We will be immediately replacing our standard filters in the common area HVAC equipment, which are rated to collect approximately 15% of particulate as small as 3 microns, with high efficiency filters that will remove 250% of the particulate of the same size as the standard filters. In addition, we will double the frequency that these filters are

replaced, from every 6 weeks, to every 3 weeks as long as there are continuing measurable emissions from the WTC site.

13. We are working to identify a qualified contractor to clean all the air ducts that service the common areas and the apartment vents and will advise you when the work will commence.
14. One of the residents has asked us to look into installing HEPA filters on the HVAC equipment. This is typically only done for hospital surgical and infectious disease spaces. Nevertheless, we are looking at how these filters would be installed, the impact on the equipment and of course costs associated both initially and on an ongoing basis. We will advise you of our findings.
15. We are working through the Real Estate Board of NY to have a letter issued from the Commissioner of the NYC DEP that characterizes their efforts and the nature of the testing standards they are applying to the ambient air conditions. We hope that this letter will provide additional comfort.

Neighborhood:

We recognize and appreciate the numerous inconveniences that you are dealing with every day. Related Companies has and will continue to communicate regularly with representatives of the City government offices. We must recognize that the decisions of the Mayor and the Governor are influenced most significantly by the multiple law enforcement agencies overseeing the WTC site investigation.

We have also, as part of the booklet, provided you with a listing of local elected city, state and federal officials that you should feel free to contact to advocate on your behalf. Your multiple voices will be heard more clearly than will ours.

While we are not satisfied with the current neighborhood conditions, we must also reflect on the exceptional progress that has occurred in just the last 5 weeks to restore some of the access and convenience of downtown. Hopefully, the progress will continue expeditiously and comprehensively.

Emergency Systems:

The building is serviced by a set of battery back up emergency lights in the fire stairs. Every other lamp has the battery back up and the lamps should stay lit for approximately 90 minutes after the electricity goes out. We found that approximately 25 of these emergency lights did not perform as expected and they have been replaced. Though it meets all building code requirements for the building, we will also investigate upgrading the emergency lighting system.

A resident has questioned the posted fire safety plan, which indicates that a public address system is provided and there appeared to be none in use at the time of the tragedy. In fact, the PA system referred to in the plan is for the use of the fire department only and allows them to communicate at their stations in the building. Again, though the building meets all fire code requirements, these are times when people are more

concerned about the possibility of evacuation, and we will investigate installing some form of PA system that would be audible to all residents.

Please note in times of evacuation, the police or fire department are responsible for moving throughout the building to advise the residents to leave on the floors they feel need to.

Though we received hundreds of calls from residents at our hotline number in the days after the tragedy, there were an equal number of residents that did not call us. We tried to contact many of you at the phone numbers you had provided to us, and which were maintained at the concierge desk. However, most were not able to receive those calls. We are therefore working on ways to enter emergency and cell phone numbers for our residents, along with email addresses into our database and will be advising you in the next couple of weeks of that opportunity.

We are aware that the Federal Emergency Management Agency (FEMA) and the Red Cross may be able to help residents financially. Please contact them at:

FEMA	800.525.0321
Red Cross	800.514.5103

If any residents have information that may be of assistance to others in the building, please provide same to the management office and we will distribute to the residents at large.

Lease Issues:

We have to date tried to provide you with a number of options to address the changing needs of your families. We would not presume to suggest what decisions you should make. We believe that we have acted swiftly and carefully to restore our building to good condition and to provide for all the amenities of residency that we control. We have also tried to compensate you beyond the time you were forced to be away from your homes. We want you to stay with us for years to come.

The following should summarize our previously issued correspondence:

1. Your September rent payments have been credited for the days that ConEd was unable to provide utility services.
2. We have provided a rent concession of **25%** for October and November to every resident who is current in their rent. This will be reflected on your November rent statement.

Please be advised, in order to provide you additional flexibility:

1. Any resident who transfers and signs a new one-year lease in another Related building will receive a **first full month free concession** in the new apartment. Our leasing office has a listing of all Related luxury buildings in Manhattan. Please note that our Related leasing staff will also be able to lease for early 2002 occupancy in our new Chelsea buildings, the Westminster located at 20th St and 7th Avenue (leasing

starts in December), and the Sierra located at 15th St and 7th Avenue (leasing starts in February) with a total of almost 400 apartments to chose from! Simply call the Tribeca Tower leasing office at 346-7900, call our Related Rentals hot line at **212.828.6700**, or look us up at *www.relatedrentals.com*.

2. We will allow you an early termination of your lease if you transfer to another apartment in the Related portfolio of luxury buildings. For residents who want to transfer to another Related building but only want to make a short term commitment we can offer a one year lease and provide an early termination rider that allows you to exit with 60 days notice **with a minimum stay in the new building of 6 months**. If the new Related building is not rent stabilized, we will enter into a new lease for less than one year, but for no less than 6 months. However, in either case **you will only earn the full month concession if you fulfill a full year in the new apartment**.
3. We have requested that NY regulatory agencies allow our affordable residents preferences for transfer to other Related buildings in Manhattan, subject to eligibility and other program guidelines.
4. We will allow any resident who has lost an immediate family member in the September 11 tragedy to exit the lease at any time without penalty.

In addition, we would like any interested residents to join us at a follow up meeting at which Mr. Brodsky will again be available to update you, along with a representative of our environmental consulting firm, ATC Associates, on October 30th at 6:30 pm.

As always, thank you for your kind words regarding the commitment of our building maintenance, administrative and leasing staffs. They have been working tirelessly to try to compassionately address your needs while dealing with the tragedy themselves. We are grateful for your support.

Date: December 13, 2001

To: Residents of Tribeca Tower

From: Related Management Company

In keeping with our promise to provide you with written updates on where we are with ongoing building projects and concerns, we provide the following:

1. As we have previously indicated in our last update additional testing was performed in the common areas for metal, lead, dioxins, PCB's, voc's, chromium, fiberglass and asbestos. We have been as frustrated as you that the results have taken so long to receive. However, we are extremely pleased to report **that no lead, asbestos or fiberglass was found in the air samples!** The remaining test results, minus results for dioxin, are now in and a summary from ATC of all findings of testing done to date is attached. Dioxin results are held up due to the heavy testing by regulatory agencies for dioxins that are currently being done which are taking priority over other laboratory samples. However, **all test results for other materials noted above are well below acceptable industry standards.**
2. In addition, we continued to take random test samplings of apartments (149 to date) for asbestos in addition to 9 apartments, who requested testing, for metals. So far, of the 209 samples collected (149 apartments – with the balance being in common areas) **test results indicate a single asbestos structure was detectable in only two samples. The remaining 207 samples reflected no asbestos fibers.** Air testing will continue for those apartments who request it and we will continue to provide the results as timely as possible.
3. RMC staff is continuing to install the new incremental filters previously described in our other updates and, as we schedule installation, we continue to remove all apartment HVAC units and, using wet methods, clean behind the sleeves and backside of the units. We have installed 100% of the custom filters that we have received from the supplier and hope the balance will be received and installed within the next 2 weeks. If you have any particular concerns, and want your filters changed prior to your floor being scheduled for installations, please feel free to contact our concierge desk and have a service request put through for this.
4. As previously announced in our last update, our environmental consultants identified a qualified indoor air quality and mechanical hygiene contractor to perform the cleaning of the air ducts and vent lines in the building. On Thursday, December 6th, the contractor began this work. On Monday, December 10th, while supervising the contractors, our ATC consultant noticed that some of the plastic covers that were taped over the hallway grilles had come loose and needed to be re-attached. Immediately, the contractors reattached those covers, and have since added an additional layer of plastic inside each hallway duct opening of the building to ensure

that the openings remain covered during the course of the work. The ATC consultant also confirmed that there was no visible release of any debris into the hallways on those floors where the plastic became loose.

5. Due to the need to access every apartment for the work to be beneficial, we will consider this a critical maintenance condition to the extent that we will let the contractor staff into each apartment if you are not home. We will of course keep you informed of the approximate schedule of units to be addressed so you may arrange to be home if that is your preference.
6. The contractor will use hepa vacuums, pneumatic brushes, surfactant wipes and airless antibacterial sprays in the process. The work will proceed on a vertical line basis on a 6 day per week schedule for a period that may take up to 4 weeks.
7. We have asked ATC to return to the building on the 19th of December and on the 2nd of January for the express purpose of extending our testing of apartments during the period of the vent cleaning. The sign up method for any resident that requests one will continue.
8. The exterior cleaning of the building continues. We estimate completion to be by the end of December.

We received a letter signed by a few residents dated December 8, 2001 that we believe was also sent to all residents of Tribeca Tower as well. We believe this letter contained several inaccuracies and substantial omissions which we would like to respond to publicly and openly.

- We have already spoken to one of the residents who signed the letter and have agreed to stop the duct cleaning until the residents can identify an "expert representative" to meet with our consultant and contractor. We have made it clear that we want to proceed as soon as possible and want to set up the meeting immediately. However, as of last evening, the resident group had not identified who their "expert representative" would be. We are confident that any review of the cleaning protocol and the qualifications of our contractor and consultant will satisfy the professional interests of any representative provided, and will give comfort to you.
- All the air testing performed in the apartments followed the AHERA standard protocol and did not require specific preparation by the resident or efforts to change normal behaviors during the test period.
- We have performed air testing on an ongoing basis even though there was no evidence of need other than to provide comfort to our residents.
- We have had no indication from any testing result we performed OR from any testing result performed by a public agency or other qualified source of a single condition that requires us to proceed where we have not done so.
- All of the contractors we brought to this property to perform any portion of the work have been fully qualified to do so.

Finally, we have been also advised that there is a web site that is being used to spread misinformation that is causing consternation among some residents. Specifically, a resident has had a testing company take a single surface sample in or around a hallway air duct grill. NYC Department of Environmental Protection (DEP) has issued a statement referring to wipe sampling and/or micro-vacuum sampling as "not recognized methods of asbestos sampling and should not be used".

In addition, we have spoken to the resident's tester and he indicates that he made it clear to the resident's representative that the test method was not recognized by DEP. He also told the representative that there is no correlation between surface test results and exposure to a health risk. In addition, the representative is well aware of our attempts to start cleaning the ductwork of all dust and that the methods we are using follow exactly what the tester recommended.

In response to the concerns we sensed residents would have upon receiving the above misinformation, last night, December 12th we arranged for additional air testing to be done. ATC Consultants performed 5 air tests in the 10th floor corridor (which is where the above single surface sample was taken from) and 5 air tests in the mechanical room on the second floor which is where air circulates through the air handler that services the common areas. **These tests were performed under the supervision of the DEP and we are pleased to report that zero asbestos fibers were detected in all of the tests.** A summary of the test results is attached for your review.

We are striving to be sensitive to the natural concerns that all residents and workers in downtown are subject to at this time and hope that you will carefully review information that is presented for your consideration.

We will continue to update you on the above issues and others as they present themselves. If you have any questions that you feel require more information than is available from our building staff, do not hesitate to contact us at the following email addresses:

Lisa Bergenty	District Manager	lbergenty@related.com
Tami Caldwell-Kimble	Regional VP	tkimble@related.com
Jeff Brodsky	President	jbrodsky@related.com

Once again, thank you for your patience and cooperation.



Designation: D 5755 – 95

AMERICAN SOCIETY FOR TESTING AND MATERIALS

1916 Race St. Philadelphia, Pa 19103

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Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Concentrations¹

This standard is issued under the fixed designation D 5755; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers a procedure to (a) identify asbestos in dust and (b) provide an estimate of the concentration of asbestos in the sampled dust reported as the number of asbestos structures per unit area of sampled surface.

1.1.1 If an estimate of the asbestos mass is to be determined, the user is referred to Test Method D 5756.

1.2 This test method describes the equipment and procedures necessary for sampling, by a microvacuum technique, non-airborne dust for levels of asbestos structures. The non-airborne sample is collected inside a standard filter membrane cassette from the sampling of a surface area for dust which may contain asbestos.

1.2.1 This procedure uses a microvacuuming sampling technique. The collection efficiency of this technique is unknown and will vary among substrates. Properties influencing collection efficiency include surface texture, adhesiveness, electrostatic properties and other factors.

1.3 Asbestos identified by transmission electron microscopy (TEM) is based on morphology, selected area electron diffraction (SAED), and energy dispersive X-ray analysis (EDXA). Some information about structure size is also determined.

1.4 This test method is generally applicable for an estimate of the concentration of asbestos structures starting from approximately 1000 asbestos structures per square centimetre.

1.4.1 The procedure outlined in this test method employs an indirect sample preparation technique. It is intended to disperse aggregated asbestos into fundamental fibrils, fiber bundles, clusters, or matrices that can be more accurately quantified by transmission electron microscopy. However, as with all indirect sample preparation techniques, the asbestos observed for quantification may not represent the physical form of the asbestos as sampled. More specifically, the procedure described neither creates nor destroys asbestos, but it may alter the physical form of the mineral fibers.

1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.6 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the

responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:

- D 1193 Specification for Reagent Water²
- D 1739 Test Method for the Collection and Measurement of Dustfall (Settleable Particulate Matter)³
- D 3195 Practice for Rotameter Calibration³
- D 3670 Guide for Determination of Precision and Bias of Methods of Committee D-22³
- D 5756 Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Mass Concentration³

3. Terminology

3.1 Definitions:

3.1.1 **asbestiform**—a special type of fibrous habit in which the fibers are separable into thinner fibers and ultimately into fibrils. This habit accounts for greater flexibility and higher tensile strength than other habits of the same mineral. For more information on asbestiform mineralogy, see Refs (1),⁴ (2) and (3).

3.1.2 **asbestos**—a collective term that describes a group of naturally occurring, inorganic, highly fibrous, silicate dominated minerals, which are easily separated into long, thin, flexible fibers when crushed or processed.

DISCUSSION—Included in the definition are the asbestiform varieties of: serpentine (chrysotile); riebeckite (crocidolite); grunerite (grunerite asbestos); anthophyllite (anthophyllite asbestos); tremolite (tremolite asbestos); and actinolite (actinolite asbestos). The amphibole mineral compositions are defined according to nomenclature of the International Mineralogical Association (3).

Asbestos	Chemical Abstract Service No. ⁵
Chrysotile	12001-29-5
Crocidolite	12001-28-4
Grunerite Asbestos	12172-73-5
Anthophyllite Asbestos	77536-67-5
Tremolite Asbestos	77536-68-6
Actinolite Asbestos	77536-66-4

3.1.3 **fibril**—a single fiber that cannot be separated into

¹ This test method is under the jurisdiction of ASTM Committee D-22 on Sampling and Analysis of Atmospheres and is the direct responsibility of Subcommittee D22.07 on Sampling and Analysis of Asbestos. Current edition approved August 15, 1995. Published October 1995.

² Annual Book of ASTM Standards, Vol 11.01.

³ Annual Book of ASTM Standards, Vol 11.03.

⁴ The boldface numbers in parentheses refer to the list of references at the end of this test method.

⁵ The non-asbestiform variations of the minerals indicated in 3.1.3 have different Chemical Abstract Service (CAS) numbers.

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smaller components without losing its fibrous properties or appearance.

3.2 Descriptions of Terms Specific to This Standard:

3.2.1 *aspect ratio*—the ratio of the length of a fibrous particle to its average width.

3.2.2 *bundle*—a structure composed of three or more fibers in a parallel arrangement with the fibers closer than one fiber diameter to each other.

3.2.3 *cluster*—a structure with fibers in a random arrangement such that all fibers are intermixed and no single fiber is isolated from the group; groupings of fibers must have more than two points touching.

3.2.4 *debris*—materials that are of an amount and size (particles greater than 1 mm in diameter) that can be visually identified as to their source.

3.2.5 *dust*—any material composed of particles in a size range of ≤ 1 mm and large enough to settle by virtue of their weight from the ambient air (see definition for settleable particulate matter in Test Method D 1739).

3.2.6 *fiber*—a structure having a minimum length of 0.5 μm , an aspect ratio of 5:1 or greater, and substantially parallel sides (4).

3.2.7 *fibrous*—of a mineral composed of parallel, radiating, or interlaced aggregates of fibers, from which the fibers are sometimes separable. That is, the crystalline aggregate may be referred to as fibrous even if it is not composed of separable fibers, but has that distinct appearance. The term fibrous is used in a general mineralogical way to describe aggregates of grains that crystallize in a needle-like habit and appear to be composed of fibers. Fibrous has a much more general meaning than asbestos. While it is correct that all asbestos minerals are fibrous, not all minerals having fibrous habits are asbestos.

3.2.8 *indirect preparation*—a method in which a sample passes through one or more intermediate steps prior to final filtration.

3.2.9 *matrix*—a structure in which one or more fibers, or fiber bundles that are touching, are attached to, or partially concealed by a single particle or connected group of non-fibrous particles. The exposed fiber must meet the fiber definition (see 3.2.6).

3.2.10 *structures*—a term that is used to categorize all the types of asbestos particles which are recorded during the analysis (such as fibers, bundles, clusters, and matrices). Final results of the test are always expressed in asbestos structures per square centimetre.

4. Summary of Test Method

4.1 The sample is collected by vacuuming a known surface area with a standard 25 or 37 mm air sampling cassette using a plastic tube that is attached to the inlet orifice which acts as a nozzle. The sample is transferred from inside the cassette to an aqueous solution of known volume. Aliquots of the suspension are then filtered through a membrane. A section of the membrane is prepared and transferred to a TEM grid using the direct transfer method. The asbestiform structures are identified, sized, and counted by TEM, using SAED and EDXA at a magnification of 15 000 to 20 000X.

5. Significance and Use

5.1 This microvacuum sampling and indirect analysis method is used for the general testing of non-airborne dust samples for asbestos. It is used to assist in the evaluation of dust that may be found on surfaces in buildings such as ceiling tiles, shelving, electrical components, duct work, carpet, etc. This test method provides an index of the concentration of asbestos structures in the dust per unit area analyzed as derived from a quantitative TEM analysis.

5.1.1 This test method does not describe procedures or techniques required to evaluate the safety or habitability of buildings with asbestos-containing materials, or compliance with federal, state, or local regulations or statutes. It is the user's responsibility to make these determinations.

5.1.2 At present, a single direct relationship between asbestos-containing dust and potential human exposure does not exist. Accordingly, the user should consider these data in relationship to other available information in their evaluation.

5.2 This test method uses the definition, settleable particulate material, found in Test Method D 1739 as the definition of dust. This definition accepts all particles small enough to pass through a 1 mm (No. 18) screen. Thus, a single, large asbestos containing particle(s) (from the large end of the particle size distribution) dispersed during sample preparation may result in anomalously large asbestos concentration results in the TEM analyses of that sample. It is, therefore, recommended that multiple independent samples are secured from the same area, and a minimum of three samples analyzed by the entire procedure.

6. Interferences

6.1 The following minerals have properties (that is, chemical or crystalline structure) which are very similar to asbestos minerals and may interfere with the analysis by causing a false positive to be recorded during the test. Therefore, literature references for these materials must be maintained in the laboratory for comparison to asbestos minerals so that they are not misidentified as asbestos minerals.

6.1.1 *Antigorite*.

6.1.2 *Palygorskite (Attapulgite)*.

6.1.3 *Halloysite*.

6.1.4 *Pyroxenes*.

6.1.5 *Sepiolite*.

6.1.6 *Vermiculite scrolls*.

6.1.7 *Fibrous talc*.

6.1.8 Hornblende and other amphiboles other than those listed in 3.1.2.

6.2 Collecting any dust particles greater than 1 mm in size in this test method may cause an interference and, therefore, must be avoided.

7. Materials and Equipment

7.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without

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lessening the accuracy of the determination.⁶

7.2 *Transmission Electron Microscope (TEM)*, an 80 to 120 kV TEM, capable of performing electron diffraction, with a fluorescent screen inscribed with calibrated gradations, is required. The TEM must be equipped with energy dispersive X-ray spectroscopy (EDXA) and it must have a scanning transmission electron microscopy (STEM) attachment or be capable of producing a spot size of less than 250 nm in diameter in crossover.

7.3 *Energy Dispersive X-ray System (EDXA)*.

7.4 *High Vacuum Carbon Evaporator*, with rotating stage.

7.5 *High Efficiency Particulate Air (HEPA)*, filtered negative flow hood.

7.6 *Exhaust or Fume Hood*.

7.7 *Particle-free Water* (ASTM Type II, see Specification D 1193).

7.8 *Glass Beakers* (50 mL).

7.9 *Glass Sample Containers*, with wide mouth screw cap (200 mL) or equivalent sealable container (height of the glass sample container should be approximately 13 cm high by 6 cm wide).

7.10 *Waterproof Markers*.

7.11 *Forceps* (tweezers).

7.12 *Ultrasonic Bath*, table top model (100 W).

7.13 *Graduated Pipettes* (1, 5, 10 mL sizes), glass or plastic.

7.14 *Filter Funnel*, either 25 mm or 47 mm, glass or disposable. Filter funnel assemblies, either glass or disposable plastic, and using either a 25 mm or 47 mm diameter filter.

7.15 *Side Arm Filter Flask*, 1000 mL.

7.16 *Mixed Cellulose Ester (MCE) Membrane Filters*, 25 or 47 mm diameter, $\leq 0.22 \mu\text{m}$ and $5 \mu\text{m}$ pore size.

7.17 *Polycarbonate (PC) Filters*, 25 or 47 mm diameter, $\leq 0.2 \mu\text{m}$ pore size.

7.18 *Storage Containers*, for the 25 or 47 mm filters (for archiving).

7.19 *Glass Slides*, approximately 76 by 25 mm in size.

7.20 *Scalpel Blades*, No. 10, or equivalent.

7.21 *Cabinet-type Desiccator*, or low temperature drying oven.

7.22 *Chloroform*, reagent grade.

7.23 *Acetone*, reagent grade.

7.24 *Dimethylformamide (DMF)*.

7.25 *Glacial Acetic Acid*.

7.26 *1-methyl-2-pyrrolidone*.

7.27 *Plasma Asher*, low temperature.

7.28 *pH Paper*.

7.29 *Air Sampling Pump*, low volume personal-type, capable of achieving a flow rate of 1 to 5 L/min.

7.30 *Rotameter*.

7.31 *Air Sampling Cassettes*, 25 mm or 37 mm, containing $0.8 \mu\text{m}$ or smaller pore size MCE or PC filters.

7.32 *Cork Borer*, 7 mm.

7.33 *Non-Asbestos Mineral*, references as outlined in 6.1.

7.34 *Asbestos Standards*, as outlined in 3.1.2.

7.35 *Tygon⁷ Tubing*, or equivalent.

7.36 *Small Vacuum Pump*, that can maintain a pressure of 92 kPa.

7.37 *Petri Dishes*, large glass, approximately 90 mm in diameter.

7.38 *Jaffe Washer*, stainless steel or aluminum mesh screen, 30 to 40 mesh, and approximately 75 mm by 50 mm in size.

7.39 *Copper TEM Finder Grids*, 200 mesh.

7.40 *Carbon Evaporator Rods*.

7.41 *Lens Tissue*.

7.42 *Ashless Filter Paper Filters*, 90 mm diameter.

7.43 *Gummed Paper Reinforcement Ridges*.

7.44 *Wash Bottles*, plastic.

7.45 *Reagent Alcohol*, HPLC Grade (Fisher A995 or equivalent).

7.46 *Opening Mesh Screen*, plastic, 1.0 by 1.0 mm, (Spectra-Mesh #146410 or equivalent).

7.47 *Diffraction Grating Replica*.

8. Sampling Procedure for Microvacuum Technique

8.1 For sampling asbestos-containing dust in either indoor or outdoor environments, commercially available cassettes must be used. Air monitoring cassettes containing 25 mm or 37 mm diameter mixed cellulose ester (MCE) or polycarbonate (PC) filter membranes with a pore size less than or equal to $0.8 \mu\text{m}$ are required (7.31). The number of samples collected depends upon the specific circumstances of the study.

8.2 Maintain a log of all pertinent sampling information and sampling locations.

8.3 Sampling pumps and flow indicators shall be calibrated using a certified standard apparatus or assembly (see Practice D 3195 and 7.29).

8.4 Record all calibration information (5).

8.5 Perform a leak check of the sampling system at each sampling site by activating the pump (7.29) with the closed sampling cassette in line. Any air flow shows that a leak is present that must be eliminated before initiating the sampling operation.

8.6 Attach the sampling cassette to the sampling pump at the outlet side of the cassette with plastic tubing (7.35). The plastic tubing must be long enough in that the sample areas can be reached without interference from the sampling pump. Attach a clean, approximately 25.4 mm long piece of plastic tubing (6.35 mm internal diameter) directly to the inlet orifice. Use this piece of tubing as the sampling nozzle. Cut the sampling end of the tubing at a 45° angle as illustrated in Fig. 1. The exact design of the nozzle is not critical as long as some vacuum break is provided to avoid simply pushing the dust around on the surface with the nozzle rather than vacuuming it into the cassette. The internal diameter of the nozzle and flow rate of the pump may vary as long as the air velocity is $100 (\pm 10) \text{ cm/s}$. This air velocity calculation is based on an internal sampling tube diameter of 6.35 mm at a flow rate of 2 L/min.

8.7 Measure and determine the sample area of interest. A

⁶ *Reagent Chemicals, American Chemical Society Specifications, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see Analytical Standards for Laboratory Chemicals, BDH Ltd., Poole, Dorset, U.K., and the United States Pharmacopoeia and National Formulary, U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.*

⁷ Tygon is a registered trademark of the DuPont Co.

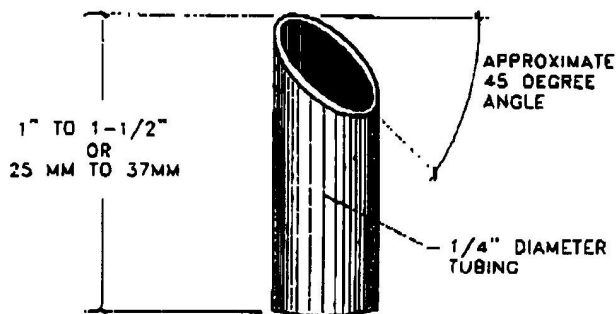
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FIG. 1 Example of the Tubing Nozzle

sample area of 100 cm² is vacuumed until there is no visible dust or particulates matter remaining. Perform a minimum of two orthogonal passes on the surface within a minimum of 2 min of sampling time. Avoid scraping or abrading the surface being sampled. (Do not sample any debris or dust particles greater than 1 mm in diameter (see 4.2).) Smaller or larger areas can be sampled, if needed. For example, some surfaces of interest may have a smaller area than 100 cm². Less dusty surfaces may require vacuuming of larger areas. Unlike air samples, the overloading of the cassettes with dust will not be a problem. As defined in 3.2.5, only dust shall be collected for this analysis.

8.8 At the end of sample collection, invert the cassette so that the nozzle inlet faces up before shutting off the power to the pump. The nozzle is then sealed with a cassette end-plug and the cassette/nozzle taped or appropriately packaged to prevent separation of the nozzle and cassette assembly. A second option is the removal of the nozzle from the cassette, then plugging of the cassette and shipment of the nozzle (also plugged at both ends) sealed in a separate closeable plastic bag. A third option is placing the nozzle inside the cassette for shipment. The nozzle is always saved and rinsed because a significant percentage of the dust drawn from a lightly loaded surface may adhere to the inside walls of the tubing.

8.9 Check that all samples are clearly labeled, that all dust sampling information sheets are completed, and that all pertinent information has been enclosed, in accordance with laboratory quality control practices, before transfer of the samples to the laboratory. Include an unused cassette and nozzle as a field blank.

8.10 Wipe off the exterior surface of the cassettes with disposable wet towels (baby wipes) prior to packaging for shipment.

9. Sample Shipment

9.1 Ship dust samples to an analytical laboratory in a sealed container, but separate from any bulk or air samples. The cassettes must be tightly sealed and packed in a material free of fibers or dust to minimize the potential for contamination. Plastic "bubble pack" is probably the most appropriate material for this purpose.

10. Sample Preparation

10.1 Under a negative flow HEPA hood (7.5), carefully wet-wipe the exterior of the cassettes to remove any possible

contamination before taking cassettes into a clean preparation area.

10.2 Perform sample preparation in a clean facility that has a separate work area from both the bulk and air sample preparation areas.

10.3 Initial specimen preparation shall take place in a clean HEPA filtered negative pressure hood to avoid any possible contamination of the laboratory or personnel, or both, by the potentially large number of asbestos structures in an asbestos-containing dust sample. Cleanliness of the preparation area hoods is measured by the cumulative process blank concentrations (see Section 11).

10.4 All sample preparation steps 10.4.1 through 10.4.6 shall take place in the dust preparation area inside a HEPA hood.

10.4.1 Remove the upper plug from the sample cassette and carefully introduce approximately 10 mL solution of a 50/50 mixture of particle-free water and reagent alcohol into the cassette using a plastic wash bottle (7.44). If the plugged nozzle was left attached to the cassette, then remove the plug and introduce the water/alcohol solution into the cassette through the tubing, and then remove the tubing, if it is visibly clean.

10.4.2 Replace the upper plug or the sample cap and lightly shake the dust suspension by hand for 3 s.

10.4.3 Remove the entire cap of the cassette and pour the suspension through a 1.0 by 1.0 mm opening screen (7.46) into a pre-cleaned 200 mL glass specimen bottle (7.9). All visible traces of the sample contained in the cassette shall be rinsed through the screen into the specimen bottle with a plastic wash bottle containing the 50/50 solution of particle-free water and alcohol. Repeat this procedure two additional times for a total of three washings. Next, rinse the nozzle two or three times through the screen into the specimen bottle with the 50/50 mixture of water and alcohol. Typically, the total amount of the 50/50 mixture used in the rinse is 50 to 75 mL. Discard the 1.0 by 1.0 mm screen and bring the volume of solution in the specimen bottle up to the 100 mL mark on the side of the bottle with particle-free water only.

10.4.4 Adjust the pH of the suspension to 3 to 4 using a 10.0 % solution of acetic acid. Use pH paper for testing. Filter the suspension within 24 h to avoid problems associated with bacterial and fungal growth.

10.4.5 Use either a disposable plastic filtration unit or a glass filtering unit (7.14) for filtration of aliquots of the suspension. The ability of an individual filtration unit to produce a uniform distribution may be tested by the filtration of a colored particulate suspension such as diluted India ink (suspension of carbon black).

10.4.5.1 If a disposable plastic filtration unit is used, then unwrap a new disposable plastic filter funnel unit (either 25 or 47 mm diameter) and remove the tape around the base of the funnel. Remove the funnel and discard the top filter supplied with the apparatus, retaining the coarse polypropylene support pad in place. Assemble the unit with the adapter and a properly sized neoprene stopper, and attach the funnel to the 1000 mL side-arm vacuum flask (7.15). Place a 5.0 µm pore size MCE (backing filter) on the support pad. Wet it with a few mL of particle-free water and place an MCE (7.16) or PC filter (≤0.22 µm pore size) (7.17) on top of the backing filter. Apply a vacuum (7.36), ensuring

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that the filters are centered and pulled flat without air bubbles. Any irregularities on the filter surface requires the discard of that filter. After the filter has been seated properly, replace the funnel and reseal it with the tape. Return the flask to atmospheric pressure.

10.4.5.2 If a glass filtration unit is used, place a 5 μ m pore size MCE (backing filter) on the glass frit surface. Wet the filter with particle-free water, and place an MCE or PC filter (≤ 0.22 μ m pore size) on top of the backing filter. Apply a vacuum, ensuring that the filters are centered and pulled flat without air bubbles. Replace the filters if any irregularities are seen on the filter surface. Before filtration of each set of sample aliquots, prepare a blank filter by filtration of 50 mL of particle-free water. If aliquots of the same sample are filtered in order of increasing concentration, the glass filtration unit need not be washed between filtration. After completion of the filtration, do not allow the filtration funnel assembly to dry because contamination is then more difficult to remove. Wash any residual suspension from the filtration assembly by holding it under a flow of water, then rub the surface with a clean paper towel soaked in a detergent solution. Repeat the cleaning operation, and then rinse two times in particle-free water.

10.4.6 With the flask at atmospheric pressure, add 20 mL of particle-free water into the funnel. Cover the filter funnel with its plastic cover if the disposable filtering unit is used.

10.4.7 Briefly hand shake (3 s) the capped bottle with the sample suspension, then place it in a tabletop ultrasonic bath (7.12) and sonicate for 3.0 min. Maintain the water level in the sonicator at the same height as the solution in sample bottle. The ultrasonic bath shall be calibrated as described in 20.5. The ultrasonic bath must be operated at equilibrium temperature. After sonicating, return the sample bottle to the work surface of the HEPA hood. Preparation steps 10.4.8 through 10.4.14 shall be carried out in this hood.

10.4.8 Shake the suspension lightly by hand for 3 s, then let it rest for 2.0 min to allow large particles to settle to the bottom of the bottle or float to the surface.

10.4.9 Estimate the amount of liquid to be withdrawn to produce an adequate filter preparation. Experience has shown that a light staining of the filter surface will yield a suitable preparation for analysis. Filter at least 1.0 mL, but no more than half the total volume. If after examination in the TEM, the smallest volume measured (1.0 mL) (7.13) yields an overloaded sample, then perform additional serial dilutions of the suspension. If it is estimated that less than 1.0 mL of solution has to be filtered because of the density of the suspension, perform a serial dilution.

10.4.9.1 If serial dilutions are required, repeat step 10.4.8 before the serial dilution portion is taken. Do not re-sonicate the original solution or any serial dilutions. The recommended procedure for a serial dilution is to mix 10 mL of the sample solution with 90 mL of particle-free water in a clean sample bottle to obtain a 1:10 serial dilution. Follow good laboratory practices when performing dilutions.

10.4.10 Insert a new disposable pipette halfway into the sample suspension and withdraw a portion. Avoid pipetting any of the large floating or settled particles. Uncover the filter funnel and dispense the mixture from the pipette into the water in the funnel.

10.4.11 Apply vacuum to the flask and draw the mixture through the filter.

10.4.12 Discard the pipette.

10.4.13 Disassemble the filtering unit and carefully remove the sample filter with fine tweezers (7.11). Place the completed sample filter particle side up, into a precleaned, labeled, disposable, plastic petri dish (7.48) or other similar container.

10.4.14 In order to ensure that an optimally-loaded filter is obtained, it is recommended that filters be prepared from several different aliquots of the dust suspension. For this series of filters, it is recommended that the volume of each aliquot of the original suspension be a factor of five higher than the previous one. If the filters are prepared in order of increasing aliquot volume, all of the filters for one sample can be prepared using one plastic disposable filtration unit, or without cleaning of glass filtration equipment between individual filtration. Before withdrawal of each aliquot from the sample, shake the suspension without additional sonification and allow to rest for 2 min.

10.4.15 There are many practical methods for drying MCE filters. The following are two examples that can be used: (1) dry MCE filters for at least 12 h (over desiccant) in an airtight cabinet-type desiccator (7.21); (2) to shorten the drying time (if desired), remove a plug of the damp filter and attach it to a glass slide (7.19) as described in 12.1.2 and 12.1.3. Place the slide with a filter plug or filter plugs (up to eight plugs can be attached to one slide) on a bed of desiccant, in the desiccator for 1 h.

10.4.16 PC filters do not require lengthy drying before preparation, but shall be placed in a desiccator for at least 30 min before preparation.

10.5 Prepare TEM specimens from small sections of each dried filter using the appropriate direct transfer preparation method.

11. Blanks

11.1 Prepare sample blanks that include both a process blank (50 mL of particle-free water) for each set of samples analyzed and one unused filter from each new box of sample filters (MCE or PC) used in the laboratory. If glass filtering units are used, prepare and analyze a process blank each time the filtering unit is cleaned. Blanks will be considered contaminated, if after analysis, they are shown to contain more than 53 asbestos structures per square millimetre. This generally corresponds to three or four asbestos structures found in ten grid openings. The source of the contamination must be found before any further analysis can be performed. Reject samples that were processed along with the contaminated blanks and prepare new samples after the source of the contamination is found.

11.2 Prepare field blanks which are included with sample sets in the same manner as the samples, to test for contamination during the sampling, shipping, handling, and preparation steps of the method.

12. TEM Specimen Preparation of Mixed Cellulose Ester (MCE) Filters

NOTE 1—Use of either the acetone or the dimethylformamide-acetic acid method is acceptable.

12.1 Acetone Fusing Method:

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12.1.1 Remove a section (a plug) from any quadrant of the sample and blank filters. Sections can be removed from the filters using a 7 mm cork borer (7.32). The cork borer must be wet wiped after each time a section is removed.

12.1.2 Place the filter section (particle side up) on a clean microscope slide. Affix the filter section to the slide with a gummed page reinforcement (7.43), or other suitable means. Label the slide with a glass scribing tool or permanent marker (7.10).

12.1.3 Prepare a fusing dish from a glass petri dish (7.37) and a metal screen bridge (7.38) with a pad of five to six ashless paper filters (7.42) and place in the bottom of the petri dish (4). Place the screen bridge on top of the pad and saturate the filter pads with acetone. Place the slide on top of the bridge in the petri dish and cover the dish. Wait approximately 5 min for the sample filter to fuse and clear.

12.2 Dimethylformamide-Acetic Acid Method:

12.2.1 Place a drop of clearing solution that consists of 35 % dimethylformamide (DMF), 15 % glacial acetic acid, and 50 % Type II water (v/v) on a clean microscope slide. Gauge the amount used so that the clearing solution just saturates the filter section.

12.2.2 Carefully lay the filter segment, sample surface upward, on top of the solution. Bring the filter and solution together at an angle of about 20° to help exclude air bubbles. Remove any excess clearing solution. Place the slide in an oven or on a hot plate, in a fume hood, at 65 to 70°C for 10 min.

12.3 Plasma etching of the collapsed filter is required.

12.3.1 The microscope slide to which the collapsed filter pieces are attached is placed in a plasma asher (7.27). Because plasma ashers vary greatly in their performance, both from unit to unit and between different positions in the asher chamber, it is difficult to specify the exact conditions that must be used. Insufficient etching will result in a failure to expose embedded fibers, and too much etching may result in the loss of particles from the filter surface. To determine the optimum time for ashing, place an unused 25 mm diameter MCE filter in the center of a glass microscope slide. Position the slide approximately in the center of the asher chamber. Close the chamber and evacuate to a pressure of approximately 40 Pa, while admitting oxygen to the chamber at a rate of 8 to 20 cm³/min. Adjust the tuning of the system so that the intensity of the plasma is maximized. Determine the time required for complete oxidation of the filter. Adjust the system parameters to achieve complete oxidation of the filter in a period of approximately 15 min. For etching of collapsed filters, use these operating parameters for a period of 8 min. For additional information on calibration, see the *USEPA Asbestos-Containing Materials in Schools* (4) or *NIST/NVLAP Program Handbook for Airborne Asbestos Analysis* (6) documents.

12.3.2 Place the glass slide containing the collapsed filters into the low-temperature plasma asher, and etch the filter.

12.4 Carbon coating of the collapsed and etched filters is required.

12.4.1 Carbon coating must be performed with a high-vacuum coating unit (7.4), capable of less than 10⁻⁴ torr (13 MPa) pressure. Units that are based on evaporation of carbon filaments in a vacuum generated only by an oil rotary pump have not been evaluated for this application and shall

not be used. Carbon rods (7.40) used for evaporators shall be sharpened with a carbon rod sharpener to a neck of about 4 mm in length and 1 mm in diameter. The rods are installed in the evaporator in such a manner that the points are approximately 100 to 120 mm from the surface of the microscope slide held in the rotating device.

12.4.2 Place the glass slide holding the filters on the rotation device, and evacuate the evaporator chamber to a vacuum of at least 13 MPa. Perform the evaporation in very short bursts, separated by 3 to 4 s to allow the electrodes to cool. An alternate method of evaporation is by using a slow continuous applied current. An experienced analyst can judge the thickness of the carbon film to be applied. Conduct tests on unused filters first. If the carbon film is too thin, large particles will be lost from the TEM specimen, and there will be few complete and undamaged grid openings on the specimen.

12.4.2.1 If the coating is too thick, it will lead to a TEM image that is lacking in contrast, and the ability to obtain electron diffraction patterns will be compromised. The carbon film shall be as thin as possible and still remain intact on most of the grid openings of the TEM specimen.

12.5 *Preparation of the Jaffe Washer*—The precise design of the Jaffe washer is not considered important, so any one of the published designs may be used (7, 8). One such washer consists of a simple stainless steel bridge contained in a glass petri dish.

12.5.1 Place several pieces of lens tissue (7.41) on the stainless steel bridge. The pieces of lens tissue shall be large enough to completely drape over the bridge and into the solvent. In a fume hood, fill the petri dish with acetone (or DMF) until the height of the solvent is brought up to contact the underside of the metal bridge as illustrated in Fig. 2.

12.6 Placing the Specimens into the Jaffe Washer:

12.6.1 Place the TEM grids (7.39) shiny side up on a piece of lens tissue or filter paper so that individual grids can be easily picked up with tweezers.

12.6.2 Prepare three grids from each sample.

12.6.2.1 Using a curved scalpel blade (7.20), excise at least two square (3 mm by 3 mm) pieces of the carbon-coated MCE filter from the glass slide.

12.6.2.2 Place the square filter piece carbon-side up on top of a TEM specimen grid.

12.6.2.3 Place the whole assembly (filter/grid) on the saturated lens tissue in the Jaffe washer.

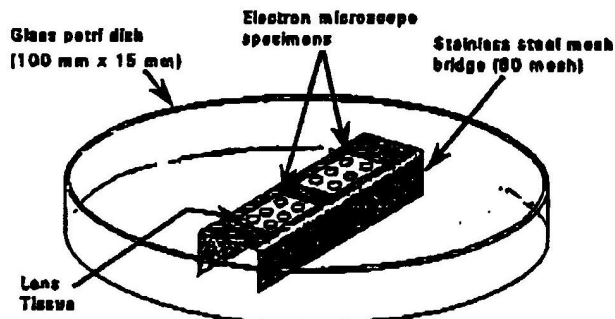


FIG. 2. Example of Design of Solvent Washer (Jaffe Washer)

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12.6.2.4 Place the three TEM grid sample filter preparations on the same piece of lens tissue in the Jaffe washer.

12.6.2.5 Place the lid on the Jaffe washer and allow the system to stand for several hours.

12.7 Alternately, place the grids on a low level (petri dish filled to the $\frac{1}{2}$ mark) DMF Jaffe washer for 60 min. Add enough solution of equal parts DMF/acetone to fill the washer to the screen level. Remove the grids after 30 min if they have cleared, that is, all filter material has been removed from the carbon film, as determined by inspection in the TEM.

12.8 Carefully remove the grids from the Jaffe washer, allowing the grids to dry before placing them in a clean marked grid box.

13. TEM Specimen Preparation of Polycarbonate (PC) Filter

13.1 Cover the surface of a clean microscope slide with two strips of double-sided adhesive tape.

13.2 Cut a strip of filter paper slightly narrower than the width of the slide. Position the filter paper strip on the center of the length of the slide.

13.3 Using a clean, curved scalpel blade, cut a strip of the PC filter approximately 25 by 6 mm. Use a rocking motion of the scalpel blade to avoid tearing the filter. Place the PC strip particle side up on the slide perpendicular to the long axis of the slide. The ends of the PC strip must contact the double sided adhesive tape. Each slide can hold several PC strips. With a glass marker, label each PC strip with the individual sample number.

13.4 Carbon coat the PC filter strips as discussed in 12.4.2. PC filters do not require etching.

NOTE 2: Caution—Do not overheat the filter sections while carbon coating.

13.5 Prepare a Jaffe washer as described in 12.5, but fill the washer with chloroform or 1-methyl-2-pyrrolidone to the level of the screen.

13.6 Using a clean curved scalpel blade, excise three, 3-mm square filter pieces from each PC strip. Place the filter squares carbon side up on the shiny side of a TEM grid. Pick up the grid and filter section together and place them on the lens tissue in the Jaffe washer.

13.7 Place the lid on the Jaffe washer and rest the grids in place for at least 4 h. Best results are obtained with longer wicking times, up to 12 h.

13.8 Carefully remove the grids from the Jaffe washer, allowing the grids to dry before placing them in a clean, marked grid box.

14. Grid Opening Measurements

14.1 TEM grids must have a known grid opening area. Determine this area as follows:

14.2 Measure at least 20 grid openings in each of 20 random 75 to 100 μm (200-mesh) copper grids for a total of 400 grid openings for every 1000 grids used, by placing the 20 grids on a glass slide and examining them under the optical microscope. Use a calibrated graticule to measure the average length and width of the 20 openings from each of the individual grids. From the accumulated data, calculate the average grid opening area of the 400 openings.

14.3 Grid area measurements can also be made at the

TEM at a calibrated screen magnification of between 15 000 and 20 000X. Typically measure one grid opening for each grid examined. Measure grid openings in both the x and y directions and calculate the area.

14.4 Pre-calibrated TEM grids are also acceptable for this test method.

15. TEM Method

15.1 Microscope settings: 80 to 120 kV, 15 000 to 20 000X screen magnification for analysis (7.2).

15.2 Analyze two grids for each sample. Analyze one-half of the sample area on one sample grid preparation and the remaining half on a second sample grid preparation.

15.3 Determination of Specimen Suitability:

15.3.1 Carefully load the TEM grid, carbon side facing up (in the TEM column) with the grid bars oriented parallel/perpendicular to the length of the specimen holder. Use a hand lens or loupe, if necessary. This procedure will line up the grid with the X and y translation directions of the microscope. Insert the specimen holder into the microscope.

15.3.2 Scan the entire grid at low magnification (250X to 1000X) to determine its suitability for high magnification analysis as specified in 15.3.3.

15.3.3 Grids are acceptable for analysis if the following conditions are met:

15.3.3.1 The fraction of grid openings covered by the replica section is at least 50 %.

15.3.3.2 Relative to that section of the grid covered by the carbon replica, the fraction of intact grid openings is greater than 50 %.

15.3.3.3 The fractional area of undissolved filter is less than 10 %.

15.3.3.4 The fraction of grid openings with overlapping or folded replica film is less than 50 %.

15.3.3.5 At least 20 grid openings, that have no overlapping or folded replica, are less than 5 % covered with holes and have less than 5 % opaque area due to incomplete filter dissolution.

15.4 Determination of Grid Opening Suitability:

15.4.1 If the grid meets acceptance criteria, choose a grid opening for analysis from various areas of the grid so that the entire grid is represented. Determine the suitability of each individual grid opening prior to the analysis.

15.4.2 The individual grid opening must have less than 5 % holes over its area.

15.4.3 Grid openings must be less than 25 % covered with particulate matter.

15.4.4 Grid openings must be uniformly loaded.

15.5 Observe and record the orientation of the grid at 80 to 150X, on a grid map record sheet along with the location of the grid openings that are examined for the analysis. If indexed grids are used, a grid map is not required, but the identifying coordinates of the grid square must be recorded.

16. Recording Data Rules

16.1 Record on the count sheet any continuous grouping of particles in which an asbestos fiber is detected. Classify asbestos structures as fibers, bundles, clusters, or matrices as defined in 5.2.

16.2 Use the criteria for fiber, bundle, cluster, and matrix identification, as described in the USEPA Asbestos-Containing

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Materials in Schools document (4). Record, for each AHERA structure identified, the length and width measurements.

16.3 Record NSD (No Structures Detected) when no structures are detected in the grid opening.

16.4 Identify structures classified as chrysotile identified by either electron diffraction or X-ray analysis (7.3) and recorded on a count sheet. Verify at least one out of every ten chrysotile structures by X-ray analysis.

16.5 Structures classified as amphiboles by X-ray analysis and electron diffraction are recorded on the count sheet. For more information on identification, see Yamate, et al, (7) or Chatfield and Dillon (8).

16.6 Record a typical electron diffraction pattern for each type of asbestos observed for each group of samples (or a minimum of every five samples) analyzed. Record the micrograph number on the count sheet. Record at least one X-ray spectrum for each type of asbestos observed per sample. Attach the print-outs to the back of the count sheet. If the X-ray spectrum is stored, record the file and disk number on the count sheet.

16.7 Counting Rules:

16.7.1 At a screen magnification of between 15 000 and 20 000X evaluate the grids for the most concentrated sample loading; reject the sample if it is estimated to contain more than 50 asbestos structures per grid opening. Proceed to the next lower concentrated sample until a set of grids are obtained that have less than 30 asbestos structures per grid opening.

16.8 *Analytical Sensitivity*—An analytical sensitivity of approximately 1000 asbestos structures per square centimetre (calculated for the detection of a single asbestos structure) has been designed for this analysis. This sensitivity can be achieved by increasing the amount of liquid filtered, increasing the number of grid openings analyzed, or decreasing the size of the final filter. Occasionally, due to high particle loadings or high asbestos concentration, this analytical sensitivity cannot be practically achieved and stopping rules apply.

16.9 *Limit of Detection*—The limit of detection for this method is defined as, at a minimum, the counting of four asbestos structures during the TEM analysis. If less than four asbestos structures are counted during the analysis then the analytical result which will be reported will be less than the limit of detection and a "less than" sign (<) will appear before the number. All data shall be provided in the laboratory report.

16.10 Stopping Rules:

16.10.1 The analysis is stopped upon the completion of the grid square that achieves an analytical sensitivity of less than 1000 asbestos structures per square centimetre.

16.10.2 If an analytical sensitivity of 1000 asbestos structures per square centimetre cannot be achieved after analyzing ten grid openings then stop on grid opening No. 10 or the grid opening which contains the 100th asbestos structure, whichever comes first. A minimum of four grid squares shall be analyzed for each sample.

16.10.2.1 If the analysis is stopped because of the 100th structure rule, the entire grid square containing the 100th structure must be counted.

16.11 After analysis, remove the grids from the TEM, and replace them in the appropriate grid storage holder.

17. Sample Storage

17.1 The washed-out sample cassettes can be discarded after use.

17.2 Sample grids and unused filter sections (7.18) must be stored for a minimum of one year.

18. Reporting

18.1 Report the following information for each dust sample analyzed:

18.1.1 Concentration in structures/cm².

18.1.2 The analytical sensitivity.

18.1.3 Types of asbestos present.

18.1.4 Number of asbestos structures counted.

18.1.5 Effective filtration area.

18.1.6 Average size of the TEM grid openings that were counted.

18.1.7 Number of grid openings examined.

18.1.8 Sample dilution used.

18.1.9 Area of the surface sampled.

18.1.10 Listing of size data for each structure counted.

18.1.11 A copy of the TEM count sheet or a complete listing of the raw data. An example of a typical count sheet is shown in Appendix X1.

18.2 Determine the amount of asbestos in any accepted sample using the following formula:

$$\frac{EFA \times 100 \text{ mL} \times \#STR}{GO \times GOA \times V \times SPL} = \text{asbestos structures/cm}^2 \quad (1)$$

where:

#STR = number of asbestos structures counted,

EFA = effective filter area of the final sampling filter, mm²,

GO = number of grid openings counted,

GOA = average grid opening area, mm²,

SPL = surface area sampled, cm², and

V = volume of sample filtered in step 10.4.9, representing the actual volume taken from the original 100 mL suspension, mL.

19. Quality Control/Quality Assurance

19.1 In general, the laboratory's quality control checks are used to verify that a system is performing according to specifications regarding accuracy and consistency. In an analytical laboratory, spiked or known quantitative samples are normally used. However, due to the difficulties in preparing known quantitative asbestos samples, routine quality control testing focuses on re-analysis of samples (duplicate recounts).

19.1.1 Re-analyze samples at a rate of 1/10 of the sample sets (one out of every ten samples analyzed not including laboratory blanks). The re-analysis shall consist of a second sample preparation obtained from the final filter.

19.2 In addition, quality assurance programs must follow the criteria shown in the *USEPA Asbestos-Containing Materials in Schools* document (4) and in the *NIST/NVLAP Program Handbook for Airborne Asbestos Analysis* document (6). These documents describe sample custody, sample preparation, blank checks for contamination, calibration, sample analysis, analyst qualifications, and technical facilities.

20. Calibrations

20.1 Perform calibrations of the instrumentation on a

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regular basis, and retain these records in the laboratory, in accordance with the laboratory's quality assurance program.

20.2 Record calibrations in a log book along with dates of calibration and the attached backup documentation.

20.3 A calibration list for the instrument is as follows:

20.3.1 *TEM*:

20.3.1.1 Check the alignment and the systems operation. Refer to the TEM manufacturer's operational manual for detailed instructions.

20.3.1.2 Calibrate the camera length of the TEM in electron diffraction (ED) operating mode before ED patterns of unknown samples are observed. Camera length can be measured by using a carbon coated grid on which a thin film of gold has been sputtered or evaporated. A thin film of gold is evaporated on the specimen TEM grid to obtain zone-axis ED patterns superimposed with a ring pattern from the polycrystalline gold film. In practice, it is desirable to optimize the thickness of the gold film so that only one or two sharp rings are obtained on the superimposed ED pattern. Thick gold films will tend to mask weak diffraction spots from the fibrous particles. Since the unknown d-spacings of most interest in asbestos analysis are those which lie closest to the transmitted beam, multiple gold rings from thick films are unnecessary. Alternatively, a gold standard specimen can be used to obtain an average camera constant calculated for that particular instrument and can then be used for ED patterns of unknowns taken during the corresponding period.

20.3.1.3 Perform magnification calibration at the fluorescent screen. This calibration must be performed at the magnification used for structure counting. Calibration is performed with a grating replica (7.47) (for example, one containing at least 2160 lines/mm).

(a) Define a field of view on the fluorescent screen. The field of view must be measurable or previously inscribed with a scale or concentric circles (all scales should be metric).

(b) Frequency of calibration will depend on the service history of the particular microscope.

(c) Check the calibration after any maintenance of the microscope that involves adjustment of the power supply to the lens or the high voltage system or the mechanical disassembly of the electron optical column (apart from filament exchange).

(d) The analyst must ensure that the grating replica is placed at the same distance from the objective lens as the specimen.

(e) For instruments that incorporate a eucentric tilting specimen stage, all specimens and the grating replica must be placed at the eucentric position.

20.3.1.4 The smallest spot size of the TEM must be checked.

(a) At the crossover point, photograph the spot size at a screen magnification of 15 000 to 20 000X. An exposure time of 1 s is usually adequate.

(b) The measured spot size must be less than or equal to 250 nm.

20.4 *EDXA*:

20.4.1 The resolution and calibration of the EDXA must be verified.

20.4.1.1 Collect a standard EDXA Cu peak from the Cu grid.

20.4.1.2 Compare the X-ray energy versus channel

number for the Cu peak and be certain that readings are within ± 10 eV.

20.4.2 Collect a standard EDXA of crocidolite asbestos (NIST SRM 1866).

20.4.2.1 The elemental analysis of the crocidolite must resolve the Na peak.

20.4.3 Collect a standard EDXA of chrysotile asbestos.

20.4.3.1 The elemental analysis of chrysotile must resolve both Si and Mg on a single chrysotile fiber.

20.5 Ultrasonic bath calibration shall be performed as follows:

20.5.1 Fill the bath water to a level equal to the height of suspension in the glass sample container that will be used for the dust analysis. Operate the bath until the water reaches the equilibrium temperature.

20.5.2 Place 100 mL of water (at approximately 20°C) in another 200-mL glass sample container, and record its temperature.

20.5.3 Place the sample container in the water in the ultrasonic bath (with the power turned off). After 60 s, remove the glass container and record its temperature.

20.5.4 Place 100 mL of water (at approximately 20°C) in another 200-mL glass sample container, and record its temperature.

20.5.5 Place the second sample container into the water in the ultrasonic bath (with the power turned on). After 60 s, remove the glass container and record its temperature.

20.5.6 Calculate the rate of energy deposition into the sample container using the following formula:

$$R = 4.185 \times \sigma \times \rho \times \frac{(\theta_2 - \theta_1)}{t} \quad (2)$$

where:

4.185 = Joules/cal,

R = energy deposition, watts/mL,

θ_1 = temperature rise with the ultrasonic bath not operating, °C,

θ_2 = temperature rise with the ultrasonic bath operating, °C,

t = time in seconds, 60 s (20.5.3 and 20.5.5),

σ = specific heat of the liquid in the glass sample container, 1.0 cal/g, and

ρ = density of the liquid in the glass sample container, 1.0 g/cm³.

20.5.7 Adjust the operating conditions of the bath so that the rate of energy deposition is in the range of 0.08 to 0.12 MW/m³, as defined by this procedure.

21. Precision and Bias

21.1 *Precision*—The precision of the procedure in this test method is being determined using round robin data from participating laboratories.

21.2 *Bias*—Since there is no accepted reference material suitable for determining the bias of the procedure in this test method, bias has not been determined (see Specification D 3670).

NOTE 3—Round robin data is under development and will be presented as a research report.

22. Keywords

22.1 asbestos; microvacuuming; settled dust; TEM

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APPENDIX

(Nonmandatory Information)

X1. DUST SAMPLE ANALYSIS

X1.1 See Figs. X1.1 and X1.2 for the dust analysis worksheet and the TEM count sheet.

DUST SAMPLE ANALYSIS

Client:	_____	Accelerating Voltage:	_____
Sample ID:	_____	Indicated Mag:	KX
Job Number:	_____	Screen Mag:	KX
Date Sample Analyzed:	- -	Microscope:	1 2 3 4 5
Number of Openings/Grids Counted:	_____	Filter Type:	_____
Grid Accepted, 600X:	Yes No	Filter Size:	_____
Percent Loading:	_____ %	Filter Pore Size (μm):	_____
Grid Box #1:	_____	Grid Opening:	1) _____ μm x _____ μm 2) _____ μm x _____ μm

Analyst: _____

Reviewer: _____

Counting Rules: AHERA LEVEL II

Calculation Data:

Effective Filter Area in mm ² :	(EFA)	_____
Number of Grid Openings Counted:	(GO)	_____
Average Grid Opening Area in mm ² :	(GOA)	_____
Volume of sample Filtered in ml:	(V)	_____
Surface area Sampled in cm ² :	(SPL)	_____
Number of Asbestos Structures Counted:	(#STR)	_____

* If the number of asbestos structures counted is less than or equal to 4, enter 4 structures as the limit of detection here.

FORMULA FOR CALCULATION OF ASBESTOS STRUCTURES "DUST" PER CM²:

$$\frac{EFA \times 100 \times \#STR}{GO \times GOA \times V \times SPL} = (\text{Asbestos Structures per cm}^2)$$

Results for Total Asbestos Structures: _____
(Structures per cm²)Results for Structures ≥ microns: _____
(Structures per cm²)

FIG. X1.1 Dust Sample Analysis Work Sheet

Job Number: _____

[illegible]

Type:

C	=	Chrysotile
AM	=	Amosite
CR	=	Crocidolite
AC	=	Actinolite
TR	=	Tremolite
AN	=	Anthrophyllite
N	=	Non Asbestos

Structure:

F = Fiber
B = Bundle
C = Cluster
M = Matrix

Others:

NSD = No Structures Detected
Morph = Morphology
SAED = Selected Area Electron Diffraction
EDS = Energy Dispersive X-Ray Spectroscopy
ER = Inter-Row Spacing
NP = No Pattern

FIG. X1.2 TEM Count Sheet

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Date: December 9, 2001

To: Joel Kupferman

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 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.

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.

12/11/01 TUE 14:08 [TX/RX NO 8950] 002

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 10 th 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.

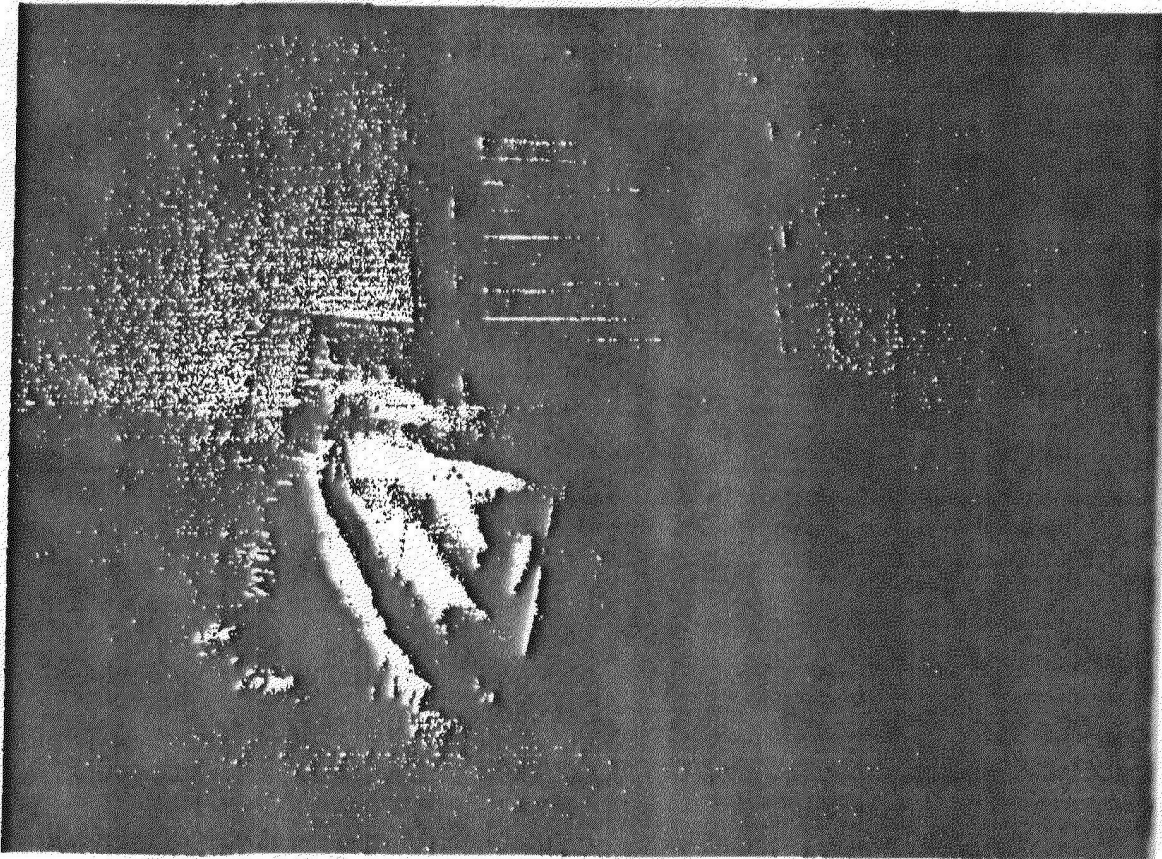
The duct system should be cleaned by a professional duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination. ✓

Sincerely,



Edward Olmsted

12/11/01 TUE 14:06 [TX/RX NO 8850] 003



34th floor

ol. sorgath 12/10/01

<http://mail.justice.com/mail/attachment/!1!nyeljp/43f4de270264e0379fcf1a0ac5...> 12/11/2001

ACTS
ARTS, CRAFTS AND THEATER SAFETY

181 Thompson St., # 23
New York, NY 10012-2586
212/777-0062
E-mail:ACTSFYCECS.com
<http://www.caseweb.com/ACTS>

Joel R. Kupferman, Esq.
Executive Director
New York Environmental Law & Justice Project
315 Broadway - Suite 200
New York NY 10007-1121

December 11, 2001

Dear Joel Kupferman,

I have reviewed the December 9, 2001 report on asbestos sampling done by Ed Olmsted, CIH, at 105 Duane Street.

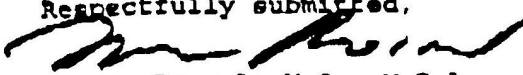
I concur with Mr. Olmsted's conclusion that the sample taken from the air diffuser in the 10th floor public hallway shows levels of asbestos well above the recommended limit of 1000 structure per square centimeter.

I also concur that the finding of 355,000 asbestos structure per square centimeter is a clear indication that the ventilation system should be cleaned by a professional duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination. I would add that the work must be done by trained and certified asbestos abatement workers who can prevent contamination of other parts of the building while they work.

I also would add that this single sample should be followed up by other samples taken from other locations in the ventilation system. This sampling must be undertaken immediately because asbestos fibers in ventilation systems are likely to deposit throughout the building. The reading of 740 asbestos structures per square centimeter on the living room table top is high enough to cause concern that further deposition could be hazardous. If the cleaning is delayed until many apartments attain levels requiring abatement, the cost of cleanup will rise exponentially.

It is also likely that there are already apartments in the building in which the asbestos dust levels are much higher. These locations are most likely to be those in which the air is supplied by diffusers that are closer to the ventilation system's air intakes and filters. People living in these apartments may be at risk now.

Respectfully submitted,


Monona Rossol, M.S., M.F.A.,
industrial hygienist

NEW YORK ENVIRONMENTAL LAW & JUSTICE PROJECT

*member of the Clean Water Network
member of the National Lawyers Guild*

315 Broadway, Suite 200
New York, NY 10007-1121
Tel : 212-766-9910
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e-mail: nyoljp@justice.com

*Jool R. Kupferman, Esq.; Executive Director
Kimberly Flynn: Policy Analyst
Charles Minkoff, Ph.D.: Scientific Data Analyst*

December 11, 2001

Department of Environmental Protection
Bureau of Air, Noise and Hazardous Materials
Asbestos and Lead Control Program
59-17 Junction Blvd.
Corona, NY 11373
Tel: (718) 595-3682
Fax: (718) 595-3749

RE:	Asbestos Condition at 105 Duane Street, NY, NY 10007 Building Owner: Related Management Company, L.P.
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Dear Department of Environmental Protection,

This letter is a formal notification of a complaint with regards to a high level of asbestos contamination at 105 Duane Street, New York, New York. Proper asbestos methods as required by law and regulation are not being utilized¹. We require immediate action due to postpone any work on the ventilation system in that building which is to begin on Wednesday, December 12, 2001. A survey was performed on December 3rd, 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 building through the ventilation system. This survey was made to determine the level of asbestos in dust in the level of asbestos in dust in the dust in the 10th floor apartment and hallway of the building.

¹. Several residents of the building and myself noticed that the hallway air grilles were removed for cleaning. In their place, management placed plastic and paper products to supposedly provide professional protection which were applied in such a manner that many were found to have fallen off within 24 hours of application. See picture.

On December 3rd, dust samples were taken by Mr. Olmsted from the 10th floor to determine whether asbestos fibers were settled on surfaces. The results reported in fibers per square centimeter of surface tested. The following summarizes Samples E1203-2: sampled from supply air diffuser in the 10th floor public hallway. Result - 555,000 asbestos structures per square centimeter.

These samples were analyzed by: International Asbestos Testing Laboratory (IATL), 1600 Horizon Way Unit 1000 Mt. Laurel NJ 08054-NYS Department of Health Certification # ELAP 11021.

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 buildings collapsed.

The duct system should be cleaned by a profession duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination. [see attached letter]

Another Industrial Hygienist, Monona Rossol, M.S., M.F.A., concurs stating that: "... the finding of 555,000 asbestos structure per square centimeter is a clear indication that the ventilation system should be cleaned by a professional duct cleaning company using vacuum and cleaning equipment designed for asbestos decontamination. I would add that the work must be done by trained and certified asbestos abatement workers who can prevent contamination of other part of the building while they work." [see attached letter]

Further documentation will be provided shortly. Please give this matter your immediate attention and action.

Yours.....


Joel R. Kupferman

Attorney for the Concerned Tenants of 105 Duane Street

cc: New York City Department of Health
New York State Department of Health
New York State Department of Environmental Conservation
United States Environmental Protection Agency Region #2-
Robert Fitzpatrick & Ken Eng
Cong. J. Nadler
NYC Councilmembers K.Freed, S. Michels
Assemblymembers Brodsky, Gottfreid, Silver, Glick
State Senator Patterson
WTC Emergency Environmental Group
Related Management Company, L.P.



Ambient Air Sampling

To: Related Management Company
Subject: Summary of Ambient Air Sampling to Date
Re: Tribeca Tower
From: Fred Burkhardt
Date: December 11, 2001

The following is a brief summary of the observations, real-time monitoring, and ambient air sampling performed at Tribeca Tower to date.

Apartment Visual Inspection

ATC visually inspected 406 units for accumulated dust and/or debris consistent with material that from ATC's experience emanated from the collapse of the World Trade Center Buildings. Thirty-four units were inaccessible or the occupants refused access and were not inspected.

Of the 406 units inspected, ATC did not observe any dust and/or debris accumulations that in ATC's opinion was consistent with widespread deposition of material that emanated from the collapse of the World Trade Center Buildings. However, ATC observed adjacent to open windows in four units, limited dust accumulations (no debris) although inconsistent with material that emanated from the collapse of the World Trade Center Buildings present nonetheless.

Asbestos Air Sampling via TEM

ATC collected a total of 60 common area and 149 residential unit samples to ascertain the presence or absence of airborne asbestos. All samples were collected and analyzed in accordance with the AHERA Transmission Electron Microscopy (TEM) method as set forth at 40 CFR Part 763, Subpart E, Appendix A which provides resolution down to 0.5 μ . structure size. Of the total 209 samples collected, a single asbestos structure was detectable on only two samples.

In the absence of a specific ambient air standard, ATC has selected as a criteria for acceptable ambient air sample sets, the AHERA re-occupancy requirement following an asbestos abatement action of an average of less than 70 asbestos structures per square millimeter (<70 s/mm²) per sample set. This criteria has been selected because the AHERA requirement is the most stringent reoccupancy requirement available, and has been designed to be protective of children following an asbestos abatement project.

Based upon analytical sample results for all samples recording levels well below the AHERA clearance requirement, it is ATC's opinion that the ambient air samples collected throughout the building are representative of the ambient conditions at the time of testing and that the areas tested meet an acceptable criterion for re-occupancy



Ambient Air Sampling

Fiberglass in Air via PCM

Twelve ambient air samples collected within the common areas lobby were analyzed for fiberglass using the Phase Contrast Microscopy (PCM) analytical method. All samples collected recorded fiber levels less than 0.01 f/cc

In the absence of a specific ambient air standard for fiberglass, ATC has selected as a criteria for acceptable ambient air sample sets, the NYCDEP re-occupancy requirement following an asbestos abatement action of an average of less than 0.01 fibers per cubic centimeter (0.01 f/cc²).

In conclusion, based upon the analytical results for fiberglass recording fiber concentrations below the NYC acceptable airborne clearance requirement following an abatement action, it is ATC's opinion that the ambient air samples collected throughout the building meet an acceptable criterion for re-occupancy

PCB's in Air

One ambient air sample collected within the lobby and analyzed for PCB's recorded analytical results less than analytical detection limit.

Indoor Air Quality

The IAQ evaluation included collection of seventy-five real-time measurements of temperature, relative humidity, carbon dioxide (CO₂), carbon monoxide (CO), respirable particulates and total volatile organic compounds (TVOC). Currently, there are no regulatory standards for indoor air quality in non-industrial buildings, such as residential units. For the real-time data collected, ATC uses the commonly accepted guidelines cited in the following publications:

- *Ventilation for Acceptable Indoor Air Quality (ASHRAE 62-1999)*, American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE);
- *Thermal Environmental Conditions for Human Occupancy (ASHRAE 55-1992)*;
- *Industrial Hygienists Guide to Indoor Air Quality Investigations (1993)*, American Industrial Hygiene Association (AIHA).

PARAMETER	TARGET LEVEL	AGENCY OR ORGANIZATION
Carbon Dioxide (CO ₂)	<700 parts per million (ppm) above background level	ASHRAE 62
Carbon Monoxide (CO)	9 ppm	USEPA NPAQS (as cited in ASHRAE 62)
Respirable Particles (PM ₁₀)	50 micrograms per cubic meter of air (µg/m ³)	USEPA NPAQS (as cited in ASHRAE 62)
Temperature	Summer: 73-79°F at 50% RH Winter: 68-75°F at 50% RH	ASHRAE 55
Relative Humidity	30 – 60 %	ASHRAE 55



Ambient Air Sampling

PARAMETER	TARGET LEVEL	AGENCY ORGANIZATION	OR
Total Volatile Organic Compounds (TVOC)	1 ppm	AIHA	

USEPA = United States Environmental Protection Agency

NPAAQS = National Primary Ambient-Air Quality Standard

AIHA = American Industrial Hygiene Association

All parameters measured during the IAQ assessment were within recommended guideline ranges.

PCB's in Air

One ambient air sample collected within the lobby and analyzed for PCB's recorded analytical results less than analytical detection limit.

Dioxins

Results for the one ambient air sample collected within the lobby for airborne Dioxin is pending. The limited availability of Dioxin laboratories and large backlog volume prevents an accurate estimate of return.

Airborne Metals

One common area and nine residential units were sampled for and analyzed for airborne metals (copper, lead, and chromium). All recorded analytical results were less than analytical detection limit for lead and chromium. Detectable levels of copper were detected in seven samples and were more than 1000 times lower than the best available occupational standards. There was no observed likely source recorded for the copper.

NEW YORK ENVIRONMENTAL LAW & JUSTICE PROJECT

<http://www.NYenviroLAW.org>

A non-profit public interest organization which counsels and represents groups and individual concerns with the preservation and improvement of community environmental conditions. It is possible for citizens to protect themselves and their communities from dangerous and burdensome environmental hazards through knowledge and effective -- affordable legal avenues. We believe that environmental justice should be available to all people regardless of race, gender or age. By utilizing our "commando" law techniques we are able to effectively promote the interests of the environmental community.

We, after much scientific study and sampling into the multitude of carcinogens and toxics released into the environmental due to the WTC disaster, require that the surrounding area be designated a EPA SUPERFUND Site. We feel that this is necessary in light of the fact that each of these chemicals can be most hazardous by themselves but since there are such large quantities and so many of them combined into a superheated form and dispersed over a large densely metropolitan area as an extremely fine particulate probably has accentuated its toxicity and possibility for a synergistic effect. The lack of data or research into this magnitude of exposure simply does not exist due to the fact that such circumstances have never been encountered. By declaring the area to be an EPA SUPERFUND site, the onus to prove safety will be established and appropriate methods and procedures will be federally enforced. The facts are plain and simple - extremely hazardous materials became airborne when the World Trade Center disintegrated and thus could pose a MOST SERIOUS health threat to people who live and work in the downtown area, not just Ground Zero. These particles and gasses obey the laws of physics and thus spread around the downtown area and were not confined to the immediate vicinity of the WTC area. Public trust in government has diminished as workers and residents have become sick and required medical attention. It is time that the various governmental agencies at the federal, state, and local level do whatever is necessary, including a medical registry, to protect the public health and safety and thereby regain the public's trust.

DEC 13, 2001
- NEW
DOCUMENTS
TO SEE!!!
New Design
shortly!!!

Contact New York Environmental Law and Justice Project

212-766-9910

We were on WCBS TV
at 6:15 PM on Friday
Night -October 26. A
report was also shown on
NY1!

**NOTICE :Informational Letter from several
residents of 105 Duane Street regarding the
situation that was reported on WNBC News last
night.**

PHOTOS

Dr. Levin MD, Director of Occupation and Environmental
Diseases, Mt. Sinai say in DailyNews 11-9-01 Airway
Disfunction caused by Gases from WTC 76K

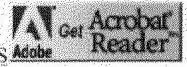
nyelj@justice.com

**EMERGENCY!!! DEC. 11 : Residents of 105
Duane Street (TRIBECA TOWER) -- Your**

Our site uses extensively

building has come up with a high level of asbestos contamination. Industrial Hygenist Report!! and Our Letter To Various City, State, and Federal Agencies Who Are Coming to the Building on Wednesday December 12th in the Morning (DEP HAZMAT Team & Department of Health)

the Adobe Acrobat PDF format for document integrity and legibility. Please download the FREE reader to view

documents 

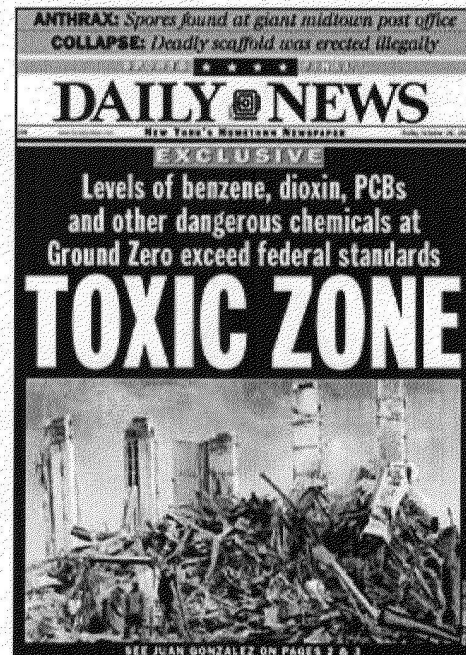
MORE info on WTC - INCLUDING OFFICIAL EPA DOCUMENTS!!! READ THEM FOR YOURSELVES!!!!

SEE the FRONT PAGE of THE DAILY NEWS of OUR STORY (in PDF FORMAT):

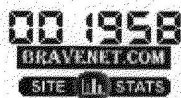
Downwind From Disaster:

Special Report on World Trade Center Health Crisis

More on our Project
Breaking News
Cases
Documents
Personnel



Email the Envirolaw Webmeister: nyelj@justice.com



[WTC index](#)

NEW YORK ENVIRONMENTAL LAW & JUSTICE PROJECT

<http://www.NYenviroLAW.org>

A non-profit public interest organization which counsels and represents groups and individual concerns with the preservation and improvement of community environmental conditions. It is possible for citizens to protect themselves and their communities from dangerous and burdensome environmental hazards through knowledge and effective -- affordable legal avenues. We believe that environmental justice should be available to all people regardless of race, gender or age. By utilizing our "commando" law techniques we are able to effectively promote the interests of the environmental community.

We, after much scientific study and sampling into the multitude of carcinogens and toxics released into the environmental due to the WTC disaster, require that the surrounding area be designated a EPA SUPERFUND Site. We feel that this is necessary in light of the fact that each of these chemicals are life threatening by themselves but since there are such large quantities and so many of them combined into a superheated and dispersed over a large densely metropolitan area in an extremely fine particulate form probably has accentuated its toxicity and possibility for a synergistic effect. The lack of data or research into this type of exposure simply does not exist due to the fact that such circumstances have never been encountered. By declaring the area to be an EPA SUPERFUND site, the onus to prove safety will be established and appropriate methods and procedures will be Federally Enforced. The facts are plain and simple - extremely hazardous materials became airborne when the World Trade Center disintegrated and thus could pose a MOST SERIOUS health threat to people who live and work in the downtown area, not just Ground Zero. These particles and gasses obey the laws of physics and thus spread around the downtown area and were not limited to the immediate vicinity of the WTC area. Public trust in government has diminished as workers and residents have become sick and required medical attention. It is time that the various governmental agencies at the federal, state, and local level do whatever is necessary to protect the public health and safety and thereby regain the public's trust.

Letter from several residents of Tribeca Tower

We are fighting on several ground regarding the situation at Tribeca Tower (105 Duane St). The management we feel deliberately asked for tests (Ambient Air Tests) several weeks after the disaster had occurred. Instead of using bulk-wipe test method which ATC was using for the city, they used Ambient Air Tests, we think that management had picked Ambient Air Testing as a testing method since it would produce false negative results. After many residents have become ill and suffered, the Residents of 105 Duane Street felt it was time to just do their independent test. The management had proceeded to engage in a cleanup which they considered appropriate for a building not affected with asbestos. Using only the initial EPA web-site, they incorrectly stated that there was no significant asbestos fibers found in the general area or building- which indicates the bias of the landlord. Some of the filters at City Hall the EPA that they had become totally clogged and therefore declared N/A. However the management claimed they could be trusted to maintain tenants safety. Residents were amazed to see that instead a professional environmental cleanup crew that had been promised, a work crew equipped with Windex in hand was seen cleaning the building who claimed to be working for "Verizon" (!?!). Then management removed hallway vent grilles without ever testing the ventilation system for asbestos (the ventilation

system took in the dust cloud from the World Trade Center collapse), covering them up with flimsy paper/plastic material and duct taped to the wall that fell off within hours. Then management released a disturbing memo to several residents stating that they would, if need be, actually drill through the locks, if they were unable to access the vent duct system in their apartments for their cleanup. Residents had seen examples of management complete disregard for their concerns and felt that their apartments could be further contaminated. The residents, having no choice, went to file the results of the asbestos test of the ventilation grille with various local, state, and federal agencies. The test results unfortunately confirmed their worst fears with asbestos readings of over 500 times the recommended limit. WNBC TV Newscast came to the building to publicize the situation and we are most grateful for the support and understanding of our NYC Council members, especially Ms. Katherine Freed and the NYC Department of Health staff who did a terrific job of safeguarding the public's health and well-being. The following points need to be made:

1. Channel 4 said that Tribeca Tower was evacuated on Sept. 11. This is not accurate as some tenants as well as building employees but NO management remained in the building.
2. Management states that releasing information was "irresponsible". That would be funny if it was not so tragic.
3. What was not mentioned on the news was the amount of people getting sick in the building and the number of people who moved (either temporary or permanent).
4. Management continues to refuse to allow most tenants to break their lease or require them to sign a waiver in the management's best interest.
5. Doesn't management realize they are shooting themselves in the foot? They should be bending over backwards to assuage our fears since the tenants are getting fed up with obstinance regarding the contamination and moving out. Management should do everything in its power to keeps it tenants here since they will have severe problems repopulating Tribeca Tower.
 - A. Who wants to live next to a mass grave, still smoking and reeking the whole entire neighborhood.
 - B. The attendant noise and overwhelming construction atmosphere due to the rebuilding of that area.
 - C. Fewer people will want to live down in Tribeca since downtown office space and other amenities have noticeably shrunk with the demise of the WTC.
 - D. The New York City economy is shrinking and fewer people can afford to live here.

From a few residents of Tribeca Tower
(105 Duane St. NY NY)



Ambient Air Sampling

Subject: Tribeca Towers
105 Duane Street

Re: Ambient Air Sampling

To: Peter Hoyle
Related Management

From: Fred Burkhardt

Date: December 13, 2001

On December 12, 2001, at the request of and witnessed by the NYCDEP, ATC collected a total of ten ambient air sample from within Tribeca Tower. Five samples were collected from the common hallway of the tenth floor, with one sample placed directly in front of the supply air entry point. A second set of five ambient air samples were collected from the second floor air handler room servicing the common areas including the tenth floor.

In the absence of a specific ambient air standard, ATC has selected as a criteria for acceptable ambient air sample sets, the AHERA re-occupancy requirement following an asbestos abatement action of an average of less than 70 asbestos structures per square millimeter (<70 s/mm²) per sample set. This criteria has been selected because the AHERA requirement is the most stringent airborne asbestos reoccupancy standard available, and has been designed to be protective of children following an asbestos abatement project.

Based upon analytical sample results for all samples recording no asbestos structures detected which is significantly below the AHERA clearance requirement. It is ATC's opinion that the ambient air samples collected from these areas are representative of the ambient conditions at the time of testing and that the areas tested meet an acceptable criterion for re-occupancy. If you have any questions or require additional explanation of the information presented please do not hesitate to call me at 212-353-8280.

Thank You.

DRAFT 105 Duane Street Fact Sheet

The New York City Departments of Health (DOH) and Environmental Protection (DEP) were notified by the New York Environmental Law & Justice Project that tenants residing at 105 Duane Street are concerned about asbestos fibers in their building resulting from the collapse of the Twin Towers. The DOH has developed this fact sheet to help address these specific concerns.

What sampling has been performed for asbestos at 105 Duane Street?

- Sampling of the air in 209 locations (residential units and common areas) was performed by an environmental consultant, ATC Associates, on behalf of Related Management Company.
- Sampling of three surfaces (two residential units and one common area) within the building and one dust sample from outside of the building was performed by the United States Public Health Service (USPHS) on behalf of DOH.
- Sampling of two surfaces (a 10th floor apartment surface and common area air diffuser) was performed by Ed Olmsted, CIH, on behalf of the tenants.
- ATC Associates on behalf of the building owner and under the direction of the DEP performed air sampling at five locations within the common hallway of the 10th floor. One of these samples was placed directly in front of the supply air entry point (air diffuser). Another set of five samples was collected from the 2nd floor air handling room, which services the common areas.

What are the sampling results?

- All of the 209 air samples collected by ATC Associates, on behalf of Related Management Company, were within the most stringent standard used for clearance in an indoor environment.
- No asbestos was detected in the surface and dust samples collected by the USPHS. Results of a more detailed analysis of these samples are pending.
- All of the 10 air samples collected by ATC Associates, on behalf of the building owner, were within the most stringent standard used for clearance in an indoor environment.
- Both of the surface samples collected by Ed Olmstead using a vacuum sampling method showed the presence of asbestos fibers.

Do these results mean I have been exposed to dangerous levels of asbestos?

No. The mere presence of asbestos does not necessarily pose a health concern. For asbestos to cause health problems it must be inhaled or ingested. All of the air samples collected at the building, including those from within the ventilation system, indicate that asbestos is not airborne in quantities that would pose a health concern.

Weren't the levels found on the supply air diffuser very high?

There are no standards or guidelines to compare the results of the vacuum samples, which were collected by Ed Olmstead using the American Society for Testing and Materials Method D-5755. This method can grossly overestimate the presence of asbestos fibers. Furthermore, the information on this method states that a minimum of three samples should be collected from the same area and that "the user should consider these data in relationship to other available information in their evaluation." In looking at all of the sampling data collected so far, they suggest that asbestos does not pose a health threat at the building.

How should the ventilation system be cleaned?

The ventilation system should be cleaned using procedures that will prevent the dispersion of any small particles and fibers, including asbestos, into occupied or cleaned areas of the building and ventilation system. This would involve the use of a HEPA vacuum. The building owner has forwarded a plan for cleaning the ventilation system to the DEP. The DEP has reviewed the plan and will inspect the site during the cleaning. An assessment of the ventilation system will continue throughout the cleaning process.

Radhakrishnan, Krish

From: Lutchmedial, Carlstien
Sent: Thursday, December 20, 2001 2:38 PM
To: Radhakrishnan, Krish
Cc: Theodorellys, Penny; Plumptre, Alphonso
Subject: 105 Duane Street

Today December 20, 2001 I conducted an inspection at 105 Duane street, Manhattan. The purpose of the visit was to determine whether any more sampling was required of the ventilation system. Present were Howard Bader - a consultant for the tenants association, two tenants were present, a representative of Tech Clean (duct cleaning company), ATC Labs rep, Lisa Bergenty of Relations Management (bldg. Mgt. Co.) a DOH - Peter Stallbohm, Brendan Farell - Super. Some other helpers were present.

I requested from Mr. Bader to take us wherever he deemed appropriate to start. The 10th floor diffuser was chosen. On opening, we found that there was no visible dust. Bader also, used a portable monitor to check for respirable fibers and found none. It was then suggested by him that this might be the condition of all the other locations. As a result, no more inspection was necessary. I repeated to him that I would be happy to look at more.

One of the tenants who was present, wanted her apartment vent inspected. This we did and found that there was minor dust accumulation which appeared to be very old. Bader said that he may take a sample. It was agreed that the owner would treat the clean up of the duct as though it was an ACM project. However, this is on hold because of other concerns by the tenants.

DOH also agreed that there was no concern reference ACM. It was acknowledged that the owners are done more than sufficient sampling. The tenants concern was that some procedures were not being followed. Such as, the plastic covering the duct had fallen off or had holes. The tenants also had in their possession a document from EPA dated December 19, 2001 which indicated DEP methods were inaccurate.

Mr. Kupperman (tenants attorney) met me outside the building and expressed his concern that DEP protocols were incorrect based on the EPA document.

Before leaving the site I again requested if there was any other concerns regarding ACM and was told "no."

Based on my inspection there was no suspect material to be sampled. The owner is still agreeing to do any more sampling required by the tenants. Also, it was agreed that DEP will be notified when any duct cleaning begins.

Post-it® Fax Note 7671		Date 12/21/01	# of pages ▶ 19
To Alessandra	From Bob		
Co./Dept.	Co. DEP		
Phone # 212-788-2937	Phone # 718-595-4418		
Fax # 212-788-2941	Fax #		



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

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

DATE: December 19, 2001

SUBJECT:

- **Wipe sampling for asbestos in Lower Manhattan**
- **Projection of airborne levels from settled WTC dusts**
- **Estimation of increased cancer risks based on various WTC dust exposure scenarios**

FROM: Cate Jenkins, Ph.D.
Waste Identification Branch (Mail Code 5304 W)
Hazardous Waste Identification Division

C. Jenkins

TO: Affected Parties and Responsible Officials

The following memorandum provides information on taking wipe samples of settled dusts inside buildings in Lower Manhattan that resulted from the collapse of the World Trade Center (WTC). Studies are discussed which correlate the amount of asbestos that will become airborne (resuspended) because of activities such as sweeping, athletic activities, etc. Information is provided on the cumulative exposures (total doses) found by the Agency for Toxic Substances and Disease Registry (ATSDR) to be associated with asbestos-related health effects, and examples are given how to use this information to calculate doses of asbestos from the WTC disaster. Finally, a brief section explains the different methods for analyzing and reporting asbestos levels.

The analyses, projections, and opinions in this memorandum represent my own professional judgement and are not intended to be construed as any official position or recommendation by the U.S. Environmental Protection Agency. This memorandum is not intended as any final risk assessment risks from continued and past exposures to asbestos, and has not been reviewed by EPA. The data is too incomplete at this time for any complete projection of risks, and there are too many methods available for performing such projections. My attempt was intended only as a point of discussion prior to more rigorous assessments.

CONTRADICTORY ASBESTOS TESTING GUIDANCE

Impossible instructions from NYC DEP

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 owners' 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 landbrds 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.

Laboratory results for settled dust layers are reported as "asbestos structures/square centimeter (structures/cm²). This cannot be converted into a percentage of asbestos. Thus, it is almost impossible for building owners to even test for the 1% level in the first place. See the last section of this memorandum for more information on asbestos sampling and analysis techniques.

NYC DEP instructions also contrary to stated EPA standard for the cleanup

The NYC DEP instructions also reversed the decision by the federal EPA that asbestos levels should be non-detectable. 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).² 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.

EPA regulations apply the 1% level to the asbestos containing materials themselves, such as insulation or asbestos floor tiles, not to the dusts that would result from the presence somewhere in the building of asbestos containing materials (ACM). EPA assumed that the dusts resulting from the presence of these ACM somewhere in the building would have much lower levels of

asbestos than 1%. And it is these dusts themselves that are considered to be the ultimate hazard by EPA, even though they have levels lower than 1%. The U.S. EPA has clearly stated that levels lower than 1% could present hazards:³

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.

The NYC DEP also exercised no oversight over building owners to insure that they did test their premises, or used a professional asbestos abatement firm for remediation.

TAKING WIPE SAMPLES OF INTERIOR SURFACES

Practicality of taking wipe samples

Taking a wipe or microvacuum sample may be the only practical way to quickly see if a building is contaminated inside, or if cleanup is complete. Air sampling is highly variable depending on the time, the exact location, the amount of activity stirring up dusts, etc. Furthermore, a large amount of specialized equipment is required. Even if air sampling shows no detectable asbestos, there could still be a substantial reservoir in settled dusts somewhere waiting to become airborne under the right conditions. Air sampling cannot be used in lieu of a complete removal of the asbestos-contaminated dusts.

Because there will probably be a continued demand over for at least the next year, if not more, to test areas in Lower Manhattan, it might be a good time for certain individuals to learn wipe sampling techniques. Probably an individual should not take this on her/himself for only a one-time sampling event. Even for wipe sampling, there is a fairly rigorous standardized procedure to follow with wiping methods and placing of the wipe in containers for transport, etc.

This might be an option for staff at environmental and occupational safety and health groups. Chemists, pharmacists, other scientists and health professionals might want to learn this type of sampling. The laboratory which will do the actual analysis will usually work with the person to get her/him the right materials. There appear to be no insurmountable hurdles to setting up to provide these types of services. Workshops and training sessions could be held by various groups.

An alternative to wipe sampling is using a microvacuum to sample settled dusts. This would involve purchasing a pump designed for personal monitoring of workers under OSHA, calibrating it, and adapting it to the sampling technique. These pumps cost from \$1500 to \$3000. This is a less practical option, -- it also does not transfer as much asbestos from surface into the sample to be tested. The detection limit also appears to be better than the microvacuum method.

Description of ASTM method D-6480-99

EPA does not have any wipe, or even microvacuum methods for asbestos. However, the American Society of Testing and Materials (ASTM) has developed method D-6480-99.⁴ The required materials include particle-free wipe material (commonly made available for clean room supplies, called a "clean room wiper," available from major laboratory safety supply

vendors), specially filtered particle-free water, dust free disposable gloves, and a high purity alcohol. The laboratory that will perform the actual test typically will work with you to get you these supplies.

Finding a Laboratory

First, choose a laboratory which is accredited by the EPA to perform TEM (transmission electron microscopy) asbestos analyses. These labs are posted on the web at: <http://ts.nist.gov/ts/htdocs/210/214/scopes/temtm.htm>. Or, contact the National Institute for Standards and Technology (NIST) Laboratory Accreditation Administration, Gaithersburg, MD 20899 (telephone 301-975-4016). There are about 60 accredited labs. Since wipe samples cannot be used for regulatory purposes, it is irrelevant whether the lab also has an accreditation in New York State. You can use any out-of-state lab that is convenient.

Using TEM instead PCM analyses is important in terms of comparison of the wipe sample with the TEM air level testing required under the asbestos AHERA standard. It is particularly important to use TEM for the WTC dusts because the asbestos in them is very fine. A PCM analysis will only detect larger particles.

Contact the lab to see what type of wipe samples they are capable or willing to perform. Ask whether they will perform TEM analyses on samples that were collected by American Society of Testing and Materials (ASTM) wipe Method D 6480 (wipe). Ask advice on sample preparation, handling, etc.

Interpreting the results of settled dust levels, wipe samples or microvacuum samples

Industrial hygienists and other health professionals recommend professional asbestos abatement procedures when a wipe sample is over the detection limit, or background, of 260 s/cm² for wipe samples, or over 1000 s/cm² for a microvacuum sample.

If there are any elevated levels of asbestos on surfaces, then landlords should be contacted and asbestos abatement by trained, certified professionals should be instituted. Also, contact health and environmental agencies and elected officials so that they are aware of the problem and can provide assistance and intervene to provide assistance to others in the area who are probably contaminated as well. Contact local non-profit environmental and occupational safety and health organizations as well for assistance and advice.

PREDICTING AIR CONCENTRATIONS FROM SETTLED DUST LEVELS

To predict the amount of asbestos which will be in the air from a given settled dust level is not an exact science. Until such time as adequate air monitoring is available, the following may be the only viable method. Settled asbestos dusts get resuspended into the air inside buildings as the result of activities such as sweeping, walking around, moving heavy equipment, etc.

What is needed are factors, or numbers, to multiply the settled dust levels by to estimate the airborne levels. The following presents such a methodology. First, the conversion factors for an

experimental study are given. Then, the conversion factors are estimated for WTC asbestos dusts.

Settled dust level conversion factors found from controlled study

A study was performed by Millette and Hays to provide a correlation between the level of asbestos in settled dusts and the amount which will become airborne (resuspended) as the result of certain activities. This study used real world situations of asbestos contamination, primarily after the San Francisco earthquake. Table 1 shows the experimental results, along with the calculated "K-factor", the factor for multiplying the settled dust level by to find the air level. As can be seen, the air concentrations increase as the activity level increases.

Table 1. Resuspension K-Factors for settled asbestos dusts determined from controlled asbestos studies by Millette and Hays. ⁵			
ACTIVITY	SETTLED DUST LEVEL structures/square centimeter (s/cm ²)	AIR LEVEL structures/milliliter (s/mL)	K-FACTORS multiply the settled dust level by this number to get the air level
Carpet cleaning (ordinary vacuum)	23,000	0.09	3.9×10^{-6} (0.0000039)
Broom Sweeping	760,000	53.6	7.1×10^{-5} (0.000071)
Cleaning Storage Area	870,000	2.7	3.1×10^{-6} (0.0000031)
Gym-Athletic Activities	9,700	0.23	2.4×10^{-5} (0.000024)
Cable Pull	2,000,000	28.9	1.4×10^{-5} (0.000014)

Resuspension factors for settled dusts from World Trade Center

The Millette and Hays study can be used to predict airborne levels of the WTC dusts. Data is available from the Ground Zero Task Force study for two apartment buildings.⁶ Settled asbestos levels along with airborne asbestos levels were measured under passive conditions. Estimations are then made of the fraction of the settled dust which will become resuspended.

The WTC dusts are unusual in that the particles of asbestos are smaller than usually, having a greater likelihood of becoming resuspended.⁷ This appears to be the case. The actual measured fraction of asbestos that was suspended in air over settled dusts under passive conditions (no activities taking place to stir them up) were HIGHER than measured in the Millette and Hays study when a carpet was being vacuumed. It is reasonable and prudent to predict that if the WTC dusts were being vacuumed, the resuspension factor would be higher than actually measured under passive conditions, which means they would be higher than found in the Millette and Hays study. The resuspension factor for the WTC dusts have been predicted to be 10 times higher under vacuuming conditions than under passive conditions, which is 10 times higher than found

in the Millette and Hays study. All of the other Millette and Hays resuspension factors have also been increased by 10 for the WTC asbestos dusts. Table 2 provides the actual resuspension factor found by testing for WTC dusts under passive conditions, along with the predicted air levels under a variety of activities with the modified resuspension factors, called the WTC-Factors:

Table 2. Resuspension WTC-Factors for settled dusts from World Trade Center using actual measurements for passive conditions and modifications to K-Factors found in Millette and Hays study			
	SETTLED DUST LEVEL (s/cm ²)	AIR LEVEL (s/mL)	WTC-FACTORS Multiply the settled dust level by this number to predict air levels
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	2.56	4×10^{-6} (measured) (0.000004)
Carpet cleaning (ordinary vacuum)	640,000	24.96	3.9×10^{-5} (estimated) (0.000039)
Broom Sweeping	640,000	454.40	7.1×10^{-4} (estimated) (0.00071)
Cleaning storage area	640,000	19.84	3.1×10^{-5} (estimated) (0.000031)
Gym-Athletic Activities	640,000	153.60	2.4×10^{-4} (estimated) (0.00024)
Cable Pull	640,000	89.60	1.4×10^{-4} (estimated) (0.00014)
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	0.12	4×10^{-6} (measured) (0.000004)
Carpet cleaning (ordinary vacuum)	29,000	1.13	3.9×10^{-5} (estimated) (0.000039)
Broom Sweeping	29,000	20.59	7.1×10^{-4} (estimated) (0.00071)
Cleaning storage area	29,000	0.90	3.1×10^{-5} (estimated) (0.000031)
Gym-Athletic Activities	29,000	6.96	2.4×10^{-4} (estimated) (0.00024)
Cable Pull	29,000	4.06	1.4×10^{-4} (estimated) (0.00014)

(Interview Version)

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.

(I have been informed that typically, in asbestos abatement, carpeting is removed and discarded because of the inability to remove all the asbestos. More documentation on recommendations and this practice is requested. Information on actually testing or test methods for asbestos contaminated carpeting is also solicited. jenkins.cate@epa.gov)

**CALCULATING TOTAL DOSE FROM ATSDR's
CUMULATIVE EXPOSURE INDEX****Cumulative, or total dose, found by ATSDR to be related to health effects**

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.⁹

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. The ATSDR does explain that there is no absolute correlation of the total dose with health effects, but uses it as a valid method to evaluate health risks.

Table 3 lists some of the "cumulative doses" found by the ATSDR to be associated with asbestos health effects. The table also gives examples of what the air asbestos levels are required for different time periods to achieve this dose.

Table 3. CUMULATIVE EXPOSURES OF ASBESTOS ASSOCIATED WITH HEALTH EFFECTS
 From the ATSDR Toxicological Profile for Asbestos,¹⁰ including examples of air levels and the amount of time needed to accumulate the dose

HEALTH EFFECT	CUMULATIVE EXPOSURE OR DOSE asbestos inhalation (f-yr/mL)	RISK LEVEL	EQUIVALENT AIR LEVEL (in fibers per milliliter - f/mL) and NUMBER OF YEARS EXPOSURE THAT WOULD LEAD TO THIS TOTAL CUMULATIVE EXPOSURE OR DOSE					
Cumulative Exposure is given in the number of fibers per milliliter times the years of exposure (f-yr/mL), measured by PCM Risk Level is the number of excess cancer cases or cases of other health effects for a given population			1 week	3 months	6 months	1 year	2 years	50 years
lung cancer, smokers, EPA risk levels	0.00035	1 cancer per million	0.018	0.0014	0.0007	0.00035	0.000175	0.000007
	0.0035	1 cancer per 100,000	0.183	0.014	0.007	0.0035	0.00175	0.00007
	0.035	1 cancer per 10,000	1.825	0.14	0.07	0.035	0.0175	0.0007
lung cancer, non-smokers, EPA risk levels	0.0035	1 cancer per million	0.183	0.014	0.007	0.0035	0.00175	0.00007
	0.035	1 cancer per 100,000	1.825	0.14	0.07	0.035	0.0175	0.0007
	0.35	1 cancer per 10,000	18.250	1.4	0.7	0.35	0.175	0.007
mesothelioma, EPA risk levels	0.00031	1 cancer per million	0.016	0.00124	0.00062	0.00031	0.000155	0.0000062
	0.0031	1 cancer per 100,000	0.162	0.0124	0.0062	0.0031	0.00155	0.000062
	0.031	1 cancer per 10,000	1.616	0.124	0.062	0.031	0.0155	0.00062
asbestosis	2.6	no effect level	135.571	10.4	5.2	2.6	1.3	0.052
	4.5	1 case per 1000	234.643	18	9	4.5	2.25	0.09
abnormal radiological findings	0.12	3.7 per 100	6.257	0.48	0.24	0.12	0.06	0.0024

How to use Table 3

First, look for the health effect that will occur at the lowest levels of asbestos. This would be mesothelioma, a type of cancer that affects the cavity of the thorax, and also lung cancer if you are also a smoker. If a person inhales the equivalent of 0.00031 fibers of asbestos/milliliter of air for one year, then their increased risk of getting mesothelioma is 1 in a million. If they breathe 10 times that much for one year (0.0031 f-yr/mL), then the chance is increased to 1 in 100,000. Then, go over to the right hand columns which give a range of different time periods. Say you are interested in those exposures which will increase mesothelioma cancer risks by 1 in 10,000. 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

If a different time period is needed than shown in the table, multiply the one-year cumulative exposure index by the time period. For 2 weeks, multiply by 14/365, etc.

Precautions when using Table 3

Confusion over the way asbestos is reported.

The first and foremost precaution in using Table 3 is this:

DO NOT CONFUSE ASBESTOS LEVELS REPORTED AS:
 "structures per square millimeter" (s/mm³) WITH "structures per milliliter" (s/mL)

These are very different things, although to the unwary, they appear to be the same. However, "structures per square milliliter" (s/mL) are the same thing as "structures per cubic centimeter" (s/cc³). See the last section of this memo for more information on the way asbestos levels are reported.

At its web site, EPA only reported concentrations as "structures/square millimeter."¹¹ They could have given the asbestos concentration as "structures/milliliter" but did not. Thus, it is not easy to compare the EPA data unless you look at the actual lab sheets, which are posted on the internet at the NYELJP web site.¹²

Conversion of TEM measurements of WTC dusts to the PCM measurements used for the health studies.

A problem, or perhaps more an uncertainty, in using Table 3 arises from the fact that the human health studies are correlated to asbestos that was measured by the PCM method, which does not detect smaller fibers. The WTC dusts were measured by EPA using the more sensitive TEM method, which does detect these smaller fibers.

Since TEM analyses of WTC dusts give higher reading of fibers/structures asbestos than a PCM reading, some would argue that all of the WTC asbestos levels should be divided by some number (made smaller) to make them comparable to the ATSDR studies which used PCM. For the WTC dusts, the ratio of TEM fibers/structures to PCM-equivalent fibers/structures was high, around 80 to 90.¹³

I have chosen not to attempt any conversion of TEM measurements to PCM-equivalent measurements for several reasons. First, the older PCM measures used in studies cited by the ATSDR may not, in fact, be smaller than a TEM measurement of the actual asbestos to which the humans were exposed. This is because PCM cannot distinguish between asbestos and other fibrous minerals. Thus, the studies of humans using PCM measurements may actually have *overestimated* true asbestos exposures because they included non-asbestos fibers. Also, the asbestos fibers to which persons were exposed in these older studies may not have included a substantial fraction of the smaller fibers like the WTC dusts.

Second, as a matter of policy, the federal EPA has issued no guidelines or standards recommending the use of such a conversion in asbestos risk assessments. If such a recommendation were to be issued, it would first undergo extensive internal and external peer review, and be subjected to due process through a notice and comment period. As an individual staff scientist, I would not take it upon myself to lower a risk assessment until such final guidance is issued. As prudent public policy, however, it is always valid for anyone to upgrade a risk assessment based on new, even if untested, data indicating a greater hazard.

Claim that fine asbestos particles are not hazardous

Some may argue that the smaller WTC fibers are less hazardous than the larger fibers. To my knowledge, the federal EPA has not addressed this scientific theory and issued any guidance to discount any cancerous effects of fine asbestos fibers. If such a recommendation were to be issued, it would first undergo extensive internal and external peer review, and be subjected to due process through a notice and comment period. Until such time as this occurs, as a matter of prudent public health policy, it would be inappropriate to downgrade a risk assessment based on this theory. I have also been informed that EPA has no intention of downgrading the risk based on this theory.

ESTIMATING INCREASED HEALTH RISKS FROM VARIOUS WTC EXPOSURE SCENARIOS

The following represents my efforts as a staff scientist to characterize any elevated health risks from exposures to WTC asbestos-contaminated dusts. As stated at the beginning of this memorandum, this risk assessment does not represent any official EPA analysis or position and does not necessarily reflect EPA policy. It has not been reviewed by EPA. There are many alternate ways to perform a risk assessment other than the one presented below. This risk assessment has a wide range of uncertainty both because of the limited data and the many assumptions that were utilized.

The EPA does not consider any exposure to a man-made carcinogen to be acceptable, but does base its actions in existing exposure situations according to the degree of elevated risk. The EPA chooses a degree of protection, or risk level, as a criteria for abating exposures.

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. A response action is generally warranted if the cumulative excess carcinogenic risk for any single individual affected by a site exposing humans to carcinogens exceeds 1 in 10,000 (the 10^{-4} risk level) using reasonable maximum exposure assumptions for either the current or reasonably anticipated future exposures.¹⁴

Scenario 1 - Volunteer at Ground Zero for two weeks

A person volunteered to provide refreshments to the rescue workers on the perimeter of Ground Zero for two weeks. The volunteer spent 12-hour days, going home to Brooklyn at night. S/he stayed outdoors for the majority of the time, but came inside to one of the adjacent evacuated hotels for shelter from the elements, to rest, and to eat. Approximately 3 hours per day were spent inside this building.

This person also lived/may live in an urban environment for a life of 85 years, with an exposure level of 6×10^{-6} (0.000006) s/mL.¹⁵

From Table 2, the asbestos level inside the contaminated building near Ground Zero is estimated to be 10 s/mL, midway between the "passive" conditions tested in the high-exposure building near Ground Zero, and the level estimated for cleaning out a storage room.

The level at the refreshment stand on the perimeter of Ground Zero is estimated to be 0.16 s/mL, towards the high side of EPA's air readings outdoors near Ground Zero in the month of October, but low for the month of September..

(Internet Version)

s/mL	x	time period (years)	=	total dose (s-year/mL)
0.16		(14/365)x(9/24)		0.0023
10		(14/365)x(3/24)		0.0479
0.000006		85		0.0005
total dose (cumulative exposure)				0.0507

From Table 3, the increased risk of getting mesothelioma will be almost 2 per 100,000 for the one week volunteer service in New York City. The whole life in an urban setting contributed very little to this risk. Going indoors to the contaminated building for 3 hours a day, rather than staying outside, represents essentially all of this risk.

If the volunteer had stayed outside for the whole time, the risks would be as follows:

s/mL	x	time period (years)	=	total dose (s-year/mL)
0.16		(14/365)x(12/24)		0.0031
0.000006		85		0.0005
total dose (cumulative exposure)				0.0036

The increased risk of mesothelioma would be around 1 in 100,000, due almost entirely to the 2 weeks service in NYC.

Scenario 2 - Resident of Lower Manhattan in contaminated building

A resident works in lower Manhattan and was present nearby during the collapse of the World Trade Center, but not in a building whose windows were blown out. The resident was engulfed by the dust cloud while walking up to Warren Street to her/his apartment. The resident stayed one night with no electricity and water because of 3 cats before leaving for two days, returning September 14 after restoration of services. There was no forced evacuation of the apartment building, many residents remained even when there was no electricity or water.

The landlord was in the process of cleaning common areas, which were primarily carpeted, by common cleaning techniques, vacuuming and dusting, starting September 14, for 4 days. The resident performed her/his own apartment cleaning and has remained in place. The resident only wore a dust mask, as recommended by the New York City Department of Health (NYC DOH) while cleaning the apartment,¹⁶ which provided no protection against the asbestos.

The apartment building interiors only had a minimal, small amounts of dust from the WTC. 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.¹⁷ An apartment with just such minimal, small amount of WTC dusts was the subject of the Ground Zero Task Force study, and the asbestos concentrations, and may be found in Table 2. 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.¹⁸

(Internet Version) CC The office in Lower Manhattan where the resident works had similar cleaning measures

implemented by the landlord, although in this case individual offices were cleaned by the landlord. Here also the dusting from the WTC was minimal and fine. No windows were broken in either the apartment building or the office building.

The resident was in a very high-contamination situation for 2 days. Upon returning to her/his apartment, the citizen was in another 4 day high contamination exposure while cleaning the apartment and being present while cleaning was going on of other apartments and common areas. The resident has remained in contaminated circumstances while at home and in the office for approximately 3 months after inadequate cleaning procedures.

The levels of asbestos exposure during the first two days exposure is estimated to be 500 s/mL. This level is 100 times the highest level found by the HP Environmental study in passive conditions in two buildings damaged but still standing near the World Trade Center.¹⁹ EPA did not appear to have monitoring equipment in place at this time. If it had, the portals could have been occluded with heavy dusts and no readings would have been possible.

The level of asbestos during the 4 days cleaning and living in the apartment is estimated to be 10 s/mL, a point midway between vacuum cleaning and broom cleaning from Table 2 for the low exposure building.

The level of asbestos for the balance of the time, a 3 month period at home and at an equally contaminated office, is estimated to be 0.10 s/mL. This is the same as the air level actually found in an apartment on Warren Street before the cleanup, but under passive conditions. This level is assumed to apply to the apartment now under active conditions after some minimal cleanup, where the carpets retain most of the original asbestos. The cumulative exposure is as follows:

s/mL	x	time period (years)	=	total dose (s-year/mL)
500		2/365		2.74
10		4/365		0.11
1.0		1/4 yr		0.25
total dose (cumulative exposure)				3.1

The increased risk for mesothelioma is 1 in 100. The increased risk for lung cancer is 1 in 1000. The person has a risk of nearly 1/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

To continue this scenario, the resident continues to live in the apartment for another 15 years before moving to Arizona because of decreased lung function. The additional exposure to asbestos, added onto the exposures to date, are as follows:

s/mL	x	time period (years)	=	total dose (s-year/mL)
cumulative dose from above			=	3.1
1.0		15		15
total dose (cumulative exposure)				18.1

This resident has almost a 1 in 10 risk of mesothelioma. The person has a risk of nearly 4/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

Scenario 3 - New resident moves into partially cleaned up apartment near Ground Zero

A new resident moves into an apartment near Ground Zero that had been heavily contaminated because windows had been broken out. The former tenant had died in the collapse of the World Trade Center. The apartment had wall-to-wall carpeting, which was incompletely cleaned by using only an average suction capacity dry type HEPA vacuum. The carpeting had been new, so was not replaced for another 30 years. Other carpeting in common areas of the building also was not replaced on average of 30 years after the event. There was no special duct cleaning or other abatement measures. The resident was inside the apartment an average of 3/4 of her/his life. This included extra time on weekends, but some occasional times away in the evenings and on vacations. The resident was a smoker.

The asbestos air level is estimated to be 1 s/mL over the 30 year period. This assumes that the level was probably higher initially, near 2.56, the same as the level under passive conditions in the high exposure building in Table 2 before cleanup. After time, the level decreased somewhat, but never to background.

s/mL	x	time period (years)	=	total dose (s-year/mL)
1		30 x (3/4)		22.5

The increased risk of both mesothelioma and lung cancer both is nearly 1 in 10. The person has a risk of 5/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

Scenario 4 - Laborer works as janitor cleaning buildings in Lower Manhattan for 3 months

A laborer works as a janitor for 3 months cleaning up buildings and apartments in Lower Manhattan for 3 months. He sometimes wore a dust mask, but never a HEPA respirator. He also sleeps in buildings which have not been cleaned up during this period to save money. He is also a heavy smoker. His average exposure is 229 s/mL, which is midway between the passive conditions and the broom sweeping for the high exposure building in Table 2.

s/mL	x	time period (years)	=	total dose (s-year/mL)
229		1/4		57

His increased risk of mesothelioma and lung cancer both is about 1 in 5. The person has a risk of over 50/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

Scenario 5 - Firefighter works rescue operation from September 11 until October 11

A firefighter is engaged in the rescue and recovery operation for one month, starting on September 11. He works 12 hours a day, sleeping in an adjacent hotel for 9 hours a night and

(Internet Version)

also taking breaks at this adjacent hotel for another 3 hours a day. He is a smoker.

The levels of outdoor asbestos exposure during the first 2.5 weeks exposure is estimated to be 500 s/mL. He is both in the open air and in confined spaces. This level is 100 times the highest level found by the HP Environmental study in passive conditions in two buildings damaged but still standing near the World Trade Center.²⁰ EPA did not have monitoring equipment in confined spaces, although it did eventually on the perimeter of Ground Zero. OSHA does not appear to have had personal monitoring equipment on firefighters, only stationary monitoring in open areas around Ground Zero.

The level of outdoor asbestos exposure is estimated to be 0.50 s/mL during the second 2.5 weeks, a level consistent with many EPA readings at Ground Zero during the first month. Actually, there would have been a gradual decline of the initial 500 to 0.50 s/mL levels over the month, but the 2-time period per exposure level is convenient for calculations.

From Table 2, the asbestos level inside the contaminated building near Ground Zero is estimated to be 10 s/mL, midway between the "passive" conditions tested in the high-exposure building near Ground Zero, and the level estimated for cleaning out a storage room.

s/mL	x	time period (years)	=	total dose (s-year/mL)
500		(15/365)x(12/24)		10.2740
0.50		(15/365)x(12/24)		0.0103
10		(30/365)x(12/24)		0.4110
total dose (cumulative exposure)				10.6952

His increased risk is 1 in 30 for both mesothelioma and lung cancer. The firefighter has a risk of over 2/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

LAB METHODS FOR ASBESTOS, WAYS OF REPORTING RESULTS

This section may be helpful for interpreting the many different ways that asbestos levels are measured analytically, and also the many different ways these levels are reported.

PCM methods for air and bulk samples

The older method for measuring asbestos in air was by phase contrast microscopy (PCM). PCM measurements are reported as either structures/milliliter (s/mL) or fibers/milliliter (f/mL). PCM cannot detect fibers and structures with diameters smaller than 0.5 micrometers (0.5 μ m or 0.5 μ m). PCM cannot distinguish asbestos fibers from non-asbestos fibers.

Thus, TEM measurements will give higher readings of asbestos fibers than PCM measurements if most of the fibers are actually asbestos, and if the asbestos fibers themselves have a significant fraction that are smaller than 0.5 μ m. In WTC dusts, all the data I have seen indicates that TEM measurements are higher than PCM measurements of the same sample.

PCM is still used to determine whether workers are under the permissible exposure limit (PEL) by OSHA. The OSHA method requires reporting only of single fibers, not structures of asbestos (bundles and clumps of asbestos). The OSHA method also only allows the counting of fibers 5.0 μm in length or longer. The OSHA method uses TEM in conjunction with PCM, but only to rule out those fibers found by PCM which were not asbestos. The TEM part of the OSHA method *is not* used to detect the smaller fibers that were not found by PCM.

PLM measurements for percent asbestos in bulk dust only

Polarized light microscopy (PLM) is used for bulk building materials, dust and debris samples to determine the percentage of asbestos.

Wipe and micro-vacuum samples for settled dusts

For thin settled dust layers, there is not enough to scoop up or place in a jar or bag. Thus, the PLM method above cannot be used. The settled dust must be sampled by either wiping or with a microvacuum. A microvacuum is a modified personal air sampling pump.

There are no EPA methods for either wipe samples or micro-vacuum samples. ASTM methods D-6480 (wipe sampling) and D-5755 (microvacuum) will most commonly give the results in units of structures/square centimeter. This is not a mass concentration - percentage.

Generally speaking, there is no readily available method to determine a mass percentage of asbestos in these settled dust layers, as you can using the PLM method above. There is one method, ASTM D-5756, a microvacuum method, which is designed to give results as mass concentration - percentage, but this method is rarely used, and very tedious and expensive in terms of laboratory time and effort.

TEM method for air samples and settled dust samples detects smaller fibers and structures

The best method of measuring asbestos in air is by transmission electron microscopy (TEM). TEM is a newer, more costly technique that can detect fibers smaller than 0.5 micrometers (0.5 μm or 0.5 μm), which are missed by PCM. Thus, TEM measurements will give higher readings of asbestos fibers than PCM measurements if most of the fibers are actually asbestos, and if the asbestos fibers themselves have a significant fraction that are smaller than 0.5 μm . In WTC dusts, all the data I have seen indicates that TEM measurements are higher than PCM measurements of the same sample.

Difference between "fibers" of asbestos and "structures" of asbestos

Asbestos levels are given as "structures" or "fibers" or "structures + fibers." Asbestos structures include both individual fibers as well as bundles of fibers, clumps of fibers, and things like particles of plaster with fibers sticking out. Since around the mid 1980's, methods have included counting all structures, since in the environment and/or body, these can easily break down into individual fibers.

Reporting TEM air measurements in either “structures/square millimeter” or “structures/milliliter”

To complicate things further, in the WTC disaster, EPA’s web site²¹ has only been reporting TEM measurements in the units of “structures/square millimeter” (s/mm²), which IS NOT THE SAME as “structures/milliliter (s/mL)”. The actual lab sheets, which were obtained by a Freedom of Information Act request and posted at the New York Environmental Law and Justice Project web site²² gave the asbestos levels in both units.

The “structures/mm²” unit refers to the number of structures on a given area of a filter through which the air drawn. There is no easy way to convert “structures/square millimeter” to “fibers/milliliter” unless you have the volume of air sampled from the original lab sheet. This is because you need the air volume to convert fibers/millimeter to fibers/milliliter, and this volume is not always the same. Any level reported as structures/square millimeter will always be much higher than the structures/milliliter, usually by a factor of at least 100.

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 AHERA “Standard” for clearance is - “A response action is determined to be completed by TEM when the abatement area has been cleaned and the airborne asbestos concentration inside the abatement area is no higher than concentrations at locations outside the abatement area.” The 70 structures criterion is an intermediate standard designed to reduce the number of analyses (and costs) by stating that if the average loading on the five samples collected inside the abatement does not exceed 70 structures.mm², the samples are below filter backgrounds and there is no need to analyze the five outside samples and perform the “Z-test.”

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.

“cc” and “mL” are the same thing, “um” and “μm” are the same thing

Milliliters (mL) are the same as cubic centimeters (cc). Air concentrations are sometimes reported using cubic centimeters instead of milliliters, as in “fibers/cc” or “fibers/mL”.

Micrometers are abbreviated either as “μm” with the Greek “ μ ” or as “ um”.

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www.epa.gov/enviro/nyc/asbestos/
22. www.nyeljp.org

Dr. Jenkins met with two agents from the National Enforcement Investigations Center (NEIC), a division of the EPA's Office of Criminal Enforcement, Forensics and Training, concerning her allegations of fraud (TR 732). After this meeting, Jenkins wrote two follow-up memoranda to the NEIC, one dated November 16, 1990 and the other dated January 24, 1991, detailing how she believed the alleged Monsanto fraud affected the EPA regulatory process (CX 305, CX 307). She sent copies to a number of outside parties (CX 305 at 6, CX 307 at 9-10). After writing the first memo, Jenkins was contacted by one of the investigators and asked not to reveal that there was an ongoing criminal investigation (TR 1206-07). Jenkins informed the investigator that she already had spoken to a veteran's group and sent copies of her memo to outside groups which revealed a criminal investigation was underway (TR 1207). She told the investigator there "was no way I could honor his request at this point, whether or not I agreed with whether or not such a request was appropriate" (TR 1207-08). Jenkins' supervisor, Mike Petruska, testified that he considered disciplining Jenkins for publicly revealing an ongoing criminal investigation because doing so violated EPA policy (TR 1574). However, Petruska decided against disciplining Jenkins because the policy had not yet been codified as a regulation in the Code of Federal Regulations (TR 1574-75). Jenkins had no further contact with the NEIC after the second memo was sent (TR 758).

Monsanto wrote its first letter to the EPA about Jenkins' fraud accusations on March 26, 1990 (CX 321). Monsanto stated its concern that Jenkins' memo, which was characterized as "simply parroting unsupported arguments contained in a plaintiff's brief," was now being viewed by the media as the official EPA position (*id.*). The assistant administrator of the EPA, Don Clay, responded with a letter stating that Jenkins' memo reflected only her opinion and not that of the EPA and regretted "any problems that Monsanto may have had as a result of the news media's use of this memorandum" (CX 321).

Monsanto wrote a second letter to the EPA on April 8, 1991 which also was concerned with Jenkins revealing the preliminary criminal investigation to the public (CX 305). The letter stated in part that:

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[O]ur basic frustration with this investigation does not extend to the EPA criminal program's handling of this matter. However, this investigation has become a media event through the unprofessional efforts of a single EPA employee not resident in the criminal program. Specifically, memoranda . . . prepared by this employee detailing many untrue allegations provoking the investigation have been improperly released to the public . . . and, consequently, have been widely discussed in the lay and scientific press.

CX 323 at 1. In a third letter on November 15, 1991, Monsanto's attorney expressed more concern over "Dr. Jenkins' insistence in a continued public discussion of the matters addressed in . . . her affidavit" (CX 324 at 1). This letter stated that:

it is highly inappropriate and a violation of the agency's responsibility . . . for an employee publicly to discuss matters of the type to which Dr. Jenkins refers. This is the third occasion on which this has happened.

CX 324 at 1. Jenkins testified that she learned in 1992 that both the Department of Justice and the EPA's Inspector General's office investigated possible personnel actions that could be taken against

complainant for publicly revealing the ongoing investigation of Monsanto (TR 742). The EPA's Office of Enforcement also addressed Jenkins' violation of EPA policy and requested that appropriate administrative action be taken (CX 326). However, no formal personnel action was taken.

Jenkins' performance standards for FY 1991 included "Agency policies concerning communicating with the public are followed" as a criterion required for an outstanding or fully successful rating (CX 334 at 6). Petruska, complainant's supervisor, testified that he believed she was the only person in the office who had this criteria listed on her performance rating (TR 1632-33). Jenkins believed that her performance rating of "fully successful" rather than "outstanding" for FY 1991 was based on the "follows agency policies on communications" criterion (TR 737). However, Petruska testified that he used many different criteria in determining Jenkins' performance evaluation for that year and not just "one thing" (TR 1600-01).

b. Discussion

1. Complainant's Credibility

Claimant's credibility is the key issue in this case, both because there is frequent conflict between her version of events and that of other witnesses and because her

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perception of events is the principal component in her belief that she has been discriminated against for her protected activities. Accordingly, much of this part of the decision will address claimant's credibility.

Getting right to the point, Cate Jenkins is the most disingenuous, evasive, and self-serving witness I have ever observed. She is an intense woman who believes that any means are acceptable if, in her view, the ends are desirable, including lying (even under oath), searching through co-workers' personal effects, and leaking confidential information. She further believes that any person, rule, or law which stands in her way can be ignored. She has acted and continues to act as if she believes she is the only person at EPA who is concerned with the public interest and everyone else is selling out to the industries regulated by EPA. Accordingly, she irrationally assumes that every criticism of her job performance, no matter how obviously valid, is part of a plan to impede her efforts to protect the public and the environment. It does not appear to have entered her mind that proposals which differ from hers may nevertheless be meritorious or even worthy of consideration, nor does it appear to have occurred to her that her "ends justify the means" philosophy may compromise both her credibility and that of the EPA. Dr. Jenkins' sanctimonious, condescending, and distrusting attitude toward her colleagues made it inevitable that serious problems would develop in her employment relationships.⁸

What makes the foregoing particularly lamentable is that Dr. Jenkins is without doubt an extremely intelligent woman and a capable chemist. Her near photographic memory was demonstrated repeatedly at the hearing (when it suited her convenience) through her uncanny ability to instantaneously identify the exhibit numbers of documents and to locate particular passages in these documents. This was all-the-more impressive when it is considered that complainant had marked almost 400 documentary exhibits taking up five loose-leaf binders. Moreover, she firmly believes in the mission of the EPA, and in that respect is well-intentioned. But she is so lacking in judgment that she actually has made it more difficult for EPA to accomplish its mission.

Complainant's utter lack of credibility could only truly be appreciated through personally observing her six days of testimony. I do not often rely solely on demeanor in determining a witness's credibility, but the complainant's demeanor was so disquieting that it is dispositive here by itself. Complainant often appeared to be in her own world, divorced from reality. She frequently answered questions with long discourses that quickly became unfocused. During her period on the witness stand complainant lied with impunity and did not appear the least embarrassed when she was caught in these lies (*e.g.*, TR 968-82, 1014-17). She bragged about her bizarre behavior which she seemed to have no idea was in any way aberrant or unusual (*e.g.* TR 1245-55). In addition, she had alleged lapses of memory on unfavorable points so frequently that it was obvious the problem was one of honesty rather than memory. She has her own moral standards which are not in accord with those of the rest of society. She has no concept of team or organization, refuses to

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recognize the authority of her supervisors, and has no sense of loyalty to anything other than herself. She also has an enormous ego. When Thoreau wrote supportively about marching to the beat of a different drummer, I do not think this is what he had in mind.

Examples of these points abound. Complainant made it a practice to snoop through other people's offices (TR 1245-55). When confronted about this by Scarberry, she justified her actions by stating "if anything's private, you should keep it locked up." (TR 1245-46) She stated that starting in late 1987 she "was in a data collection mode . . ." (TR 1247). When asked whether she went through her co-workers' files, she testified:

Yeah. After November of '87, I was very diligent in looking at anything around, you know, that was coming in, the general mail or the branch files or anything like that, yes. Anything that was being sent out -- if something was put on a secretary's desk[,] in her Xerox ... box, I would go through that.

(TR 1248). She also admitted going through a file that was in a credenza in Petruska's office and removing some documents from that file to copy them (TR 1249). She subsequently stated that she might have been going through her co-workers' files as early as June 1986 (TR 1251), and apparently she continued her snooping at least through December 1989, when she removed a document from Sylvia Lowrance's in-box (TR 528-32). Thus it would not be surprising if the complainant went through Scarberry's desk to retrieve the within-grade raise form he signed but did not turn in, and turned it in herself.

Not only did complainant snoop through other people's files, but as above noted, she surreptitiously recorded her conversations with co-workers and supervisors. Although complainant alleges that she was unaware until 1988 of the longstanding EPA Order prohibiting its employees from secretly tape-recording conversations (*see* RX 67), her testimony is not believable. Complainant was aware of every statute, court decision, and regulation which supported her actions, whether in regard to the secret taping of telephone conversations, stigmatization, or the leaking of confidential information (*see, e.g.* TR 309-10, 1054-56, 1145-49). It is simply not believable that she was unaware of a specific EPA Order directly on point in this regard. More likely, she simply ignored the EPA Order, rationalizing that it was either outdated or somehow did not apply to her (TR 1145-51).

An enlightening incident related to the complainant's surreptitious tape recording is that on May 16,

1988, complainant wrote a memo to then-EPA Administrator Lee Thomas requesting that the EPA Order banning secret tape recordings be immediately retracted (CX 222). In this memo, complainant stated that:

A few years ago, I was informally advised by law enforcement officials and legal associates that carrying a surreptitious tape recorder was legal and a good idea *since I was receiving death threats associated with my professional duties.*

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(*Id.* at 1) (emphasis added). She also stated in a letter she wrote to several Congressmen that she was a victim of "inferential death threats" (TR 1021), and informed co-workers of these death threats as well (TR 1022). But she admitted on cross-examination that she never received any death threats (TR 1025-26; *see also* TR 2083). In fact, she never received any threats at all.

Complainant also contends she was unaware that it was impermissible for her to send out her own unauthorized letters to members of Congress, government agencies, the media, and environmental groups on official EPA letterhead stationery (TR 656; *see* CX 151, 157, 250). In fact, she argues that EPA policy permitted it (TR 1059-61). But she is lying. She admits that Scarberry, who was her supervisor at the time, informed her that her April 13, 1988 memo to EPA Region 9 was improperly written on EPA letterhead stationery because it contained her personal opinion (TR 1068-69). Further, she admits she used EPA letterhead to give her letters more authority (TR 1066); and her testimony that she accidentally used the letterhead stationery of the EPA Administrator in her February 7, 1990 letter regarding the Toth study of dioxin toxicity (CX 250) is laughable (TR 1070-71). It is clear that complainant deliberately used EPA letterhead stationery to make it appear that her letters stated the position of EPA and did not care that it was improper to do so, in effect daring EPA to do something about it. Nothing was done.

Similarly, complainant was called by Special Agents of EPA's National Enforcement Investigations Center in November 1990 to set up an interview to discuss her allegations that Monsanto Company falsified health studies regarding the effects of dioxin (*see, e.g.* CX 301). Apparently, based on this telephone call, complainant adduced that NEIC was conducting a criminal investigation of Monsanto, and almost immediately disclosed this in a speech to a Vietnam veterans organization (TR 1201-04).⁹ Although on December 22, 1989, EPA had issued a series of memoranda informing its staff not to disclose the existence of ongoing criminal investigations (CX 332), complainant alleges that at this time she did not know it was against EPA policy to do so (TR 737-38, 1210-12). However, she met with the NEIC agents on November 14, 1990, and at that meeting she was told not to discuss the investigation with anyone (CX 326; TR 1575). Notwithstanding this instruction, complainant prepared a memo for the NEIC agents on November 15, 1990 reiterating the substance of her complaint against Monsanto, and sent copies of this memo to 16 people or organizations outside of EPA, including environmental and veterans' groups (CX 305). Although complainant contends -- I believe untruthfully -- that she was not informed of the non-disclosure policy until after she sent out this memo (TR 1207), complainant concedes that she was aware of this policy by January 24, 1991 when she wrote a follow-up memo to the NEIC agents (CX 307). Nevertheless, she sent copies of this memo to the same people and organizations to whom she sent her November 5, 1990 memo (TR 1207-08). Complainant's tortured explanation of why she made this memo public despite specifically being instructed not to make further disclosures regarding the investigation is

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illustrative of how out of control she was by that time (*see* TR 1206-19).

Other examples of complainant's character which deserve notice are illustrated by the following incidents:

-- Complainant was calculating enough to notify her supervisors when she was engaging in protected activity, believing that if they were aware she engaged in protected activity it would be more difficult to take action against her. She stated that "it was important in employee discrimination cases at all times to ensure that your management was aware of your protected activity." (TR 536; *see* TR 537-38).

-- In a May 17, 1989 memo to Dellinger summarizing the status of her work on the methyl bromide and UDMH listings (CX 241), complainant became extremely defensive. She complained she was being assigned an "inordinate work load" (*id.* at 3), lashed out at Dellinger for plotting against her, and offered a number of excuses why the work was not going to be completed on time. She added that, "[a]s I told you on May 12, my first priorities will not be any HSWA listing work, but instead pursuing my EEO and DOL complaints" (*id.* at 2). Conversely, at the same time complainant was alleging that she had little to do (TR 437).

--The adulation, attention, and publicity complainant received from the media, special interest groups, and Congress for her public criticism of her employer and disclosure of confidential information was very important to her, apparently more important than performing the job she was being paid to do at EPA. She was proud of being labeled a whistleblower. Complainant not only collected all the articles she could find criticizing EPA's regulation of dioxin and the wood preserving industry in which her name is mentioned (*e.g.*, CX 6, 153, 154, 171, 178-80, 195-96, 199-201, 203, 205-07, 342, 345-64, 366-86, 388-89, 391), but usually she both starred and underlined her name in these articles. Several of these publications include her picture, and a report by the environmental organization Greenpeace regarding a wood treating pesticide is virtually dedicated to her (*see* CX 196, at 1-4). She even received an award from a Vietnam veterans' organization (TR 777). She exulted in her television appearances, and made sure everyone was informed of her media coverage (*see, e.g.* TR 474-82, 535-36, 546-47). It is also revealing that complainant referred to the wood preserving regulations as "my wood preserving regulations" (TR 127) ten years after being removed from the project.

--Complainant's refusal to acknowledge, let alone accept, criticism is astounding. Despite all the criticism complainant received for her work on the wood preserving listing, when she was asked to fill out her performance evaluation for the year October 1, 1986 through September 30, 1987 she gave herself a perfect rating, 500 out of a possible 500 points. On the other hand, her supervisors, Scarberry and Straus, rated her unsatisfactory, 190 out of 500 (*see* CX 66). In this performance evaluation,

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complainant's supervisor, Scarberry, stated that he "had to rewrite a poorly written memo . . . that [complainant] would not deal with" (*id.* at 5). Complainant concedes that the memo had both grammatical and spelling errors but, noting that *Spellcheck* was not yet available, argued that "it was really an unreasonable thing to fault an employee for." (TR 840-41). Even more extraordinary testimony concerned the issue/options paper for the wood preserving listing that Scarberry instructed

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Getting right to the point, Cate Jenkins is the most disingenuous, evasive, and self-serving witness I have ever observed. She is an intense woman who believes that any means are acceptable if, in her view, the ends are desirable, including lying (even under oath), searching through co-workers' personal effects, and leaking confidential information. She further believes that any person, rule, or law which stands in her way can be ignored. She has acted and continues to act as if she believes she is the only person at EPA who is concerned with the public interest and everyone else is selling out to the industries regulated by EPA. Accordingly, she irrationally assumes that every criticism of her job performance, no matter how obviously valid, is part of a plan to impede her efforts to protect the public and the environment. It does not appear to have entered her mind that proposals which differ from hers may nevertheless be meritorious or even worthy of consideration, nor does it appear to have occurred to her that her "ends justify the means" philosophy may compromise both her credibility and that of the EPA. Dr. Jenkins' sanctimonious, condescending, and distrusting attitude toward her colleagues made it inevitable that serious problems would develop in her employment relationships.⁸

What makes the foregoing particularly lamentable is that Dr. Jenkins is without doubt an extremely intelligent woman and a capable chemist. Her near photographic memory was demonstrated repeatedly at the hearing (when it suited her convenience) through her uncanny ability to instantaneously identify the exhibit numbers of documents and to locate particular passages in these documents. This was all-the-more impressive when it is considered that complainant had marked almost 400 documentary exhibits taking up five loose-leaf binders. Moreover, she firmly believes in the mission of the EPA, and in that respect is well-intentioned. But she is so lacking in judgment that she actually has made it more difficult for EPA to accomplish its mission.

Complainant's utter lack of credibility could only truly be appreciated through personally observing her six days of testimony. I do not often rely solely on demeanor in determining a witness's credibility, but the complainant's demeanor was so disquieting that it is dispositive here by itself. Complainant often appeared to be in her own world, divorced from reality. She frequently answered questions with long discourses that quickly became unfocused. During her period on the witness stand complainant lied with impunity and did not appear the least embarrassed when she was caught in these lies (e.g., TR 968-82, 1014-17). She bragged about her bizarre behavior which she seemed to have no idea was in any way aberrant or unusual (e.g. TR 1245-55). In addition, she had alleged lapses of memory on unfavorable points so frequently that it was obvious the problem was one of honesty rather than memory. She has her own moral standards which are not in accord with those of the rest of society. She has no concept of team or organization, refuses to

have been, despite the fact that Jenkins testified that she missed the application deadline for that promotion (TR 1883-84). It may not be coincidental that complainant's aberrant work performance began at the time Scarberry became her supervisor.

--It was clear from Jenkins' own testimony that she had difficulty getting along with her co-workers. Many of Jenkins' own actions contributed to the discordant office environment, including her surreptitious taping of conversations and phone calls which was eventually discovered (TR 247-48), her bringing media crews to the office to tape her opinion concerning controversial subjects (TR 759-60), her demeaning description of her supervisor, Robert Scarberry, to others in the office (TR 1160-61), her looking through support staff's in-boxes to collect data (TR 1245-55), her reading of papers left out on people's desks in their offices (*id.*), and her filing of numerous grievances and lawsuits. Jenkins' apparent lack of awareness that these actions, meritorious or not, could lead to a tense work environment lessens her credibility as a witness. Jenkins was and clearly continues to be very emotionally involved with this case. The longer she testified, the more rambling and accusatory her testimony became. She is so emotionally involved that she can not possibly be objective.

In sum, I find that her testimony was inherently unreliable, and absent corroborating evidence is insufficient to establish any controverted fact.

2. Merits of 1987 Allegations¹¹

Under the Solid Waste Disposal Act:

[Page 28]

[n]o person shall fire, or in any other way discriminate against, or cause to be fired or discriminated against, any employee or any authorized representative of employees by reason of the fact that such employee or representative has filed, instituted, or caused to be filed or instituted any proceeding under this chapter or under any applicable implementation plan, or has testified or is about to testify in any proceeding resulting from the administration or enforcement of the provisions of this chapter or of any applicable implementation plan.

42 U.S.C. § 6971 (a) (1994). The other environmental statutes under which complainant has filed this claim have similar employee protection provisions.

To prevail under the environmental whistleblower statutes, including the Solid Waste Disposal Act, a complainant must establish that: (1) the complainant engaged in protected activity, (2) the employer knew of the complainant's protected activity, (3) an adverse employment action was taken, and (4) the adverse employment action was motivated, in whole or in part, by the complainant's protected activity. *See Dartey v. Zack*, 82-ERA-2 (1983); *Mackowiak v. University Nuclear Systems, Inc.*, 735 F.2d 1159, 1162 (9th Cir. 1984). If the complainant is successful in proving these points, the burden then shifts to the respondent to produce evidence that the adverse action was motivated by a legitimate, non-discriminatory reason. *See Guttman v. Passaic Valley Sewerage Comm'rs v.*

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For the purposes of this decision, it will be assumed that the complainant's activities were protected and that the Environmental Protection Agency was aware of the complainant's activities. Therefore, this decision will discuss only the next two elements required for complainant to meet her initial burden. First, whether adverse actions were taken against the complainant, and second, if adverse actions were taken, whether they were in retaliation for the complainant's having engaged in protected activity.

"An adverse action is simply something unpleasant, detrimental, even unfortunate, but not necessarily (and not usually) discriminatory." *Stone & Webster Engineering Corp. v. Herman*, 115 F.3d 1568, 1573 (11th Cir. 1997). Clear examples of adverse employment actions include dismissal, demotion, or an involuntary transfer to a less desirable position. See *Mandreger v. Detroit Edison Co.*, 88-ERA-17 (Sec'y, March 30, 1994); *Nichols v. Bechtel Constructors, Inc.*, 87-ERA-44 (Sec'y, Oct. 26, 1992); *English v. General Electric Co.*, 85-ERA-2 (Sec'y, Feb. 13, 1992). Monetary loss is not required. See *Boytin v. Pennsylvania Power and Light Co.*, 94-ERA-32 (Sec'y, Oct 20, 1995).

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Complainant contends that she was subjected to five adverse actions that precipitated the filing of the original April 11, 1987 complaint. These actions include: 1) removal from the wood preserving issues/option paper in September 1987, 2) removal from the wood preserving listing project in September 1987, 3) denial of a within-grade increase in November 1987, 4) being given an unsatisfactory performance evaluation in November 1987 and 5) a March 1988 elevation of an unsatisfactory evaluation to "satisfactory," rather than "exceeds expectations."

a. Removal from Wood Preserving Options Paper and Listing Project

The record contains ample evidence that Jenkins' protected activities, such as writing letters to Congress, were not the reason for the adverse actions taken against her in September through November of 1987. While it was permissible for Jenkins to write letters to Congress and to her supervisors expressing her concern over the regulatory course that was being explored, her refusal to address certain issues in her work assignments that her supervisors instructed her to address was not acceptable. Jenkins certainly was under no obligation to support ideas she disagreed with, however, she did have an obligation to follow her supervisors' instructions to address certain issues in the options paper. For example, Jenkins' supervisors wanted her to address the stigmatization issue. While Jenkins acknowledged in her testimony that stigmatization is a "genuine concern" (TR 148), she refused to address this issue in the paper because she believed it had "nothing to do with the criteria for listing hazardous wastes" (CX 32 at 5). This was not her decision to make.

Jenkins' position was clearly frustrating to her superiors. She was repeatedly asked to address certain issues in the paper and she repeatedly refused to do so. Straus believed that her draft of the paper was "biased" and lacked a "fair analysis" and he asked her to write the paper again. Jenkins refused again on the grounds that she believed that analyzing the stigma issue as it related to listing wastes was illegal and wanted to ask the Office of General Counsel for their opinion on the issue. Lowrance, the division director of the Office of Solid Waste, was frustrated by Jenkins' position as well. Lowrance testified that she did not think it appropriate to contact the Office of General Counsel at that point because OSW was only examining options and the OGC eventually reviews all final regulatory proposals. She made comments on a memo by Jenkins that "it is not illegal to consider programmatic policy factors" and even wrote "This is silly -- what is in an options paper is a policy

call - not a legal one" (CX 39). Jenkins' supervisors felt that her drafting of the options paper never adequately addressed the stigma issue and had other problems, and ultimately removed her from the project (CX 43).

The events that led to Jenkins' removal from the wood preserving project illustrate her inability to relate to others in her workplace and to follow the instructions of her supervisors if she disagreed with them. These are problems that continued throughout the time period concerning this case. Her approach to her work on the options paper and the listing

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project reveals Jenkins' belief that she was right, her supervisors were wrong, and therefore she need not heed the instructions she was given. To say the least, this does not facilitate a good working relationship. All of her supervisors at this time -- Scarberry, Straus, and Lowrance -- gave Jenkins extensive feedback on the options paper and were quite generous in providing her numerous opportunities to re-draft the paper so that it would address the options they felt needed to be addressed. Lowrance, who is an attorney, teaches classes at Catholic University's law school, and, more importantly, was the top supervisor in OSW, informed Jenkins that simply addressing issues in a paper, which is not a final regulatory proposal, was not illegal. Lowrance testified credibly that she believed and continues to believe that "policy work and technical work should be done looking at a broad array of options and variables in the agency" (TR 1710). This is a point Jenkins failed to understand, as she continued to insist, even at the hearing, that addressing the stigma issue in the options paper was illegal.

Most, if not all, employees disagree with their supervisors at some point in their careers. During the many opportunities Jenkins was given to re-draft the paper, she could have, at any point, addressed the issues she was instructed to by her supervisors and formally noted her disagreement with their position. Instead, she refused to address these options at all. Jenkins' refusal to write the paper in a manner consistent with her supervisors' instructions caused a significant delay in developing the regulatory package. In order to alleviate that delay and facilitate the process, she was removed from the paper and the project. This removal was not in retaliation for any protected activity, but rather was based on her refusal to address issues that her supervisors ordered her to examine. That type of refusal is not protected by any of the environmental whistleblower statutes. Furthermore, the record clearly demonstrates that Jenkins' participation in protected activities during this period -- for example, writing letters to Congress -- in no way precipitated her removal from the paper or the listing project. Rather, her removal was precipitated by her own refusal to perform the work required of her.

b. Denial of Within-Grade Increase, Unsatisfactory Performance Evaluation, and Change in Performance Evaluation

The denial of Jenkins' within-grade increase and her unsatisfactory performance evaluation were based on many of the same reasons that she was removed from the wood preserving paper and project, namely her poor performance. Scarberry's memo addressing the denial of the salary increase explained that he expected a "GS-13 professional . . . to be able to work independently and come up with a satisfactory product" (CX 65 at 1). The memo continued, stating:

I have to give you specific work instructions, and your products have to be rewritten with substantial revisions in order to be acceptable. Your work is generally completed late, and I

have expressed to you on several occasions over the past two years, both orally and in writing, my concern over the quality and timeliness of your assignments. As a result, an abnormal amount of my time has been used in providing detailed instructions as well as rewriting/editing your technical assignments. After these discussions, guidance, and recommendations, there has been no demonstrable improvement in your work performance.

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CX 65 at 1. The record supports Scarberry's statements in this memo. Both Jenkins and Scarberry testified that they had numerous meetings over Jenkins' work. Numerous drafts prepared by Jenkins have extensive comments written on them. While these comments by themselves are not necessarily probative as to the quality of Jenkins' work, the fact that almost all Jenkins' drafts required extensive re-writes is probative. Jenkins is a high-level professional and her work should not have needed the close supervision that it did. Furthermore, Scarberry's statement that Jenkins consistently missed deadlines is also supported by the record.

Jenkins's difficulty in meeting deadlines and communicating effectively with her supervisors is demonstrated by her December 1, 1986 memo stating that she would re-draft a document and turn it in to her supervisors in "two weeks or so" (CX 13). However, Jenkins did not turn in this draft until early February (TR 1846) (*see supra* pages 25-26). Jenkins' refusal to address certain issues in the options paper was another legitimate performance related problem.

Thus from September to November 1987, the record is replete with performance related concerns from her supervisors before, during, and after she engaged in protected activity. If anything, the record reflects that Jenkins' supervisors were extraordinarily generous in providing her many opportunities to improve her work; when no improvement was seen, these adverse actions followed. Therefore, I find that complainant's removal from the wood preserving paper and project, denial of salary increase, and unsatisfactory performance evaluation were not acts of discrimination based on protected activities, but rather actions taken because of Jenkins' poor work performance.

Finally, that Jenkins ultimately was granted a within grade salary increase and given a satisfactory performance evaluation by Lowrance was not an adverse action. Lowrance credibly testified that she did this because she was leaving her position and she wanted the issue put aside so that the slate would be clean for her replacement. Though Jenkins contends that not raising her evaluation to "exceeds expectations" is an adverse action, I disagree. Jenkins' supervisors had legitimate, well-documented performance problems with complainant's work, such that her performance did not deserve even a "fully satisfactory" rating, let alone an "exceeds expectations" evaluation. In fact, the decision by Lowrance to grant Jenkins a salary increase and raise her performance evaluation was made in an effort to put the issue to rest so that the office would be more harmonious and better able to perform its work, rather than an effort to commend Jenkins for her work performance.

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4. Merits of 1988-1989 Allegations

Complainant next contends that during 1988 and 1989 she was subject to the following adverse actions:

6/10/88: Reassignment to report to branch chief, removal of Listing Section to another branch

within 3 months of reassignment, resulting in isolation

11/87 - 6/88: Imposition of IDP

12/88: Satisfactory rather than exceeds expectation performance rating

1989 - 1989: Period of no duties and isolation

Compl. brief at 177.

a. Reassignment to New Supervisor

The first alleged adverse action, reassignment to a different branch chief, was a decision to which Jenkins agreed. Barnes, the new director of the Character and Assessment Division, thought Jenkins might work more productively than she had under Scarberry if she was reassigned to Dellinger, who he believed was an excellent supervisor (TR 1732). While Jenkins testified that she did not believe that she agreed to this transfer, but rather that she "chose the lesser of two evils or three evils or four evils," the record reflects that Jenkins had input into this decision (TR 1138). In fact, Barnes offered Jenkins the option of working directly for him, but she turned that option down so she could continue with her listings work (TR 598-99). Hence, Jenkins was given a choice of whom to work for other than Scarberry and she chose Dellinger over Barnes.

This reassignment was designed to remove Jenkins from working with a supervisor who she clearly did not respect and with whom she had difficulty working. It is not credible that Jenkins would want to continue working for a supervisor against whom she had made such serious accusations as sexual harassment and forgery. Barnes took these accusations into account and no doubt also considered the stressful work situation that resulted between Scarberry and Jenkins when he decided to reassign her. Barnes' attempt to place complainant in a more amenable supervisory situation where it was hoped she could work more comfortably and productively clearly was not a punitive measure. Accordingly, I find that her reassignment to another supervisor was not an adverse action and in any event was not in retaliation for protected activity.

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b. Reorganization of Office Resulting in Isolation

Complainant next states that she was subject to an adverse action when the listings section was removed from her branch and moved to another branch in 1988, which allegedly resulted in her isolation. During the time period in which the isolation was alleged, the office was reorganized as a result of an unanticipated medical waste crisis (TR 1803-04).¹² One of the results of the reorganization was that the listing section was removed from Dellinger's supervision and transferred to another branch within the division (TR 1805). Jenkins suggested that she be transferred to the branch where the listing section was located, but Barnes denied this request because the chief of that branch was in the process of leaving and it was anticipated that Scarberry would become the new branch chief (TR 1806). After this re-organization, Jenkins continued to work on listings projects (TR 1807-08).

Jenkins has failed to show that the removal of the listing section from her branch and the following denial of transfer to where the listing section was located was discriminatory. First, the reorganization

was precipitated by a crisis having nothing to do with Jenkins. Second, Barnes had legitimate reasons to want to prevent Scarberry and Jenkins from working together. He described their relationship as "dysfunctional" and "impeding the flow of work in the division" (TR 1731-32). It is reasonable that he would not want to recreate that situation by again placing Jenkins under Scarberry's authority. While the circumstances under which Jenkins was performing listing work may have been unique, for she was the only one in her branch doing listings, Jenkins' situation was unique because of the difficult relationship that had developed between her and Scarberry. Accordingly, I find that the failure to transfer Jenkins to the branch performing listings work and any resulting isolation was not discriminatory.

c. Imposition of IDP

Complainant next contends that the imposition of an Individual Development Plan (IDP) from November 1987 to June 1988 was an adverse action. First, the record indicates that Jenkins was only subject to an IDP from December 2, 1987 to January 31, 1988 (CX 72). Second, EPA policy required that Jenkins be placed on the IDP after an unsatisfactory performance evaluation (*id.*). As discussed above, I found that the unsatisfactory performance evaluation was based on Jenkins' work-related performance problems, not retaliation for protected activity. Therefore, placing her on an IDP was not only justified because of her performance problems, but required by EPA policy. Because the goal of an IDP is to give the employee the opportunity to demonstrate her fitness for government service, it should not be viewed as an adverse action. However, even assuming that it was an adverse action, placing her on the IDP was clearly not motivated by discriminatory reasons, but rather by her performance problems and EPA policy. Accordingly, I find that Jenkins has failed to establish that placing her on the IDP was based on her participation in protected activities.

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d. FY 1988 Performance Rating

The December 1988 performance rating of "fully successful" rather than "exceeds expectations" is the next alleged adverse action.¹³ Scarberry testified that while he viewed Jenkins' performance as unsatisfactory in the beginning of the year, he thought her work had improved as the year progressed (TR 1868). He stated that he believed her work became minimally satisfactory during the time period in which he was her supervisor, which was from October 1987 to June 1988 (TR 1869). Dellinger testified that he rated Jenkins as "exceeds expectations" for the time period in which he supervised her, June 1988 to September 30, 1988. Therefore, averaging the two evaluations, Jenkins was given a "fully successful" rating for this time period. Jenkins has not shown how a "fully successful" rating in this situation is an adverse action or why she would have been entitled to a higher rating.

e. Period of No Duties and Isolation 1988 - 1989

Complainant's next asserted adverse action is that from 1988 to 1989 she was subjected to a "period of no duties and isolation" (Compl. brief at 177). The record does not support this contention, but instead shows that complainant was given appropriate job duties during this period. Jenkins did testify that from June to August of 1988 she did not meet regularly with her supervisor to discuss her work. However, her supervisor at this time, Dellinger, testified that he was responsible for handling an unexpected medical waste crisis during this time period (TR 1803). Dellinger explained that Jenkins was responsible for working on "at least two hazardous waste" listings during 1988 (TR 1807-08). Jenkins testified that she also worked on a solvents exemptions project in 1988 (TR 1261).

In May of 1989, Jenkins wrote a letter to Dellinger stating that she was overburdened by her workload.

As I told you on May 23, my first priorities will not be any HSWA listing work, but instead pursuing my EEO and DOL complaints. This means that any anticipated milestones that you set up must slip considerably, especially considering the fact that I will need to spend significant time with a District Court suit to force EPA to complete my EEO investigative file during the months of May, June, and July. Your assignment of the inordinate work load of both UDMH, methyl bromide, and chlorinated aliphatics becomes even more infeasible in light of these other duties.

CX 241. In light of the above evidence, I find that Jenkins was not subject to a period of "no duties" in the 1988-1989 period.

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4. Merits of 1990 -1991 Allegations

a. Removal from Solvents and UDMH II Listing Projects

The next adverse action asserted by complainant was her removal from the solvents and UDMH II listing assignments on August 30, 1990 (Compl. brief at 177). Assuming this was an adverse action, Jenkins cannot show that the motive for removing her was discriminatory. Jenkins claims that she was removed from this project because she raised the possibility of the presence of dioxins in solvents other than the four that had been listed by the contractor (CX 267). Petruska testified that confusion existed over the meaning of the HSWA and that he believed the statute meant for the EPA to conclude solvents listing work that had already commenced at the time of HSWA's passage (TR 1583). Jenkins disagreed strongly with this position in a memo (CX 270).

Petruska forwarded this memo to Scarberry and Abrams and asked if they had "any thoughts." Abrams replied, stating in part "[i]t depends whether we want to satisfy the HSWA statute or make work for Cate with an unlimited budget for dioxin analysis" (CX 271). Jenkins prepared a \$24 million proposed budget to study new solvents listings. Her supervisors responded to this proposal with statements such as "this is absurd" and "this is a farce" (CX 273 A). In a later memo concerning the solvents II project, Petruska stated we "don't need more data" and later informed Jenkins that she should focus her work on the four solvents that had already been listed. Complainant wrote a July 25, 1990 memo stating that the UDMH Listings, Olin Process should be tested for dioxins "in the absence of definitive data to rule out their presence" (CX 260). Her supervisors disagreed. Finally, on August 30, 1990, Petruska told Jenkins that while she could continue work on the UDMH listing, she should stop work on UDMH II because "[w]e may take the position that given the lack of data on the Olin process, that this is not a HSWA listing" (CX 261).

For the purposes of this decision, even assuming that Jenkins' actions regarding this project were protected and that removing her from the project was an adverse action, the EPA had legitimate, non-discriminatory business reasons to do so. First, the decision to list or not list a solvent was in many ways a political and a policy decision based on how HSWA was interpreted. Though Jenkins clearly believed, and continues to believe, that only her interpretation of HSWA was the proper one, alternate theories of what HSWA required were permissible and certainly not illegal. Jenkins' supervisors were ultimately responsible for deciding what initially should be listed, not her. Second, the only option

advocated by Jenkins, more testing, required an expenditure of \$24 million. Her supervisors believed complainant's proposal of spending that amount of money on additional testing was misdirected and they wanted to proceed with the listing process without additional testing, delay, and cost. Finally, as Petruska's memo indicates, OSW was investigating whether UDMH II should even be listed under HSWA. Therefore, in light of OSW's position regarding HSWA, as well as Jenkins' contrary position, her supervisors removed her from the project. This was a legitimate, non-discriminatory reason to remove Jenkins from the UDMH project.

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b. Period of Isolation and No Duties, 1990 -1991

Complainant alleges that from 1990-1991 she faced another period of no duties and isolation which constituted an adverse action. This assertion cannot be supported regarding her activities in 1990. She worked on both Uniroyal's UDMH listing and UDMH II until August 30, 1990 at which point she was removed from UDMH II but continued work on the Uniroyal listing. Complainant also interacted significantly with the public during this time period, which she argues was a part of her official duties (Compl. brief at 135). She was interviewed in connection with a criminal investigation of Monsanto in February and November of 1990 and wrote a follow up memo regarding Monsanto in January 1991. Accordingly, I find that complainant was not subject to a period of no duties and isolation in 1990.

After January 1991, however, Jenkins did experience a period where she was assigned no duties. This was confirmed by Petruska as being unusual (TR 1491-92). One of the reasons Jenkins had no duties during this time period was due to the fact that her supervisors decided she should not work on any listings involving Monsanto products (TR 1554-56). Even assuming that the no work period was an adverse action motivated in part by Jenkins protected activities involving Monsanto, the EPA had a legitimate, non-discriminatory business reason to not assign her to any work involving Monsanto products.

Prior to the time of Jenkins' period of no duties, she engaged in several interactions regarding Monsanto. In February of 1990, she wrote the chair of EPA's Science Advisory Board alleging that Monsanto had fraudulently prepared an epidemiological study. The information contained in this letter was based on a plaintiff's brief in a suit against Monsanto. She worked with Vietnam veterans groups and Congress regarding dioxin exposure and the Monsanto study. She met with two agents from the National Enforcement Investigations Center about her fraud allegations concerning Monsanto. She wrote two follow-up memos after the meeting describing how she believed the allegedly fraudulent study affected EPA's regulatory process and sent copies to outside parties. One of the investigators contacted her after she sent out her first memo and asked that she not reveal the ongoing criminal investigation of Monsanto, to which she responded she could not comply. Petruska testified that he considered disciplining Jenkins for revealing an ongoing criminal investigation because doing so violated EPA policy. Monsanto wrote several letters to the EPA expressing their concern over Jenkins' actions. The Department of Justice, EPA's Inspector General's office, and EPA's Office of Enforcement all investigated possible personnel actions that could be taken against complainant for revealing this information and violating EPA policy (TR 74, CX 326).

Because of these incidents, it would have been foolhardy for Petruska to have assigned Jenkins work concerning Monsanto products. He testified that he was concerned that Monsanto might have a legal basis to challenge any listings that Jenkins worked on because of the "appearance that she wasn't

completely objective" concerning

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Monsanto (TR 1555-56). He further stated that a person doing listing work must have a good relationship with the industry and that he thought that would not be the case if Jenkins was working on a listing project involving Monsanto (TR 1603). Therefore, I find that the decision to not place Jenkins on any Monsanto listing projects, which was part of the reason Jenkins had no work in 1991, was based on legitimate, non-discriminatory reasons.

There were other reasons why Jenkins was assigned no duties during 1991 that were acknowledged in complainant's brief. First, three potential listing projects were ruled out because Petruska decided either that more data was not needed for the listing or that the particular waste need not be listed (TR 1560-62). Second, complainant's participation in another dye and pigment listing was ruled out because she had once alleged the industry had made threats against her (TR 1491). Her supervisors decided this was a reason not to assign Jenkins to dye and pigment work (TR 1491). These reasons support the conclusion that Jenkins' "no-work" period in 1991 emerged from Petruska's legitimate concerns, rather than malicious or discriminatory intent.

5. Merits of 1991 Allegations

Jenkins final contentions are:

4/29/91: Retroactive imposition of a clause in performance standards requiring adherence to an unpublished unavailable policy on communications

10/29/91: Satisfactory rather than exceeds expectations performance evaluation based on alleged non-adherence to policy on communications.

Compl. brief at 177.

Jenkins did not receive her final performance standards for FY 1991 until April or May of 1991 (TR 737-38). When she received them a requirement had been added stating "Agency policies concerning communicating with the public are followed" (CX 334 at 6). Petruska agreed that this clause was put into her standards after she had already revealed the criminal investigation of Monsanto to the public. Adding this criteria was not an adverse action.

By adding the criteria, Petruska was ensuring, in a formal manner, that Jenkins was notified of the communications policy and the importance of adhering to it. Jenkins claimed at the hearing that she was not familiar with the communications policy prior to April, a contention that is not credible in light of her testimony that she would regularly read through files to determine what EPA policy was on various subjects and because she had been involved previously with investigations. Furthermore, Petruska testified that he thought Jenkins should have been aware of the policy and not disclosed the information to the public. However,

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because Jenkins insisted that she was not familiar with the policy, Petruska took the formal action of inserting a provision requiring her adherence to it into her performance standards. That was not an

adverse action, but rather an action motivated by the need for Jenkins to understand and adhere to EPA's communications policy.

Finally, Jenkins' allegation that the October 29, 1991 performance rating of "fully successful" rather than "outstanding" was an adverse action cannot be supported. Jenkins contends that this rating was based solely on her non-adherence to communications policy. However, Petruska testified credibly that the evaluation was based on a number of factors, including adherence to communications policy (TR 1600-01). Subsequent to the addition of the communications policy criteria to her performance standards, Jenkins again violated the communications policy by publicly discussing the Monsanto investigation (CX 324). Therefore, rating her performance on that criteria as "unsatisfactory" was reasonable (CX 334). Furthermore, Jenkins' ratings in most other performance areas for that evaluation were "fully successful" rather than "outstanding." Therefore, a "fully successful" evaluation was not an adverse action because it was based accurately on Jenkins' performance during this period.

C. Conclusion

In sum, complainant has failed to prove that the respondents discriminated against her due to activity protected under the any of the six environmental statutes. Any adverse actions taken against the complainant from 1987 to 1991 were taken for legitimate business reasons and were not retaliatory. Therefore, it is recommended that this case be dismissed in its entirety.

RECOMMENDED ORDER

On the basis of the foregoing, it is recommended that the case of Dr. Cate Jenkins be dismissed in its entirety.

JEFFREY TURECK
Administrative Law Judge

NOTICE: This Recommended Decision and Order will automatically become the final order of the Secretary unless, pursuant to 29 C.F.R. §24.8, a petition for review is timely filed with the Administrative Review Board, United States Department of Labor, Room S-

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4309, Frances Perkins Building, 200 Constitution Avenue, NW, Washington, DC 20210. Such a petition for review must be received by the Administrative Review Board within ten business days of the date of this Recommended Decision and Order, and shall be served on all parties and on the Chief Administrative Law Judge. *See* 29 C.F.R. §§ 24.8 and 24.9, as amended by 63 Fed. Reg. 6614 (1998).

[ENDNOTES]

¹This case also arises under the Clean Air Act, Safe Drinking Water Act, Water Pollution Control Act, Comprehensive Environmental Response, Compensation and Liability Act, and Toxic Substances Control Act. The Solid Waste Disposal Act is also known as the Resource Conservation and Recovery Act (RCRA).

²In a later case brought by the complainant, Judge Glenn Lawrence issued a *Recommended Decision and Order* ordering, *inter alia*, that complainant be re-instated to her previous position, that respondent pay all fees and costs, and that complainant be awarded \$10,000 in exemplary damages (see *Jenkins v. United States Environmental Protection Agency*, 92-CAA-6 (ALJ, Dec. 14, 1992)). This decision was adopted by the Secretary of Labor on May 18, 1994 (see 92-CAA-6 (Sec'y, May 18, 1994)).

No request was made by either the complainant or respondent to treat Judge Lawrence's decision as having a collateral estoppel effect on the instant case. See, e.g. ALJX 2 at 5-6. Further, regardless of whether collateral estoppel could have had an effect on this case had either party raised it, I find that the issues contested and relief requested in 92-CAA-6 are sufficiently different such that collateral estoppel would not apply.

³Despite the extensions of time ultimately granted to the parties to file their briefs, it is obvious that respondent's brief was hastily written, and calling it a half-hearted effort would be giving it too much credit.

⁴Citations to the record of this proceeding will be abbreviated as follows: ALJX -- Administrative Law Judge's Exhibit, CX -- Complainant's Exhibit; RX -- Respondent's Exhibit; TR-- Hearing Transcript.

⁵Although complainant intimates that she was excluded from these meetings for nefarious purposes, there is no evidence in the record indicating either that the meetings were deliberately scheduled when she was unable to attend them or that it would have been normal agency practice for her to have attended these meetings.

⁶On January 7, 1988, while under her IDP, complainant filed an EEO complaint for sexual harassment against Scarberry for an innocuous comment about her smile. This complaint was ultimately dismissed because it was not timely filed.

⁷"Penta" is an abbreviation for Pentachlorophenol, "an organic chemical produced by reacting chlorine gas with phenol, used primarily in the U.S. for wood treatment." (CX 196 at vii)

⁸Complainant appears surprised that her relationship with her then-supervisor, Matthew Straus, began to deteriorate in October 1986 after she wrote a memo which was critical of Straus. See TR 767. Likewise, complainant seems not to have drawn a connection between her bizarre behavior at work, such as searching through colleagues' offices, brandishing a fake pistol and disclosing the existence of a confidential criminal investigation, and her estrangement from the EPA staff. See TR 790-92.

⁹Dioxin toxicity is a concern to Vietnam veterans because dioxin is a major component of Agent Orange, a defoliant used during the Vietnam War which is suspected of being the cause of health problems which have arisen in Vietnam veterans. See, e.g., CX 196.

¹⁰We are not talking about a handful of personal copies that someone might make on his or her employer's copying machine for the sake of convenience. It is likely that complainant copied tens of thousands of pages of EPA documents.

¹¹ While the timeliness of the complaint was raised initially as an issue, neither party raised it at the hearing, and the respondent devoted only a short paragraph in its brief to the issue. Therefore, it is unclear whether timeliness continues to be an issue. Further, a discussion of the timeliness of the complaints is very complicated, since six separate complaints were filed and issues such as the continuing violations theory would have to be addressed. Regardless, because it is recommended that the complaints be dismissed on the merits, there is no reason to discuss the timeliness question, and it will not be addressed in this decision.

¹² Dellinger testified that during the summer of 1988 medical waste began to wash up on the shores of New Jersey and New York. As a result of this crisis, Dellinger was made responsible for supervising all activity regarding a newly created medical waste project.

¹³ While complainant's brief states the lower rating was "satisfactory," the record reflects that the lower rating was "fully successful" (CX 224-B).



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

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

DATE: December 19, 2001

SUBJECT:

- **Wipe sampling for asbestos in Lower Manhattan**
- **Projection of airborne levels from settled WTC dusts**
- **Estimation of increased cancer risks based on various WTC dust exposure scenarios**

FROM: Cate Jenkins, Ph.D.
Waste Identification Branch (Mail Code 5304 W)
Hazardous Waste Identification Division

C Jenkins

TO: Affected Parties and Responsible Officials

The following memorandum provides information on taking **wipe samples** of settled dusts inside buildings in Lower Manhattan that resulted from the collapse of the World Trade Center (WTC). Studies are discussed which correlate the amount of asbestos that will become airborne (resuspended) because of activities such as sweeping, athletic activities, etc. Information is provided on the cumulative exposures (total doses) found by the Agency for Toxic Substances and Disease Registry (ATSDR) to be associated with asbestos-related health effects, and examples are given how to use this information to calculate doses of asbestos from the WTC disaster. Finally, a brief section explains the different methods for analyzing and reporting asbestos levels.

The analyses, projections, and opinions in this memorandum represent my own professional judgement and are not intended to be construed as any official position or recommendation by the U.S. Environmental Protection Agency. This memorandum is not intended as any final risk assessment risks from continued and past exposures to asbestos, and has not been reviewed by EPA. The data is too incomplete at this time for any complete projection of risks, and there are too many methods available for performing such projections. My attempt was intended only as a point of discussion prior to more rigorous assessments.

CONTRADICTORY ASBESTOS TESTING GUIDANCE

Impossible instructions from NYC DEP

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 owners' 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.

Laboratory results for settled dust layers are reported as "asbestos structures/square centimeter (structures/cm²). This cannot be converted into a percentage of asbestos. Thus, it is almost impossible for building owners to even test for the 1% level in the first place. See the last section of this memorandum for more information on asbestos sampling and analysis techniques.

NYC DEP instructions also contrary to stated EPA standard for the cleanup

The NYC DEP instructions also reversed the decision by the federal EPA that asbestos levels should be non-detectable. 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).² 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.

EPA regulations apply the 1% level to the asbestos containing materials themselves, such as insulation or asbestos floor tiles, not to the dusts that would result from the presence somewhere in the building of asbestos containing materials (ACM). EPA assumed that the dusts resulting from the presence of these ACM somewhere in the building would have much lower levels of

This is the same standard where is the violation of std set by EPA.

This is completely not true. The detection is based on the volume collected & the amount of the filter analyzed (mm²). On most DEP samples the detection was 13.36 w/ 1000 fibers collected - one fiber 13.36 = 2 fibers 13.36 = 1 fiber etc.

This compares an air & a bulk standard. The two are not linked by a formula.

No!

asbestos than 1%. And it is these dusts themselves that are considered to be the ultimate hazard by EPA, even though they have levels lower than 1%. The U.S. EPA has clearly stated that levels lower than 1% could present hazards:³

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.

The NYC DEP also exercised no oversight over building owners to insure that they did test their premises, or used a professional asbestos abatement firm for remediation.

TAKING WIPE SAMPLES OF INTERIOR SURFACES

Practicality of taking wipe samples

Taking a wipe or microvacuum sample may be the only practical way to quickly see if a building is contaminated inside, or if cleanup is complete. Air sampling is highly variable depending on the time, the exact location, the amount of activity stirring up dusts, etc. Furthermore, a large amount of specialized equipment is required. Even if air sampling shows no detectable asbestos, there could still be a substantial reservoir in settled dusts somewhere waiting to become airborne under the right conditions. Air sampling cannot be used in lieu of a complete removal of the asbestos-contaminated dusts.

Because there will probably be a continued demand over for at least the next year, if not more, to test areas in Lower Manhattan, it might be a good time for certain individuals to learn wipe sampling techniques. Probably an individual should not take this on her/himself for only a one-time sampling event. Even for wipe sampling, there is a fairly rigorous standardized procedure to follow with wiping methods and placing of the wipe in containers for transport, etc.

This might be an option for staff at environmental and occupational safety and health groups. Chemists, pharmacists, other scientists and health professionals might want to learn this type of sampling. The laboratory which will do the actual analysis will usually work with the person to get her/him the right materials. There appear to be no insurmountable hurdles to setting up to provide these types of services. Workshops and training sessions could be held by various groups.

An alternative to wipe sampling is using a microvacuum to sample settled dusts. This would involve purchasing a pump designed for personal monitoring of workers under OSHA, calibrating it, and adapting it to the sampling technique. These pumps cost from \$1500 to \$3000. This is a less practical option, -- also does not transfer as much asbestos from surface into the sample to be tested. The detection limit also appears to be better than the microvacuum method. ?

Description of ASTM method D-6480-99

EPA does not have any wipe, or even microvacuum methods for asbestos. However, the American Society of Testing and Materials (ASTM) has developed method D-6480-99.⁴ The required materials include particle-free wipe material (commonly made available for clean room supplies, called a "clean room wiper," available from major laboratory safety supply

vendors), specially filtered particle-free water, dust free disposable gloves, and a high purity alcohol. The laboratory that will perform the actual test typically will work with you to get you these supplies.

Finding a Laboratory

First, choose a laboratory which is accredited by the EPA to perform TEM (transmission electron microscopy) asbestos analyses. These labs are posted on the web at: <http://ts.nist.gov/ts/htdocs/210/214/scopes/temtm.htm>. Or, contact the National Institute for Standards and Technology (NIST) Laboratory Accreditation Administration, Gaithersburg, MD 20899 (telephone 301-975-4016). There are about 60 accredited labs. **Since wipe samples cannot be used for regulatory purposes, it is irrelevant whether the lab also has an accreditation in New York State. You can use any out-of-state lab that is convenient.**

Using TEM instead PCM analyses is important in terms of comparison of the wipe sample with the TEM air level testing required under the asbestos AHERA standard. It is particularly important to use TEM for the WTC dusts because the asbestos in them is very fine. A PCM analysis will only detect larger particles.

Contact the lab to see what type of wipe samples they are capable or willing to perform. Ask whether they will perform TEM analyses on samples that were collected by American Society of Testing and Materials (ASTM) wipe Method D 6480 (wipe). Ask advice on sample preparation, handling, etc.

Interpreting the results of settled dust levels, wipe samples or microvacuum samples

Industrial hygienists and other health professionals recommend professional asbestos abatement procedures when a wipe sample is over the **detection limit, or background**, of 260 s/cm² for wipe samples, or over 1000 s/cm² for a microvacuum sample.

If there are any elevated levels of asbestos on surfaces, then landlords should be contacted and asbestos abatement by trained, certified professionals should be instituted. Also, contact health and environmental agencies and elected officials so that they are aware of the problem and can provide assistance and intervene to provide assistance to others in the area who are probably contaminated as well. Contact local non-profit environmental and occupational safety and health organizations as well for assistance and advice.

PREDICTING AIR CONCENTRATIONS FROM SETTLED DUST LEVELS

To predict the amount of asbestos which will be in the air from a given settled dust level is not an exact science. **Until such time as adequate air monitoring is available**, the following may be the only viable method. Settled asbestos dusts get resuspended into the air inside buildings as the result of activities such as sweeping, walking around, moving heavy equipment, etc.

The use of fans in the rules (referred to in guidance)

What is needed are factors, or numbers, to multiply the settled dust levels by to estimate the airborne levels. The following presents such a methodology. First, the conversion factors for an

*what is the background?
The terms are not interchangeable.*

Simulated by C

Does this call for constant air monitoring or is it a reversal of common?

experimental study are given. Then, the conversion factors are estimated for WTC asbestos dusts.

Settled dust level conversion factors found from controlled study

A study was performed by Millette and Hays to provide a correlation between the level of asbestos in settled dusts and the amount which will become airborne (resuspended) as the result of certain activities. This study used real world situations of asbestos contamination, primarily after the San Francisco earthquake. Table 1 shows the experimental results, along with the calculated "K-factor", the factor for multiplying the settled dust level by to find the air level. As can be seen, the air concentrations increase as the activity level increases.

Table 1. Resuspension K-Factors for settled asbestos dusts determined from controlled asbestos studies by Millette and Hays.⁵

ACTIVITY	SETTLED DUST LEVEL structures/square centimeter (s/cm ²)	AIR LEVEL structures/milliliter (s/mL)	K-FACTORS multiply the settled dust level by this number to get the air level
Carpet cleaning (ordinary vacuum)	23,000	0.09	3.9×10^{-6} (0.0000039)
Broom Sweeping	760,000	53.6	7.1×10^{-5} (0.000071)
Cleaning Storage Area	870,000	2.7	3.1×10^{-6} (0.0000031)
Gym-Athletic Activities	9,700	0.23	2.4×10^{-5} (0.000024)
Cable Pull	2,000,000	28.9	1.4×10^{-5} (0.000014)

Resuspension factors for settled dusts from World Trade Center

The Millette and Hays study can be used to predict airborne levels of the WTC dusts. Data is available from the Ground Zero Task Force study for two apartment buildings.⁶ Settled asbestos levels along with airborne asbestos levels were measured under passive conditions. Estimations are then made of the fraction of the settled dust which will become resuspended.

The WTC dusts are unusual in that the particles of asbestos are smaller than usually, having a greater likelihood of becoming resuspended.⁷ This appears to be the case. The actual measured fraction of asbestos that was suspended in air over settled dusts under passive conditions (no activities taking place to stir them up) were HIGHER than measured in the Millette and Hays study when a carpet was being vacuumed. It is reasonable and prudent to predict that if the WTC dusts were being vacuumed, the resuspension factor would be higher than actually measured under passive conditions, which means they would be higher than found in the Millette and Hays study. The resuspension factor for the WTC dusts have been predicted to be 10 times higher under vacuuming conditions than under passive conditions, which is 10 times higher than found

figure for ordinary vac not HEPA.

by who? where? data?

in the Millette and Hays study. All of the other Millette and Hays resuspension factors have also been increased by 10 for the WTC asbestos dusts. Table 2 provides the actual resuspension factor found by testing for WTC dusts under passive conditions, along with the predicted air levels under a variety of activities with the modified resuspension factors, called the WTC-Factors:

Table 2. Resuspension WTC-Factors for settled dusts from World Trade Center using actual measurements for passive conditions and modifications to K-Factors found in Millette and Hays study

	SETTLED DUST LEVEL (s/cm ²)	AIR LEVEL (s/mL)	WTC-FACTORS Multiply the settled dust level by this number to predict air levels
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	2.56	4×10^{-6} (measured) (0.000004)
Carpet cleaning (ordinary vacuum)	640,000	24.96	3.9×10^{-5} (estimated) (0.000039)
Broom Sweeping	640,000	454.40	7.1×10^{-4} (estimated) (0.00071)
Cleaning storage area	640,000	19.84	3.1×10^{-5} (estimated) (0.000031)
Gym-Athletic Activities	640,000	153.60	2.4×10^{-4} (estimated) (0.00024)
Cable Pull	640,000	89.60	1.4×10^{-4} (estimated) (0.00014)
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	0.12	4×10^{-6} (measured) (0.000004)
Carpet cleaning (ordinary vacuum)	29,000	1.13	3.9×10^{-5} (estimated) (0.000039)
Broom Sweeping	29,000	20.59	7.1×10^{-4} (estimated) (0.00071)
Cleaning storage area	29,000	0.90	3.1×10^{-5} (estimated) (0.000031)
Gym-Athletic Activities	29,000	6.96	2.4×10^{-4} (estimated) (0.00024)
Cable Pull	29,000	4.06	1.4×10^{-4} (estimated) (0.00014)

Aerodynamic Diameter of asbestos fibers - it here needs to be included in this type of estimation.

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.

(I have been informed that typically, in asbestos abatement, carpeting is removed and discarded because of the inability to remove all the asbestos. More documentation on recommendations and this practice is requested. Information on actually testing or test methods for asbestos contaminated carpeting is also solicited. jenkins.cate@epa.gov)

CALCULATING TOTAL DOSE FROM ATSDR's CUMULATIVE EXPOSURE INDEX

Cumulative, or total dose, found by ATSDR to be related to health effects

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. The ATSDR does explain that there is no absolute correlation of the total dose with health effects, but uses it as a valid method to evaluate health risks.

Table 3 lists some of the "cumulative doses" found by the ATSDR to be associated with asbestos health effects. The table also gives examples of what the air asbestos levels are required for different time periods to achieve this dose.

Table 3. CUMULATIVE EXPOSURES OF ASBESTOS ASSOCIATED WITH HEALTH EFFECTS
 From the ATSDR Toxicological Profile for Asbestos,¹⁰ including examples of air levels and the amount of time needed to accumulate the dose

HEALTH EFFECT	CUMULATIVE EXPOSURE OR DOSE asbestos inhalation (f-yr/mL)	RISK LEVEL	EQUIVALENT AIR LEVEL (in fibers per milliliter - f/mL) and NUMBER OF YEARS EXPOSURE THAT WOULD LEAD TO THIS TOTAL CUMULATIVE EXPOSURE OR DOSE					
Cumulative Exposure is given in the number of fibers per milliliter times the years of exposure (f-yr/mL), measured by PCM			1 week	3 months	6 months	1 year	2 years	50 years
Risk Level is the number of excess cancer cases or cases of other health effects for a given population								
lung cancer, smokers, EPA risk levels	0.00035	1 cancer per million	0.018	0.0014	0.0007	0.00035	0.000175	0.000007
	0.0035	1 cancer per 100,000	0.183	0.014	0.007	0.0035	0.00175	0.00007
	0.035	1 cancer per 10,000	1.825	0.14	0.07	0.035	0.0175	0.0007
lung cancer, non-smokers, EPA risk levels	0.00035	1 cancer per million	0.183	0.014	0.007	0.00035	0.000175	0.00007
	0.035	1 cancer per 100,000	1.825	0.14	0.07	0.035	0.0175	0.0007
	0.35	1 cancer per 10,000	18.250	1.4	0.7	0.35	0.175	0.007
mesothelioma, EPA risk levels	0.00031	1 cancer per million	0.016	0.00124	0.00062	0.00031	0.000155	0.0000062
	0.0031	1 cancer per 100,000	0.162	0.0124	0.0062	0.0031	0.00155	0.000062
	0.031	1 cancer per 10,000	1.616	0.124	0.062	0.031	0.0155	0.00062
asbestosis	2.6	no effect level	135.571	10.4	5.2	2.6	1.3	0.052
	4.5	1 case per 1000	234.643	18	9	4.5	2.25	0.09
abnormal radiological findings	0.12	3.7 per 100	6.257	0.48	0.24	0.12	0.06	0.0024

How to use Table 3

First, look for the health effect that will occur at the lowest levels of asbestos. This would be mesothelioma, a type of cancer that affects the cavity of the thorax, and also lung cancer if you are also a smoker. If a person inhales the equivalent of 0.00031 fibers of asbestos/milliliter of air for one year, then their increased risk of getting mesothelioma is 1 in a million. If they breathe 10 times that much for one year (0.0031 f-yr/mL), then the chance is increased to 1 in 100,000. Then, go over to the right hand columns which give a range of different time periods. Say you are interested in those exposures which will increase mesothelioma cancer risks by 1 in 10,000. 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

If a different time period is needed than shown in the table, multiply the one-year cumulative exposure index by the time period. For 2 weeks, multiply by 14/365, etc.

Precautions when using Table 3

Confusion over the way asbestos is reported.

The first and foremost precaution in using Table 3 is this:

DO NOT CONFUSE ASBESTOS LEVELS REPORTED AS:

"structures per square millimeter" (s/mm²) WITH "structures per milliliter" (s/mL)

These are very different things, although to the unwary, they appear to be the same. However, "structures per square milliliter" (s/mL) are the same thing as "structures per cubic centimeter" (s/cc³). See the last section of this memo for more information on the way asbestos levels are reported.

At its web site, EPA only reported concentrations as "structures/square millimeter."¹¹ They could have given the asbestos concentration as "structures/milliliter" but did not. Thus, it is not easy to compare the EPA data unless you look at the actual lab sheets, which are posted on the internet at the NYELJP web site.¹²

not
sq. mm
ml is
a volume

Conversion of TEM measurements of WTC dusts to the PCM measurements used for the health studies.

A problem, or perhaps more an uncertainty, in using Table 3 arises from the fact that the human health studies are correlated to asbestos that was measured by the PCM method, which does not detect smaller fibers. The WTC dusts were measured by EPA using the more sensitive TEM method, which does detect these smaller fibers.

Since TEM analyses of WTC dusts give higher reading of fibers/structures asbestos than a PCM reading, some would argue that all of the WTC asbestos levels should be divided by some number (made smaller) to make them comparable to the ATSDR studies which used PCM. For the WTC dusts, the ratio of TEM fibers/structures to PCM-equivalent fibers/structures was high, around 80 to 90.¹³

I have chosen not to attempt any conversion of TEM measurements to PCM-equivalent measurements for several reasons. First, the older PCM measures used in studies cited by the ATSDR may not, in fact, be smaller than a TEM measurement of the actual asbestos to which the humans were exposed. This is because PCM cannot distinguish between asbestos and other fibrous minerals. Thus, the studies of humans using PCM measurements may actually have *overestimated* true asbestos exposures because they included non-asbestos fibers. Also, the asbestos fibers to which persons were exposed in these older studies may not have included a substantial fraction of the smaller fibers like the WTC dusts.

Second, as a matter of policy, the federal EPA has issued no guidelines or standards recommending the use of such a conversion in asbestos risk assessments. If such a recommendation were to be issued, it would first undergo extensive internal and external peer review, and be subjected to due process through a notice and comment period. As an individual staff scientist, I would not take it upon myself to lower a risk assessment until such final guidance is issued. As prudent public policy, however, it is always valid for anyone to upgrade a risk assessment based on new, even if untested, data indicating a greater hazard.

Claim that fine asbestos particles are not hazardous

Some may argue that the smaller WTC fibers are less hazardous than the larger fibers. To my knowledge, the federal EPA has not addressed this scientific theory and issued any guidance to discount any cancerous effects of fine asbestos fibers. If such a recommendation were to be issued, it would first undergo extensive internal and external peer review, and be subjected to due process through a notice and comment period. Until such time as this occurs, as a matter of prudent public health policy, it would be inappropriate to downgrade a risk assessment based on this theory. I have also been informed that EPA has no intention of downgrading the risk based on this theory.

ESTIMATING INCREASED HEALTH RISKS FROM VARIOUS WTC EXPOSURE SCENARIOS

The following represents my efforts as a staff scientist to characterize any elevated health risks from exposures to WTC asbestos-contaminated dusts. As stated at the beginning of this memorandum, this risk assessment does not represent any official EPA analysis or position and does not necessarily reflect EPA policy. It has not been reviewed by EPA. There are many alternate ways to perform a risk assessment other than the one presented below. This risk assessment has a wide range of uncertainty both because of the limited data and the many assumptions that were utilized.

man-made?
The EPA does not consider any exposure to a ~~man-made~~ carcinogen to be acceptable, but does base its actions in existing exposure situations according to the degree of elevated risk. The EPA chooses a degree of protection, or risk level, as a criteria for abating exposures.

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. A response action is generally warranted if the cumulative excess carcinogenic risk for any single individual affected by a site exposing humans to carcinogens exceeds 1 in 10,000 (the 10^{-4} risk level) using reasonable maximum exposure assumptions for either the current or reasonably anticipated future exposures.¹⁴

Scenario 1 - Volunteer at Ground Zero for two weeks

A person volunteered to provide refreshments to the rescue workers on the perimeter of Ground Zero for two weeks. The volunteer spent 12-hour days, going home to Brooklyn at night. S/he stayed outdoors for the majority of the time, but came inside to one of the adjacent evacuated hotels for shelter from the elements, to rest, and to eat. Approximately 3 hours per day were spent inside this building.

This person also lived/may live in an urban environment for a life of 85 years, with an exposure level of 6×10^{-6} (0.000006) s/mL.¹⁵

From Table 2, the asbestos level inside the contaminated building near Ground Zero is estimated to be 10 s/mL, midway between the "passive" conditions tested in the high-exposure building near Ground Zero, and the level estimated for cleaning out a storage room.

The level at the refreshment stand on the perimeter of Ground Zero is estimated to be 0.16 s/mL, towards the high side of EPA's air readings outdoors near Ground Zero in the month of October, but low for the month of September..

(Internet Version)

s/mL	x	time period (years)	=	total dose (s-year/mL)
0.16		(14/365)x(9/24)		0.0023
10		(14/365)x(3/24)		0.0479
0.000006		85		0.0005
total dose (cumulative exposure)				0.0507

From Table 3, the increased risk of getting mesothelioma will be almost 2 per 100,000 for the one week volunteer service in New York City. The whole life in an urban setting contributed very little to this risk. Going indoors to the contaminated building for 3 hours a day, rather than staying outside, represents essentially all of this risk.

If the volunteer had stayed outside for the whole time, the risks would be as follows:

s/mL	x	time period (years)	=	total dose (s-year/mL)
0.16		(14/365)x(12/24)		0.0031
0.000006		85		0.0005
total dose (cumulative exposure)				0.0036

The increased risk of mesothelioma would be around 1 in 100,000, due almost entirely to the 2 weeks service in NYC.

Scenario 2 - Resident of Lower Manhattan in contaminated building

A resident works in lower Manhattan and was present nearby during the collapse of the World Trade Center, but not in a building whose windows were blown out. The resident was engulfed by the dust cloud while walking up to Warren Street to her/his apartment. The resident stayed one night with no electricity and water because of 3 cats before leaving for two days, returning September 14 after restoration of services. There was no forced evacuation of the apartment building, many residents remained even when there was no electricity or water.

The landlord was in the process of cleaning common areas, which were primarily carpeted, by common cleaning techniques, vacuuming and dusting, starting September 14, for 4 days. The resident performed her/his own apartment cleaning and has remained in place. The resident only wore a dust mask, as recommended by the New York City Department of Health (NYC DOH) while cleaning the apartment,¹⁶ which provided no protection against the asbestos.

The apartment building interiors only had a minimal, small amounts of dust from the WTC. 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.¹⁷ An apartment with just such minimal, small amount of WTC dusts was the subject of the Ground Zero Task Force study, and the asbestos concentrations, and may be found in Table 2. 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.¹⁸

(Internet Version) The office in Lower Manhattan where the resident works had similar cleaning measures

implemented by the landlord, although in this case individual offices were cleaned by the landlord. Here also the dusting from the WTC was minimal and fine. No windows were broken in either the apartment building or the office building.

The resident was in a very high-contamination situation for 2 days. Upon returning to her/his apartment, the citizen was in another 4 day high contamination exposure while cleaning the apartment and being present while cleaning was going on of other apartments and common areas. The resident has remained in contaminated circumstances while at home and in the office for approximately 3 months after inadequate cleaning procedures.

The levels of asbestos exposure during the first two days exposure is estimated to be 500 s/mL. This level is 100 times the highest level found by the HP Environmental study in passive conditions in two buildings damaged but still standing near the World Trade Center.¹⁹ EPA did not appear to have monitoring equipment in place at this time. If it had, the portals could have been occluded with heavy dusts and no readings would have been possible.

The level of asbestos during the 4 days cleaning and living in the apartment is estimated to be 10 s/mL, a point midway between vacuum cleaning and broom cleaning from Table 2 for the low exposure building.

The level of asbestos for the balance of the time, a 3 month period at home and at an equally contaminated office, is estimated to be 0.10 s/mL. This is the same as the air level actually found in an apartment on Warren Street before the cleanup, but under passive conditions. This level is assumed to apply to the apartment now under active conditions after some minimal cleanup, where the carpets retain most of the original asbestos. The cumulative exposure is as follows:

s/mL	x	time period (years)	=	total dose (s-year/mL)
500		2/365		2.74
10		4/365		0.11
1.0		1/4 yr		0.25
total dose (cumulative exposure)				3.1

The increased risk for mesothelioma is 1 in 100. The increased risk for lung cancer is 1 in 1000. The person has a risk of nearly 1/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

To continue this scenario, the resident continues to live in the apartment for another 15 years before moving to Arizona because of decreased lung function. The additional exposure to asbestos, added onto the exposures to date, are as follows:

s/mL	x	time period (years)	=	total dose (s-year/mL)
cumulative dose from above				3.1
1.0		15		15
total dose (cumulative exposure)				18.1

This resident has almost a 1 in 10 risk of mesothelioma. The person has a risk of nearly 4/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

Scenario 3 - New resident moves into partially cleaned up apartment near Ground Zero

A new resident moves into an apartment near Ground Zero that had been heavily contaminated because windows had been broken out. The former tenant had died in the collapse of the World Trade Center. The apartment had wall-to-wall carpeting, which was incompletely cleaned by using only an average suction capacity dry type HEPA vacuum. The carpeting had been new, so was not replaced for another 30 years. Other carpeting in common areas of the building also was not replaced on average of 30 years after the event. There was no special duct cleaning or other abatement measures. The resident was inside the apartment an average of 3/4 of her/his life. This included extra time on weekends, but some occasional times away in the evenings and on vacations. The resident was a smoker.

The asbestos air level is estimated to be 1 s/mL over the 30 year period. This assumes that the level was probably higher initially, near 2.56, the same as the level under passive conditions in the high exposure building in Table 2 before cleanup. After time, the level decreased somewhat, but never to background.

s/mL	x	time period (years)	=	total dose (s-year/mL)
1		30 x (3/4)		22.5

The increased risk of both mesothelioma and lung cancer both is nearly 1 in 10. The person has a risk of 5/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

Scenario 4 - Laborer works as janitor cleaning buildings in Lower Manhattan for 3 months

A laborer works as a janitor for 3 months cleaning up buildings and apartments in Lower Manhattan for 3 months. He sometimes wore a dust mask, but never a HEPA respirator. He also sleeps in buildings which have not been cleaned up during this period to save money. He is also a heavy smoker. His average exposure is 229 s/mL, which is midway between the passive conditions and the broom sweeping for the high exposure building in Table 2.

s/mL	x	time period (years)	=	total dose (s-year/mL)
229		1/4		57

His increased risk of mesothelioma and lung cancer both is about 1 in 5. The person has a risk of over 50/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

Scenario 5 - Firefighter works rescue operation from September 11 until October 11

A firefighter is engaged in the rescue and recovery operation for one month, starting on September 11. He works 12 hours a day, sleeping in an adjacent hotel for 9 hours a night and

(Internet Version)

also taking breaks at this adjacent hotel for another 3 hours a day. He is a smoker.

The levels of outdoor asbestos exposure during the first 2.5 weeks exposure is estimated to be 500 s/mL. He is both in the open air and in confined spaces. This level is 100 times the highest level found by the HP Environmental study in passive conditions in two buildings damaged but still standing near the World Trade Center.²⁰ EPA did not have monitoring equipment in confined spaces, although it did eventually on the perimeter of Ground Zero. OSHA does not appear to have had personal monitoring equipment on firefighters, only stationary monitoring in open areas around Ground Zero.

The level of outdoor asbestos exposure is estimated to be 0.50 s/mL during the second 2.5 weeks, a level consistent with many EPA readings at Ground Zero during the first month. Actually, there would have been a gradual decline of the initial 500 to 0.50 s/mL levels over the month, but the 2-time period per exposure level is convenient for calculations.

From Table 2, the asbestos level inside the contaminated building near Ground Zero is estimated to be 10 s/mL, midway between the "passive" conditions tested in the high-exposure building near Ground Zero, and the level estimated for cleaning out a storage room.

s/mL	x	time period (years)	=	total dose (s-year/mL)
500		(15/365)x(12/24)		10.2740
0.50		(15/365)x(12/24)		0.0103
10		(30/365)x(12/24)		0.4110
total dose (cumulative exposure)				10.6952

His increased risk is 1 in 30 for both mesothelioma and lung cancer. The firefighter has a risk of over 2/1000 for developing asbestosis, and would probably have abnormal radiological findings of the chest.

LAB METHODS FOR ASBESTOS, WAYS OF REPORTING RESULTS

This section may be helpful for interpreting the many different ways that asbestos levels are measured analytically, and also the many different ways these levels are reported.

PCM methods for air and bulk samples

The older method for measuring asbestos in air was by phase contrast microscopy (PCM). PCM measurements are reported as either structures/milliliter (s/mL) or fibers/milliliter (f/mL). PCM cannot detect fibers and structures with diameters smaller than 0.5 micrometers (0.5 μ m or 0.5 μ m). PCM cannot distinguish asbestos fibers from non-asbestos fibers.

Thus, TEM measurements will give higher readings of asbestos fibers than PCM measurements if most of the fibers are actually asbestos, and if the asbestos fibers themselves have a significant fraction that are smaller than 0.5 μ m. In WTC dusts, all the data I have seen indicates that TEM measurements are higher than PCM measurements of the same sample.

PCM is still used to determine whether workers are under the permissible exposure limit (PEL) by OSHA. The OSHA method requires reporting only of single fibers, not structures of asbestos (bundles and clumps of asbestos). The OSHA method also only allows the counting of fibers 5.0 μm in length or longer. The OSHA method uses TEM in conjunction with PCM, but only to rule out those fibers found by PCM which were not asbestos. The TEM part of the OSHA method *is not* used to detect the smaller fibers that were not found by PCM.

PLM measurements for percent asbestos in bulk dust only

Polarized light microscopy (PLM) is used for bulk building materials, dust and debris samples to determine the percentage of asbestos.

Wipe and micro-vacuum samples for settled dusts

For thin settled dust layers, there is not enough to scoop up or place in a jar or bag. Thus, the PLM method above cannot be used. The settled dust must be sampled by either wiping or with a microvacuum. A microvacuum is a modified personal air sampling pump.

There are no EPA methods for either wipe samples or micro-vacuum samples. ASTM methods D-6480 (wipe sampling) and D-5755 (microvacuum) will most commonly give the results in units of structures/square centimeter. This is not a mass concentration - percentage.

Generally speaking, there is no readily available method to determine a mass percentage of asbestos in these settled dust layers, as you can using the PLM method above. There is one method, ASTM D-5756, a microvacuum method, which is designed to give results as mass concentration - percentage, but this method is rarely used, and very tedious and expensive in terms of laboratory time and effort.

TEM method for air samples and settled dust samples detects smaller fibers and structures

The best method of measuring asbestos in air is by transmission electron microscopy (TEM). TEM is a newer, more costly technique that can detect fibers smaller than 0.5 micrometers (0.5 μm or 0.5 μm), which are missed by PCM. Thus, TEM measurements will give higher readings of asbestos fibers than PCM measurements if most of the fibers are actually asbestos, and if the asbestos fibers themselves have a significant fraction that are smaller than 0.5 μm . In WTC dusts, all the data I have seen indicates that TEM measurements are higher than PCM measurements of the same sample.

Difference between "fibers" of asbestos and "structures" of asbestos

Asbestos levels are given as "structures" or "fibers" or "structures + fibers." Asbestos structures include both individual fibers as well as bundles of fibers, clumps of fibers, and things like particles of plaster with fibers sticking out. Since around the mid 1980's, methods have included counting all structures, since in the environment and/or body, these can easily break down into individual fibers.

Reporting TEM air measurements in either “structures/square millimeter” or “structures/milliliter”

To complicate things further, in the WTC disaster, EPA’s web site²¹ has only been reporting TEM measurements in the units of “structures/square millimeter” (s/mm²), which IS NOT THE SAME as “structures/milliliter (s/mL)”. The actual lab sheets, which were obtained by a Freedom of Information Act request and posted at the New York Environmental Law and Justice Project web site²² gave the asbestos levels in both units.

The “structures/mm²” unit refers to the number of structures on a given area of a filter through which the air drawn. There is no easy way to convert “structures/square millimeter” to “fibers/milliliter” unless you have the volume of air sampled from the original lab sheet. This is because you need the air volume to convert fibers/millimeter to fibers/milliliter, and this volume is not always the same. Any level reported as structures/square millimeter will always be much higher than the structures/milliliter, usually by a factor of at least 100.

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 AHERA “Standard” for clearance is - “A response action is determined to be completed by TEM when the abatement area has been cleaned and the airborne asbestos concentration inside the abatement area is no higher than concentrations at locations outside the abatement area.” The 70 structures criterion is an intermediate standard designed to reduce the number of analyses (and costs) by stating that if the average loading on the five samples collected inside the abatement does not exceed 70 structures.mm², the samples are below filter backgrounds and there is no need to analyze the five outside samples and perform the “Z-test.”

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.

“cc” and “mL” are the same thing, “um” and “μm” are the same thing

Milliliters (mL) are the same as cubic centimeters (cc). Air concentrations are sometimes reported using cubic centimeters instead of milliliters, as in “fibers/cc” or “fibers/mL”.

Micrometers are abbreviated either as “μm” with the Greek “ μ ” or as “um”.

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20. Granger, R. H., McKee, T. R., Millette, J. R., Chmielinski, P., and Pineda, G. *op. cit.*
21. See any of the air monitoring locations linked to the map at:
www.epa.gov/enviro/nyc/asbestos/
22. www.nyeljp.org

Lutchmedial, Carlstien

From: Lutchmedial, Carlstien
Sent: Thursday, December 20, 2001 2:38 PM
To: Radhakrishnan, Krish
Cc: Theodorellys, Penny; Plumptre, Alphonso
Subject: 105 Duane Street

Today December 20, 2001 I conducted an inspection at 105 Duane street, Manhattan. The purpose of the visit was to determine whether any more sampling was required of the ventilation system. Present were Howard Bader – a consultant for the tenants association, two tenants were present, a representative of Tech Clean (duct cleaning company), ATC Labs rep, Lisa Bergenty of Relations Management (bldg. Mgt. Co.) a DOH – Peter Stallbohm, Brendan Farell – Super. Some other helpers were present.

I requested from Mr. Bader to take us wherever he deemed appropriate to start. The 10th floor diffuser was chosen. On opening, we found that there was no visible dust. Bader also, used a portable monitor to check for respirable fibers and found none. It was then suggested by him that this might be the condition of all the other locations. As a result, no more inspection was necessary. I repeated to him that I would be happy to look at more.

One of the tenants who was present, wanted her apartment vent inspected. This we did and found that there was minor dust accumulation which appeared to be very old. Bader said that he may take a sample. It was agreed that the owner would treat the clean up of the duct as though it was an ACM project. However, this is on hold because of other concerns by the tenants.

DOH also agreed that there was no concern reference ACM. It was acknowledged that the owners are done more than sufficient sampling. The tenants concern was that some procedures were not being followed. Such as, the plastic covering the duct had fallen off or had holes. The tenants also had in their possession a document from EPA dated December 19, 2001 which indicated DEP methods were inaccurate.

Mr. Kupperman (tenants attorney) met me outside the building and expressed his concern that DEP protocols were incorrect based on the EPA document.

Before leaving the site I again requested if there was any other concerns regarding ACM and was told "no."

Based on my inspection there was no suspect material to be sampled. The owner is still agreeing to do any more sampling required by the tenants. Also, it was agreed that DEP will be notified when any duct cleaning begins.

FACSIMILE COVER PAGE

To : CARLSTEIN LUTCHMEDIAL
Sent : 12/19/2001 at 10:49:22 AM
Subject :

From : Joel Kupferman
Pages : 17 (including Cover)

NYC DEP
Enforcement-Asbestos Control Program

Dear Mr. Lutchmedial:

Thank you for visiting the 105 Duane Street site.

Attached is the ASTM methodology for the tests performed by Edward Olmstead, CIH.

Please fax us a copy of the data and test reports that DEP performed at thsi site.

We demand that any work proposed by Related Management and its contractor Clean-Tech be postponed until further independent bulk wipe test can be performed/analyzed and that independent monitoring for any type of activity be instituted.

Please call me at 917-414-1983 upon receipt of this letter.

Yours.....

Joel R Kupferman, Esq.
Executive Dir.
NY Environmental LAw & Justice Project

cc: Councilmembers Freed, Michels
NYC DOH
EPA
NYS Attorney General- Env. Bureau
105 Duane Street Tenants Association



Ambient Air Sampling

Subject: Tribeca Towers
105 Duane Street

Re: Ambient Air Sampling

To: Peter Hoyle
Related Management

From: Fred Burkhardt

Date: December 13, 2001

On December 12, 2001, at the request of and witnessed by the NYCDEP, ATC collected a total of ten ambient air sample from within Tribeca Tower. Five samples were collected from the common hallway of the tenth floor, with one sample placed directly in front of the supply air entry point. A second set of five ambient air samples were collected from the second floor air handler room servicing the common areas including the tenth floor.

In the absence of a specific ambient air standard, ATC has selected as a criteria for acceptable ambient air sample sets, the AHERA re-occupancy requirement following an asbestos abatement action of an average of less than 70 asbestos structures per square millimeter (<70 s/mm²) per sample set. This criteria has been selected because the AHERA requirement is the most stringent airborne asbestos reoccupancy standard available, and has been designed to be protective of children following an asbestos abatement project.

Based upon analytical sample results for all samples recording no asbestos structures detected which is significantly below the AHERA clearance requirement. It is ATC's opinion that the ambient air samples collected from these areas are representative of the ambient conditions at the time of testing and that the areas tested meet an acceptable criterion for re-occupancy. If you have any questions or require additional explanation of the information presented please do not hesitate to call me at 212-353-8280.

Thank You.

Bob Fitzpatrick
EPA

Krish
DEP

12/18/01 4 pages

DEC-13-2001 15:04

RELATED MANAGEMENT CO.

P.03/17

ATC Associates

104 East 25 Street, New York, NY 10010

Phone: (212) 353-8280

Fax: (212) 353-8306



Attn: Mr. Benjamin Salerno

ATC Associates Inc

104 East 25th Street

New York

NY 10010

Fax: (212) 353-8306

Phone: (212) 353-8280

Received: 12/13/01

8:00:00 AM

ATC Group #: 6087

Analysis Date: 12/13/01

Project: Tribeca Towers

105 Duane Street, NY, NY

**Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) Performed
by EPA 40 CFR Part 763 Final Rule (AHERA)**

Sample	Volume	Area Analyzed	Non Asb	Asbestos Type(s)	Structures 0.5µ-5 µ	Analytical Sensitivity (S/cc)	Asbestos Concentration (S/mm ²)	Notes
1 6087 -1	1300.00	0.0674	0	None Detected	0	0.0044	<14.83	<0.0044
2 6087 -2	1300.00	0.0674	0	None Detected	0	0.0044	<14.83	<0.0044
3 6087 -3	1300.00	0.0674	0	None Detected	0	0.0044	<14.83	<0.0044
4 6087 -4	1300.00	0.0674	0	None Detected	0	0.0044	<14.83	<0.0044
5 6087 -5	1300.00	0.0674	0	None Detected	0	0.0044	<14.83	<0.0044
6 6087 -6	1300.00	0.0674	0	None Detected	0	0.0044	<14.83	<0.0044
7 6087 -7	1300.00	0.0674	0	None Detected	0	0.0044	<14.83	<0.0044
8 6087 -8	1300.00	0.0674	0	None Detected	0	0.0044	<14.83	<0.0044

MARK PEYSAKHOV

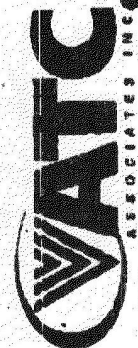
Analyzed by:

MICHAEL A. GORYCKI, Ph.D.

Approved by:

Disclaimer: The laboratory is not responsible for data reported in structures/cc, which is dependent on volume collected by non-laboratory personnel. This lab is only responsible for data reported in structures/mm². This report may not be reproduced, except in full, without written approval by ATC Associates Inc. This report may not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. This report relates only to the samples reported above. Quality control data (including 95% confidence limits and laboratory and analysis accuracy and precision) is available upon request.

Accredited for NVLAP PLM/TEM #101187-0, NY State ELAP #10873



AIR MONITORING DATA

AND

CHAIN OF CUSTODY FORM

PROJECT INFORMATION

1. Client:	2. Project Name:	3. Project #:	4. Project Monitor:
12/12/01	105 DUNNE STREET	105 DUNNE STREET	APRIL 12/01
5. Date:	6. Abatement Location:	7. Project Address:	8. Type:
12/12/01	107th	105 DUNNE STREET	a. Background b. Pre-Abate c. Abatement d. Post-Abate e. OSHA
12/12/01	107th	105 DUNNE STREET	9. Type:
12/12/01	107th	105 DUNNE STREET	a. Background b. Pre-Abate c. Abatement d. Post-Abate e. OSHA

DAILY AIR SAMPLE RECORD

10. Sample ID Number	11. Pump Number	12. Sample Location	13a. Start	13b. End	13c. Total	14a. Start	14b. End	14c. Avg	15. Total Air Vol. (liters)	16. Fibers/Fields Minus Blank	17. Fiber Conc. FCC
A11	✓	10th floor West of Apt 41	10:00	10:10	130	10	10	10	1300		
A12	✓	10th floor East of Radiantive Room	10:01	10:11	130	10	10	10	1300		
A13	✓	10th floor Radiantive Room	10:02	10:12	130	10	10	10	1300		
A14	✓	10th floor Hallway	10:03	10:13	130	10	10	10	1300		
A15	✓	10th floor South of Apt 41	10:04	10:14	130	10	10	10	1300		
A16	✓	10th floor Mechanical Room	10:30	10:40	130	10	10	10	1300		

CHAIN OF CUSTODY

18. Relinquished By:	19. Received By:	20. Date:	21. Time:
14. Gold Tassman	14. Gold Tassman	12/12/01	8:00
II			
III			
26. ATC Project Manager:	27. Receipt No.:	28. Receipt Date:	29. Receipt Time:
FRED BUCKLEMAN	1118 595 3749	12/12/01	10:00

LAB INFORMATION (ATCELP # 10878, ATC NVLAP # 1187)

22. Lab Name:	23. Date:	24. Time:
ATC-TEM	12/13	9:30
a. Analyzed By:	b. QC By:	c. Lab Batch #:
RUG		
25. Microscope (Make/Serial #):	26. Comments:	27. Container:
Nikon Labophot 238913		
Nikon Labophot 238917		
Nikon Labophot 238979		
Analysis Methodology:	PCM - NIOSH 7400A	TEM - AHERA

NY-1 (10/01)

DEC-13-2001 15:06

RELATED MANAGEMENT CO.

P.05/17



AIR MONITORING DATA AND CHAIN OF CUSTODY FORM

6087

PROJECT INFORMATION

Client: **ATC**

2. Project Name: **105 duane Street**

2a. Project Address: **105 duane Street**

6. Abatement Location: **105 duane Street**

7. ☐ PCM # **105 duane Street**

8. ☐ TEM @ 5 min MCE **216**

9. Type: ☐ Abatement ☐ Background ☐ Post-Abate ☐ OSHA ☐ Other

4. Project Number: **105 duane Street**

4a. Air Sampler: **105 duane Street**

4c. Rotameter Number: **105 duane Street**

1. ☐ PCM # **105 duane Street**

2. ☐ TEM @ 5 min MCE **216**

3. ☐ Background ☐ Post-Abate ☐ OSHA ☐ Other

AIR SAMPLE RECORD

11. Sample ID Number	12. Sample Location	13. Time (24 hrs clock)	14. Flow Rate (L/min)	15. Total Air Vol. (liters)	16. # Fibers/Field (minus Blank)	17. Fiber Conc. /CC
17	105 duane Street	10:31	10	130	10	1300
18	105 duane Street	10:32	10	130	10	1300
19	105 duane Street	10:33	10	130	10	1300
20	105 duane Street	10:34	10	130	10	1300
21	105 duane Street	10:35	10	130	10	1300
22	105 duane Street	10:36	10	130	10	1300

AIN OF CUSTODY

Relinquished By: **105 duane Street**

19. Received By: **105 duane Street**

20. Date: **12/13/2001**

21. Time: **10:30**

27. Recd To: **red Buckhardt**

28. Recd From: **105 duane Street**

29. Recd Date: **12/13/2001**

30. Recd Time: **10:30**

LAB INFORMATION (ATC ELAP # 10879, ATC NVLAP # 1187)

22. Lab Name: **ATC-TEM**

23. Date: **12/13**

24. Time: **9:30**

25. Microscope Make/Serial #: **105 duane Street**

26. Microscope Model/Serial #: **105 duane Street**

27. Recd To: **red Buckhardt**

28. Recd From: **105 duane Street**

29. Recd Date: **12/13/2001**

30. Recd Time: **10:30**

2016

ATC

12/13/2001 13:31 FAX 212 353 8306

WHITE - File YELLOW - Client/Report

PINK - Lab GOLDENROD - Field

NY-1 (1/00)



AIR MONITORING DATA AND CHAIN OF CUSTODY FORM

PROJECT INFORMATION

Client: <u>12/23/01 Flow & Mechanical</u>		2. Project Name: <u>105 deLave Street</u>		3. Project #	
6. Abatement Location: <u>10th</u>		7. ☐ PCM (as micro-MDE) Customer Name/Address: <u>105 deLave Street</u>		4a. Air Sampler: <u>Harold Tassman</u>	
1. Date: <u>12/23/01</u>		12. Sample Location		9. Type: <u>Abatement</u>	
12a. Project Address: <u>105 deLave Street</u>		12b. LWA		10. Environmental	
12c. Sample Coordinates		Field Blank		a. ☐ Background	
Field Blank		Field Blank		b. ☐ Pre-Abate	
30 Sec		30 Sec		c. ☐ OSHA	
South side of golden		13. Time (24 hrs clock)		d. ☐ Post-Abate	
Area 10 105 deLave St		13a. Start		e. ☐ OSHA	
11 feet from brick column		13b. End		14. Flow Rate (L/min.)	
down at 105 deLave Street		13c. Total		14a. Start	
20 feet North of		13d. End		14b. Avg	
down entrance elevator at 10		13e. Total		15. Total Air Vol. (liters)	
deLave Street		13f. End		16. Fibers/Fields Minus Blank	
		13g. Total		17. Fiber Conc. #/cc	

DAILY AIR SAMPLE RECORD

0. Sample ID Number	11. Pump Number	12. Sample Location	13. Time (24 hrs clock)	14. Flow Rate (L/min.)	15. Total Air Vol. (liters)	16. Fibers/Fields Minus Blank	17. Fiber Conc. #/cc
A16		Field Blank	00:00	10	10		
A17		Field Blank	00:00	10	10		
A18		South side of golden	02:12	10	10		
A19		Area 10 105 deLave St	02:13	10	10		
A20		11 feet from brick column	02:14	10	10		
A21		down at 105 deLave Street	02:14	10	10		
A22		20 feet North of					
A23		down entrance elevator at 10					
A24		deLave Street					
A25							
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CHAIN OF CUSTODY

18. Requisitioned By: <u>Harold Tassman</u>	19. Received By: <u>[Signature]</u>	20. Date: <u>12/23/01</u>	21. Time: <u>9:30</u>
22. Lab Name: <u>ATC-TEM</u>	23. Date: <u>12/13</u>	24. Time: <u>9:30</u>	
a. Analyzed By: <u>RRY</u>	b. QC By: <u>[Signature]</u>	c. Lab Batch #: <u>[Signature]</u>	
25. Comments: <u>SAMPLES 1-10 are aggressive samples. Sample 10-15 are common substrate samples.</u>			
26. ATC Project Manager: <u>Fred Buckland</u>	27. Result To: <u>Carol Leitch/Hail</u>	28. Comments: <u>SAMPLES 1-10 are aggressive samples. Sample 10-15 are common substrate samples.</u>	

29. Lab Information (ATC ELAP # 10879, ATC NVLAP # 1187)	
25. Microscope Make/Serial #:	26. Analysis Methodology:
☐ Nikon Labophot 238913	PCM - NIOSH 7400A
☐ Nikon Labophot 238917	TEM - AHERA
☒ Nikon Labophot 238979	
NY-1 (1000)	

WASPI!
page 5 of 5

<u>Client Name:</u>	ATC	<u>Volume (liters):</u>	1300
<u>Lab Group #:</u>	6087	<u>Filter Type / Filter Area:</u>	MCE 385 mm ²
<u>Lab Sample #:</u>	7	<u>Grid Opening Size:</u>	0.01124
<u>Client Sample #:</u>	7	<u>Area Examined:</u>	0.06744 mm ²
<u>GRID BOX:</u>	SPB	<u>Magnification:</u>	20,000
<u>GRID ID:</u>	SFE4	<u>Accelerating Voltage:</u>	100 KeV
<u># Grid Openings:</u>	6	<u>Analysis Date:</u>	12/13/01

MARK PEYSAKHOV

[illegible]

	F	B	C	M	>50
Chrysotile					
Amphibole					
Ambiguous					
Non-Asbestos					
Non-Identified					

NYC-WTC 000126002

<u>Client Name:</u>	ATC	<u>Volume (liters):</u>	1300
<u>Lab Group #:</u>	6087	<u>Filter Type / Filter Area:</u>	MCE 385 mm ²
<u>Lab Sample #:</u>	4	<u>Grid Opening Size:</u>	0.01124
<u>Client Sample #:</u>	4	<u>Area Examined:</u>	0.06744 mm ²
<u>GRID BOX:</u>	6FB	<u>Magnification:</u>	20,000
<u>GRID ID:</u>	125	<u>Accelerating Voltage:</u>	100 KeV
<u># Grid Openings:</u>	6	<u>Analysis Date:</u>	12/13/01

MARK PEYSAKHOV

[illegible]

	F	B	C	M	>5µ
Chrysotile					
Amphibole					
Ambiguous					
Non-Asbestos					
Non-identified					

Post-it® Fax Note 7671		Date 12/18/01	# of pages ▶ 1
To KEN KEN	From KRISH		
Co./Dept. JOH	Co. DE P		
Phone #	Phone #		
Fax # 212-676-6144	Fax #		

DEC-13-2001 15:13

RELATED MANAGEMENT CO.

P.17/17

Attn: Mr. Benjamin Sallemi
ATC Associates Inc
104 East 25th Street
New York NY 10010

Received: 12/13/01 8:00:00 AM

ATC Group #: 6087

Analysis Date: 12/13/01

Fax: (212) 353-8306 Phone: (212) 353-8280

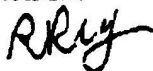
Project: Tribeca Towers
105 Duane Street, NY, NY

**Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) Performed
by EPA 40 CFR Part 763 Final Rule (AHERA)**

Sample	Volume	Area Analyzed	Non Asb	Asbestos Type(s)	Structures 0.5µ-5 µ	Analytical Sensitivity (S/cc)	Asbestos Concentration (S/mm ²)	(S/cc)	Notes
9 6087 -9	1300.00	0.0674	0	None Detected	0	0	0.0044	<14.83	<0.0044
10 6087 -10	1300.00	0.0674	0	None Detected	0	0	0.0044	<14.83	<0.0044

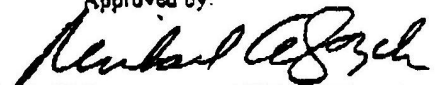
MARK PEYSAKHOV

Analyzed by:



MICHAEL A. GORYCKI, Ph.D.

Approved by:



Disclaimer: The laboratory is not responsible for data reported in structures/cc, which is dependent on volume collected by non-laboratory personnel. This lab is only responsible for data reported in structures/mm². This report may not be reproduced, except in full, without written approval by ATC Associates Inc. This report may not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. This report relates only to the samples reported above. Quality control data (including 95% confidence limits and laboratory and analysis accuracy and precision) is available upon request.

Accredited for NVLAP PLM/TEM #101167-0, NY State ELAP #10879

TOTAL P.17