

Job: Ground Zero Location

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Building Science Section

The entire penthouse condominium unit was mapped for room temperature, room humidity, surface temperatures, dew point, and moisture content. The sling psychrometer was used for baseline testing results and the digital hygrometer was used for the data collection. All surface moisture mapping was conducted using the Tramex moisture-testing gauge and an infrared laser.

The following are field data from moisture and humidity mapping.

9.3	
0.6	
2.5	
5.0	
9.0	
0.1	
6.9	



Below we plotted the coolest room. Condensation will occur in cool rooms first. Level one main kitchen and small dining area.



1501 Spring Garden Lakewood Ohio 44107 Ambassador Construction Consultants Inc. www.houseinvestigations.com , Clevelandmold@aol.com 216-924-TEST 216-431-TEST

Report Date: Tuesday, September 12, 2006 Project Information: Level one main kitchen and small dining area.

Altitude: 30 (Feet) Barometric Pressure: 29.889 (in.Hg) Atmospheric Pressure: 14.680 (psia)

1. Main Kitchen level one

STATE POINT D	AIA									
Air Flow	Dry	Wet	Relative	Humidity	Specific	Enthalpy	Dew	Density	Vapor	Absolute
(Standard)	Bulb	Bulb	Humidity	Ratio	Volume		Point		Pressure	Humidity
(cfm)	(°F)	(°F)	(%)	(gr/lb)	(cu.ft./lb)	(Btu/lb)	(°F)	(lb/cu.ft.)	(in.Hg)	(gr/cu.ft.)
1.000	70,700	61.400	59.3	66.7	13.585	27.378	55.8294	0.0743	0.4493	4.910

2. Dew Pointg 55.8 F

Main Kitchon lovel

STATE POINT D	ATA												
Air Flow	Dry	Wet	Relative	Humidity	Specific	Enthalpy	Dew	Density	Vapor	Absolute			
(Standard)	Bulb	Bulb	Humidity	Ratio	Volume		Point	-	Pressure	Humidity			
(cfm)	(°F)	(°F)	(%)	(gr/lb)	(cu.ft./lb)	(Btu/lb)	(°F)	(lb/cu.ft.)	(in.Hg)	(gr/cu.ft.)			
1,000	120.000	76.284	13.0	66.6	14.847	39.407	55.8000	0.0680	0.4488	4.488			
Process: Conn	Process: Connect States												
			Total	Sensible	Latent	Moisture		Sensible	Enthalpy/				
Start Point Name			Energy	Energy	Energy	Differ	rence	Heat Ratio	Humidi	ty Ratio			
		(Btu/hr)	(Btu/hr)	(Btu/hr)	(lb/hr)			(Btu/lb / lb/lb)					

3. Exterior N Ground Zero Side

STATE POINT D	DATA											
Air Flow	Dry	Wet	Relative	Humidity	Specific	Enthalpy	Dew	Density	Vapor	Absolute		
(Standard)	Bulb	Bulb	Humidity	Ratio	Volume		Point		Pressure	Humidity		
(cfm)	(°F)	(°F)	(%)	(gr/lb)	(cu.ft./lb)	(Btu/lb)	(°F)	(lb/cu.ft.)	(in.Hg)	(gr/cu.ft.)		
1,000	78.600	68.589	60.6	89.2	13.858	32.837	63.8520	0.0731	0.5980	6.440		
Process: Conn	Process: Connect States											
			Total	Sensible	Latent	Mois	sture	Sensible	Enth	ialpy/		
Start Point Name			Energy	Energy	Energy	Difference		Heat Ratio	Humidity Ratio			
			(Btu/hr)	(Btu/hr)	(Btu/hr)	(lb/	/hr)		(Btu/lb / lb/lb)			
Exterior N Ground Zero Side			0	-1	1	0	.0	-999.000	N/A			

4. Dew Point 63.8 F

STATE POINT D	ATA											
Air Flow	Dry	Wet	Relative	Humidity	Specific	Enthalpy	Dew	Density	Vapor	Absolute		
(Standard)	Bulb	Bulb	Humidity	Ratio	Volume		Point	-	Pressure	Humidity		
(cfm)	(°F)	(°F)	(%)	(gr/lb)	(cu.ft./lb)	(Btu/lb)	(°F)	(lb/cu.ft.)	(in.Hg)	(gr/cu.ft.)		
1,000	120.000	79.797	17.3	89.4	14.924	43.031	63.9000	0.0679	0.5990	5.991		
Process: Conn	Process: Connect States											
			Total	Sensible	Latent	Mois	Moisture Sensible		Enthalpy/			
Start Poi	nt Name		Energy	Energy	Energy	Difference		Heat Ratio	Humidity Ratio			
			(Btu/hr)	(Btu/hr)	(Btu/hr)	(lb/	(lb/hr)		(Btu/lb / lb/lb)			
Exterior N Ground Zero Side		45.876	45.768	108	0	.1	0.998	N/A				

The above graph depicts that during our inspection, the dew point¹ for the above kitchen area condition was 55.8 F. On the day of inspection all condominium surface temperatures were all significantly above this dew point. Dew point temperature and moisture are both necessary for microbial amplification. When indoor moisture generators produce excessive moisture high indoor humidity, condensation, fungal amplification, bio-growth, insects, mites, not optimal indoor air quality can be the outcome.

When comparing the exterior air to the interior air, the interior air had slightly more grains of moisture. The interior had .0743 lbs/cuft of water and the exterior had .0731 lbs/cuft of water. The AC unit was on. The AC unit acts like a dehumidifier. When AC units are on, they extract moisture from the air. Running the AC or a dehumidifier will help control moisture in the air. A spare dehumidifier will help control humidity during peak humid times.

PHOTOGRAPHIC ESSAY

The following are several digital images taken of this dwelling. These images show building conditions, testing locations, potential concerns, and other building science² conditions that existed. Below these images is an explanation of the condition. (This photographic essay is not to be considered a full home or environmental inspection.)

¹ Dp = Dew Point Temperature: The temperature of moist air saturated at the same pressure and humidity ratio. Alternatively, more simply the temperature at which water vapor will begin to condense from a sample of air.

² Building science for this report means moisture findings caused by building materials, construction methods, and moisture addition.



Limited VOC testing was done. One onehour sample was drawn and sent the laboratory for analysis. Please refer to other sections of this report.



Due to the 911 potential dusts contamination, the inspector took two two-hour personal air monitor tests samples for asbestos content. These samples were taken to the laboratory. Please refer to other section of this report.



One sample for silica dust was taken from the second level. This was a four-hour draw that was sent to the laboratory. Please refer to other sections of this report.



Numerous Air-O-Cell samples were taken for non-viable fungi, glass fibers, insect fragments, and pollen and skin fragments. These samples were sent to the laboratory for analysis. Please refer to other sections of this report.



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The HVAC ductwork was dirty. The supply ductwork is full of dust, sticky stuff and debris. Professional cleaning is required. At this time, it is assumed that other duct systems in this building are dirty as well. The building management should provide all necessary information.



The back stairwell was contaminated with dust. This hall stairwell communicates with the penthouse

condominium. It is possible the 911 dust exists in this stairwell. The inspector took one sample for full particle identification. This sample was sent to the laboratory for analysis.



The cooling tower that was located on the rooftop appeared to be dirty. Cooling towers are a major source of potential

airborne contamination. The tower will loose water during the evaporation process. This evaporate is also called drift. The drift could contain bacterial contaminants. The rooftop deck is a living area that is located near this cooling tower. This condition needs to be tested if additional information is desired. It is advised to notify the building management. The building management should provide all necessary information, testing results and quality control pertaining to this tower.



The back stairwell was contaminated with dust. This stairwell communicates with the penthouse

condominium. It is possible that the 911 dust exists in this stairwell. The inspector took one personal dust sample for asbestos testing. The asbestos sample results should not be construed as conclusive. These samples were taken for personal air monitoring purposes. This sample was sent to the laboratory.



One cold air return grill on the first level was sampled for bulk fungal testing. This sample was sent to the laboratory. See other sections of this report.



The AC unit on the rooftop has poor condensate discharge. Water is ponding on the roof. Roof debris is being saturated and providing an unsanitary environment. Roof water should not be permitted to pond. This condition needs to be properly controlled. The roof debris needs to be removed.



The back stairwell is dust contaminated.



GOVERNOR PATAKI ANNOUNCES START OF DECONSTRUCTION OF 130 LIBERTY.

- This building is right above the condominium unit.
- See adjacent material
- Obtaining all the testing results is advised. This demolition will last several years. Dust generation is expected



Dust and construction debris exists in some walls.

Phase I of the deconstruction will consist of preparation of the building, which includes the erection of scaffolding and hoists on the exterior, construction of interior hoist vestibules, erection of sidewalk sheds and perimeter fencing, exterior negative pressure tent enclosures, localized roof, façade and general exterior area clean-up and the removal of existing netting on the exterior of the building. Following building preparation, Phase I will include the cleaning and removal of all interior surfaces and non-structural elements within the building, which will allow 130 Liberty Street to be safely deconstructed. Phase I will begin this week. Phase II will be the actual floor-by-floor structural deconstruction of the building and removal of the remaining building components, once cleaned, including the exterior curtain wall, roof, CMU shafts, concrete deck, large scale mechanical equipment components and structural steel components. Phase II is scheduled to begin in early 2006. In addition to the air monitoring program planned for 130 Liberty Street, the Lower Manhattan Construction Command Center (LMCCC) will implement a neighborhood air monitoring program to monitor not only 130 Liberty Street activity, but other construction activities throughout Lower Manhattan. The principal objectives of the program are to monitor dust levels for fugitive dusts, and to immediately notify deconstruction management personnel so that all necessary corrective action can be taken should levels exceed predetermined action levels.



Ground Zero was next to this condominium unit. A high probability exists that this



The condominium unit was one of the closest

condomiumun still has some dust from the buildings to the 9-11 attack. It is highly probable that being the closest building, high 9-11 collapse. This is the penthouse condominiums view on 9-9-06 from the dust contamination existed. We penthouse exterior upper living area. recommended you get all data from past building dust remediation. It is almost impossible to remove all this buildings dust. The new GROUND ZERO construction project will last many years and new dust will be generated. New dust will contain portland Photo was taken form the internet. products, wood products, chemicals, solvents and many other newer construction type materials. Dust cleaning of this condominium unit is expected to be ongoing.



The condominium unit was contaminated with 911 dusts. Arrow points to the condominium unit location. Photograph was taken from the internet.



Red is the approximate location of the condominium building on 9-11. Photograph was taken from the internet.



The cell tower is in direct plane of the outside patio areas. People on these exterior decks will be more exposed than people on the ground or inside the condominium unit.

CELL TOWERS GENERAL

The Bottom Line According the National Cancer Society

Cellular phone towers, like cellular phones themselves, are a relatively new technology, and we do not yet have full information on health effects. In particular, not enough time has elapsed to permit epidemiologic studies. There are some theoretical reasons why cellular phone towers would not be expected to increase cancer risk, and animal studies of RF have not suggested a risk of cancer. People who are concerned can ask for measurements of RF near cellular phone

towers to be sure exposures do not exceed recommended limits. MORE ON CELL TOWERS According to the FCC When cellular and PCS antennas are mounted on rooftops, RF emissions could exceed higher than desirable guideline levels on the rooftop itself, even though rooftop antennas usually operate at lower power levels than free-standing power antennas. Such levels might become an issue for maintenance or other personnel working on the rooftop. Exposures exceeding the Building exhaust vents are located on the guidelines levels, however, are only likely to rooftop. This condominium has exterior be encountered very close to and directly in livable spaces. It is possible, that at times, front of, the antennas. In such cases, exhaust fumes from this and other units may precautions such as time limits can avoid be encountered. exposure in excess of the guidelines. The building management Building should provide exhaust vents proper testing are located on results of the the rooftop. HVAC cooling This tower. The condominium tower looked has exterior older and dirty livable space. It is possible Leaking areas had some that at times. unknown bioexhaust fumes growth. may be encountered. Older water Infrared Ð tower is image shows made of active water tower leaks. wood. This See the is a typical New York adjacent City roof image. top unit. 90-60-60 This tower We are not IT is leaking at water tower numerous experts, and locations. we do no if Water leaks this is normal 46259 contribute or abnormal. to roof You need a (R20060909 ponding. second Roof opinion. N ponding is

not



APP (Aggressive Particle Profiling.) Air-borne particulate Particle Contamination Section

Scope and Purpose:

- 1. To sample with a laser particle counter the air in various locations of the dwelling;
- 2. To determine if there is contamination by airborne particulate;
- 3. To qualify the size and quantify the amounts of the contamination.

Laser particle count examination is critical to indoor air quality investigations. A particle investigation is designed to quantify air contamination by particle size. Particle counting effectively analyzes the effectiveness of the air handling filtration systems. The particle counter used for this project was an HHPC-6 ARTI Particle Counter. The device has six channels to read various size particles in microns. The channel sizes are .3, .5, .7, 1.0, 2.0, and 5.0 microns being the largest. There is a variable pump rate, and was set to pump 2.83 liters per minute. This is equal to a volume 1/10th of a cubic foot. All samples sizes were small that consisted of 1 liter

of air. The obtained interior values should be compared to the exterior values which usually are cleaner.

The device quantifies particle contamination and allows the indoor air environmentalist to make determinations based on the results. There is a distinct coordination between respiratory penetration and particle size. The symptoms and health affects of particulate inhalations vary from respiratory irritation, allergies, infections, and cancer. In general, respired particles affect us in the following ways:

- They can impair respiratory functions.
- Particle may cause a chemical or mechanical irritation of tissues. Nerve endings at the deposition site can also be damaged.
- They can aggravate existing respiratory or cardiovascular disease. They can impact our immune system and cause more morphological changes in lung tissue.

Health exposure to contaminate falls into two categories. Indoor air quality exposure (which is non-occupational) and occupational. <u>Wallace</u> (1991), and <u>Wilkins</u> (1993), showed that inhaling particles are associated with increased prevalence of "sick building syndrome." The symptoms are mucus irritation, difficulty in concentration, and distraction of occupancy by annoyance odors. Particulate contamination breaks down as follows in the human body:

- >10, um may be respirable but do not penetrate
- 7 to 11 um particles, penetrate nasal passages
- 4.7 to 7 um particles penetrate the pharynx
- 3.3 to 4.7 um particles penetrate trachea and primary bronchi
- 2.1 to 3.3 um particles penetrate secondary bronchi
- 1.1 to 2.1 um particles penetrate terminal brochi
- 0.65 to 1.1 um particles penetrate bronchioli
- 0.43 to 0.65 um particles penetrate alveoli

A study of high-rise office buildings (Armstrong, Sherertz, and Llewellyn 1989) showed that high levels of particulate resulted in sinus and upper respiratory congestion and headaches. In 1993, <u>Gravessen</u>, <u>Ipsen</u> and <u>Skov</u> found that macromolecular organic dust correlated significantly with the number of occupant's complaints consisting of:

- Extreme fatigue
- Itching eyes
- Nasal congestion
- Headache
- Sore and irritated throats

Two categories of particles are of particular concern: <u>microbial and combustion by-product</u>. Microbial particulate causes irritation, allergenic illness, infectious illness, and has toxic effects on the body. Combustion by-products (that is particulate from vehicle exhaust, tobacco smoke, heating appliances, office machinery, and cooking appliances) creates polycyclic aromatic hydrocarbons or PAH's.

Particulate testing is particularly critical to ASHRAE Standard 52.2-1999, titled "Method of Testing General Ventilation Air-Cleaning Devices For Removal Efficiency By Particle Size.

Readings were taken of outside air to compare. We are also comparing the readings to exterior air. The general observation of counting the particle was that there are many irregular and unequal conditions relating to air quality.

The following are field data from aggressive particle profiling. These are the actual authentic field notes from mapping to decrease duplicating error.

Ground Zero Side	266670	14644	2099	892	437	45
7. Exterior N level 2 deck						
level 2 deck	270575	14781	2040	693	320	30
6. Exterior S	262244	15462	1923	139	349	32
5. Bedroom	000044	45400	4000	700	0.40	20
4. Kitchen level 2 N	215864	10593	1078	374	137	16
level 1 S	214863	9926	1277	512	243	26
2. Living room level 1 N 3. Bedroom	245856	13251	1930	883	470	45
1. Kitchen main level 1	242570	12828	1707	735	352	36
Location	0.3 Mic	0.5Mic	0,7Mic	1.0Mic	2.0MIc	5.0Mic
	Smallest	Very Small	Small	Big	Bigger	Biggest



The following are conclusions to be drawn from the air particle testing:

- 1. There is minimum airborne particulate contamination in this dwelling when compared to the exterior.
- 2. The condominium is not occupied and major aerosolizing of air was not occurring. Occupied units, HVAC systems will disturb dust.
- 3. Particulate includes but not limited to, mold spores, construction dust, drywall dust, paint, cleaning solutions, glass fibers, concrete fibers, possible lead, possible asbestos, mold, ground zero contaminates, other buildings contaminants that enter this building, house dust, pollen, and many other debris.
- 4. Periodic particulate cleaning with the use of HEPA and other cleaning techniques is advised.
- 5. Periodic duct cleaning is advised.

Recommendations regarding this information:

- Review the recommendations in the mold report.
- The document ACR 2002 Assessment, Cleaning & Restoration of HVAC Systems should be purchased and reviewed. The National Air Duct Cleaners Association publishes this document: NADCA. Their recommended procedures should be used and guidelines.
- If you are an immune compromised individual, proper air scrubbing apparatus should be used to clean the particulate contamination in your dwelling. Portable air scrubbers are available.
- We are not health specialists. The conclusions and opinions stated in this report are based on information gathered over time and the review of similar situations and conditions.
- Ambassador Construction Consultants Inc. does not accept any responsibility for the financial or health consequences of subsequent action taken by the client or its consultants based on this report, test results, opinions or recommendations. We strongly recommend second opinions.

Lead Dust Testing

Limited lead dust testing was conducted by Flame AAS (Sw 846 3050B and 7420) seven lead dust samples were taken and sent to the laboratory. The testing was limited to only seven samples.

	SQ			
	Inches	ug/ft2	ug/ft2	
Location	Area	Allowable	Actual	Pass/Fail
Window trough Dining 1st floor	36	400	<mark>710</mark>	Fail
Window sill Dining 1st floor	36	250	<40	Pass
Dining room floor	144	40	<10	Pass
Window trough Family 1st floor	36	400	<mark>450</mark>	Fail
Window sill Family 1st floor	36	250	<mark>620</mark>	Fail
Family room floor	144	40	<10	Pass
Blank	Blank	Blank	<10	Pass

Although most windows were newer, lead dust was found. This lead dust can also be traveling in the air from other buildings. The lead levels on the window troughs and sills exceeded the EPA limits as indicated in the above charts. The Exterior window troughs are lead dust contaminated. When windows are opened, the lead dust that rests in the troughs contaminates the interior window sill and interior floors. Interior lead dust cleaning is necessary. Final clearance testing should be done after lead dust cleanup has been completed.

"Federal law (24 CFR part 35 and 40 CFR part 745) requires sellers and lessors of residential units constructed prior to 1978, except housing for the elderly or persons with disabilities (unless any child who is less than six years of age resides or is expected to reside in such housing) or any zero-bedroom dwelling to disclose and provide a copy of this report to new purchasers or lessees before they become obligated under a lease or sales contract. Property owners and sellers are also required to distribute an educational pamphlet approved by the United States environmental protection agency and include standard warning language in or attached to lease contracts or sales contracts to ensure that parents have the information they need to protect children from lead-based paint hazards.

Lead is a heavy metal. It was used in many materials and products before the risk to young children was known. Certain products such as paints used in older houses before 1978, lead solder used in plumbing, and leaded gasoline were used before their harmful health effects were recognized. Although laws now prevent lead from being used in many products, there can still be lead hazards in and around many homes. Lead can get into the air, water, food, soil, and even dust and then can be breathed or swallowed leading to serious health problems, especially for young children.

Lead is a toxin (poison) that can harm young children. Children 6 years old and under are most at risk because their bodies are still developing. A young child's exposure to lead can cause learning and behavioral problems and possibly damage their brains, kidneys, and other organs.

Lead enters the body when children breathe lead dust or lead fumes, or swallow something with lead in it. Young children often put things in their mouth creating a way for lead to enter the body. The main way most young children are exposed to harmful levels of lead is through contact with lead contaminated paint and dust. In nearly all cases, lead dust is either breathed in, or taken in as dust licked off surfaces or in swallowed paint chips that contain lead.

Less often, water is contaminated when it flows through lead pipes or brass fixtures, or food is contaminated by contact with lead-glazed ceramic dishes. Certain ethnic spices, foods and cosmetics also have lead. In certain jobs and hobbies, adults may work with leaded materials and can possibly expose their child to lead if proper cleaning is not done.³

Asbestos Testing

The WTC towers were built from 1968 to 1972. A slurry mixture of asbestos and cement was sprayed on as fireproofing material. But this practice was banned by the New York City Council in 1971. This halted the spraying, but not before hundreds of tons of the material had been applied. Some but not all of it was later removed in an abatement program. A region of several square miles was blanketed by fine powder resulting from the explosive collapses of the Twin Towers. This powder, consisting of the pulverized remains of non-metallic components and contents of the Towers, contained significant percentages of asbestos. ¹Â An analysis of dust within three days of the attack found that some of the dust was four percent asbestos. ²Â This asbestos release may be a public health time bomb, because thousands of people breathed dust from the collapses.⁴ Additionally, this dust will remain in hidden areas such building envelopes, elevator shafts, stairwells, distribution systems, wall cavities, ductwork, interstitial spaces and many other locations for decades to come.

NOTE: DISCLAIMER

We are not New York City Asbestos Licensed. For all practical purposes, our testing is to be considered non conclusive. The testing was done only for the personal protection of the inspector. Due to due diligence, we are required to provide you with our information. Due to the asbestos containing dust encountered during our personal protection inspection, we recommend you perform additional asbestos testing for this penthouse unit, stairwells, interstitial space's and entire building.

³ N 1. Is Ground Zero Safe? New study suggests more asbestos at disaster site than previously revealed, <u>MSNBC News</u>, 10/5/01 [cached]

^{2. &}lt;u>Asbestos Dust Poses Threat to Rescue Crews</u>, *Boston Globe*, 9/14/01 [cached]

^{3.} Divided We Stand, *Basic Books*, 1999, page 208

^{4.} Only skyscraper in Paris, popular with tourists, has dangerous asbestos levels, AP, 3/14/05 [cached]

^{5.} Divided We Stand, Basic Books, 1999, page 212 ew York State Department of health

Asbestos testing was done using Asbestos Fiber Analysis by transmission Electron Microscopy (TEM) performed by EPA 40 CRF 763 Final Rule (AHERA). Only two air samples of air were taken for laboratory analysis.

Sample	Volume Liters	Analyzed (mm2)	Non ASB		Asbestos Type	Analytical Sensitivity	Asbestos Concentration	O /
A- U387536 Sample taken on in the master bedroom						S/cc	S/cc	S/cc
on level					None			
two B- U387433 Sample taken in the	1200	0.065		0	Detected	0.0049	<15	<.0049
kitchen					None			
level two.	1200	0.065		0	Detected	0.0049	<15	<.0049

At the time of inspection the two personal protection⁵ asbestos air tests taken were not positive for asbestos content. We did not perform aggressive air testing that would include using fans to stir up the condominiums air. These air tests are a snap shot in time. The condominium is not occupied and aerosolized dust was at a minimum. Air conditions will change hourly and daily depending on many factors.

Due to the visual dust seen in the back stairs, the inspector sampled one personal sample of dust at the back door entrance. This inspector felt it was necessary to test this area due to the excessive visual dust seen. This 13 story stairwell area communicates with the building and this penthouse condominium unit. This entire stairwell needs to be properly cleaned. The 12 X 12 floor dust sample was tested by EMSL using the Method ASTM 6480-05.

The result from this back stair floor wipe sample was positive for Chrysotile asbestos. The concentrations detected were 46400 str/cm2. Any asbestos at any level is not good. This EMSL laboratory result is attached. Additional testing is recommended.

Additional Asbestos information that may pertain to this condominium.

DEP monitored the ambient outdoor air for asbestos following the World Trade Center (WTC) disaster. This effort augmented ambient air asbestos sampling

⁵ We are not New York Asbestos licensed and are not permitted to make opinions on asbestos. At this time, we recommend testing the entire condominium unit, ductwork, interstitial space and back hall way for asbestos content.

performed by the EPA and other state and city agencies. There is currently no outdoor ambient standard for asbestos. The US and NYC standard for asbestos in community and residential buildings is 0.01 fibers/cubic centimeter (f/cc) in indoor air. An indoor area which has had asbestos detected and then removed must show that air samples are at or below the 0.01 f/cc standard before the indoor area can be re-occupied. Although the ambient outdoor air was monitored, DEP used the indoor air standard as a way to characterize the levels of asbestos in the air.

Since the measurement protocol used, phase contrast microscopy (PCM), counts fibers, DEP also conducted an additional analysis for all samples that were above 0.01 f/cc. This measurement protocol is called transmission electron microscopy (TEM) and counts the number of asbestos fibers in the sample. EPA reported their data in TEMs, and provides a good explanation of the interpretation of the standard that uses this methodology on their website.

EPA has also recently published the results of two studies related to the WTC disaster: *The Toxicological Effects of Fine Particulate Matter Derived from the Destruction of the World Trade Center*, and *The Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster*.

Results indicate that, as expected, asbestos was present in some of the debris at the site and in areas very close to the site. Between September 28, 2001 and August 3, 2002, the vast majority of air sampling results outside the security zone were below the standards for asbestos in indoor air.⁶

I have located some testing data that was done near the Liberty Properly. This data is form 2001. You can find more test data on the City of New York Department of Environmental Protection web site.

Site #	Date	Location Sampled	PCM Results (f/cc)			
24	9/15/01	LIBERTY STREET & SOUTH END AVE	0.019			
Site #	Date Location Sampled PCM Results (f/cc					
25	9/18/01	LIBERTY & CHURCH ST.	0.021			
25	9/14/01	LIBERTY & CHURCH ST.	0.020			
25	9/13/01	LIBERTY & CHURCH ST.	<loq< td=""></loq<>			
Site #	Date	Location Sampled	PCM Results (f/cc)			
Site # 26	Date 9/17/01	Location Sampled LIBERTY ST. & BROADWAY	PCM Results (f/cc) 0.062			
Site # 26 26	Date 9/17/01 9/16/01	Location Sampled LIBERTY ST. & BROADWAY LIBERTY ST. & BROADWAY	PCM Results (f/cc) 0.062 0.010			
Site # 26 26 26	Date 9/17/01 9/16/01 9/15/01	Location Sampled LIBERTY ST. & BROADWAY LIBERTY ST. & BROADWAY LIBERTY ST. & BROADWAY	PCM Results (f/cc) 0.062 0.010 0.008			
Site # 26 26 26 Site #	Date 9/17/01 9/16/01 9/15/01 Date	Location Sampled LIBERTY ST. & BROADWAY LIBERTY ST. & BROADWAY LIBERTY ST. & BROADWAY LIBERTY ST. & BROADWAY	PCM Results (f/cc) 0.062 0.010 0.008 PCM Results (f/cc)			

⁶ City of New York Department Environmental Protection

Notes:

PCM = phase contrast microscopy f/cc = fibers per cubic centimeter LOQ = Limit of Quantification

Microbial Data Microbial Section

On 9-9-06 there were nine fungal tests taken at the above address. We have attached the lab fungal results.

- 1. Five non-viable air tests were taken.
- 2. Two viable air tests were taken.
- 3. One swab test was taken.

Scope and purpose:

Spore growth is cultivated by the presence of a sympathetic environment. Food, (cellulose or wallpaper paste), moisture and limited light are conditions in which spores thrive. This is whether they enter from the exterior or any other means. Events such as dusting, opening the windows, vacuuming, and manipulating the contaminated areas, are conditions that stimulate spore movement throughout the house. Please refer to our web site <u>www.houseinvestigations.com</u> for additional information.

The following is the methodology of Air-O-Cell sampling.

Air-O-Cell Testing

The Air-O-Cell[™] air sampling cassette is a sampling device designed for the rapid collection and analysis of a wide range of airborne aerosols. These airborne aerosols include but not limited to; fungal spores, pollen, insect parts, skin cell fragments, fibers, and inorganic particulates. Air enters the cassette, the particles become impacted on the sampling substrate, and the air leaves through the exit orifice. The airflow and patented cassette housing is designed in such a way that the particles are distributed and deposited equally on a special glass slide contained in the cassette housing called the ``trace." This trace is sent to the laboratory for analysis.

Air-O-Cell benefits

- Useful for initial site testing, especially if fungal growth is not visible.
- Quick and simple procedure.
- Fast turn around times available.
- Low chance of sample contamination.
- Can determine if mold remediation was somewhat successful.
- Can determine if interior air is dirtier than exterior air.

Air-O-Cell Disadvantages

• Fungi cannot be fully speculated with this method. For example, *Aspergillus* sp. and *Penicillium* sp. are normally reported together due to the similarities in spore morphology.

- Spore viability cannot be assessed.
- Aspergillus sp. has over 70 different species (example Aspergillus Niger, Aspergillus fumagatous, or other types. The report will only state Aspergillus sp.
- Indoor spore counts change daily and seasonally.
- Sampling is always budget driven and sampling is generally limited to several samples.

Sampling Procedure

The Air-O-Cell testing cassette is designed to operate at a recommended flow rate of 15 lpm. Lower flow rates may result in a loss of some spores and the accumulation of others in a non-uniform manner. Higher flow rates may damage the spores. Clean environments such as interior of homes are run for 5 minute intervals. Very clean environments such the exterior air is run for 0-10 minute intervals.

SAMPLING DURATION

The sampling time is dependent on the density of particulate in the environment. The inspector will try not to overload the sample, otherwise it will be impossible to assess the types of spores, pollen and particulates that are present. For most of our testing were sample the exterior at 10 minutes, the interior for 5 minutes. Please refer to the actual attached laboratory results.

Materials used

- Air-O-Cell Cassette provied by Zeflon.
- Latex/nitrile glove

The following are the site Air-O-Cell samples plotted on a mold chart. The chart is designed to help one compare the results with methodology. Please refer to the end of this report for the original lab results. These lab results have all the data.

- 1. **BLUE** is the exterior air.
- 2. **RED** is the total spores added up for the test location.
- 3. Yellow is the interior result if it was higher than the exterior result. The exterior air is used to compare to the interior air. Generally, the exterior air is supposedly clean air.

AIR-O-CELL TESTING RESULTS Mold Genus	Kitchen Level one	Master bedroom level two	Living room level two	Exterior upper center roof near roof ponding area	Exterior Ground Zero side on the lower roof level.
Alternaria	0	0	0	Present	210
Ascopores	84	Present	42	1030	882
Agrocybe / Corpinus	0	0	0	0	0
Basidiospores	0	42	252	1600	2230
Cladosporium	84	42	126	2960	2230
Cercospora	0	0	0	63	0
Gadoderma	0	0	0	63	0
Epicoccum	0	0	0	21	0
Myxomycete	0	0	0	42	42
Penicillium/Aspergillus Types Periconia sp/smuts/myxomycetes Pithomyces / Ulocladium	0 0 0 0 0	0 0 0 0 0	0 0 0 0 <mark>42</mark>	0 0 0 21	168 0 0 0 0
Stachybotrys Stemphyllium Myxomycete TOTAL MOLD SPORES IN SAMPE	0 0 0 168	0 0 0 84	0 0 0 462	0 0 0 5820	0 0 0 5850
Unidentifiable spores	0	0	0	21	84
Skin fragments	1	1	1	1	1
Fibrous Particulate	<mark>1130</mark>	252	<mark>546</mark>	126	168
Hyphal fragments	0	0	0	21	0
Insect fragments	0	42	0	0	0
Pollen	0	0	0	0	42

1. The total mold spore on the exterior was higher than the interior. At the time of inspection, the air for most fungi genus encountered was dirtier on the exterior.

2. The fibrous particulate and insect fragments were higher indoors than outdoors. Dust cleaning is advised.

PARTICLE IMPACTOR SAMPLING

This method of air sampling involves drawing a measured volume of air over culture media in Petri dishes. The Petri dishes are incubated in the laboratory so the organisms impacted on the plate can grow. The fungi or bacteria are counted and identified. This method of sampling used was the Andersen N-6 Impactor[™]. Different media are available from EMSL Analytical, Inc., depending on whether fungi or bacteria are to be identified. Our scope of work did not test for bacteria. The lab provided MEA (malt extract agar) for the media used. The media was picked up on 9-06 at the New York City EMSL downtown laboratory.

Benefits

• Fungal cultures can determine whether the fungus is viable (alive), and allows for genus and species identification.

• Bacterial cultures provide enumeration and identification of culturable bacteria present in the air.

• Pathogenic microorganism must be alive in order cause infection

Disadvantages

• Cultures take 6-9 days for the bacterial or fungal cells to grow and be identified.

• Even though non-viable spores will not grow using this method, they can be significant, causing allergic reactions or irritation in some people.

• Since most environmental specimens contain a large number of organisms, each has to compete with others to grow on the media. As a result, fungi and bacteria present in the air may not be as well represented in culture.

• Some fungi do not grow well or at all in culture.

• Some organisms are unable to be identified, as they fail to produce spores, or may have not yet been scientifically characterized.

Microbiological media (Agar plates)

• Agar plates are kept refrigerated or on ice until ready to use.

• The plates must be allowed to warm up to room temperature before taking a sample (approx. 20- 30 minutes).

• The lid from the plate is not removed at anytime except during sampling.

• The lid is sealed to the plate after sample collection with Parafilm or tape.

• The plates are shipped back to EMSL on ice by OVERNIGHT PRIORITY.

• Plates do not come into direct contact with the ice due to the potential of freezing the media.

• The agar plates are frigerated until ready for overnight delivery.

- 1. **BLUE** is the exterior air.
- 2. **RED** is the total spores added up for the test location.
- 3. Please refer to the attached actual laboratory results.

Legend X / X = colony count / CFU/m3

PARTICLE IMPACTOR SAMPLING RESULTS Mold	Blank	Kitchen level one
Aspergillus niger Aspergillus versicolor	0 0	1 / 12 1 / 12
Cladosporium cladosporioides	0	3 / 36
Penicillium glabrum Rhinocladiella sp. Sporothrix Sterile (dark) Sterilt (white)	0 0 0 0 0	2 / 24 2 / 24 1 / 12 1 / 12 1 / 12
TOTAL MOLD SPORES IN SAMPLE	CLEAN	12 / 144

The mold counts for the viable testing were found to be minimal. Controlling water events, roof leaks and indoor humidity is advises. Several ceilings have moisture stains. These areas need to be monitored and repaired if found deemed. The potential for fungal reservoirs at these locations exists.

Additional

- We place the lid to Petri dish in a sterile bag during sampling.
- We include an outside sample and field blank for control.

BULK TESTING

The following is the methodology of DIRECT EXAM SAMPLING (Swab)

Tape lift, bulk and swab sampling, are techniques used for direct examination. A direct exam allows for the rapid determination of the presence of fungal spores as well as identifies the types of fungi. Direct examinations are only be used to sample visible mold growth in a contaminated area, since, most surfaces will have a deposit of fungal spores that are normally present in the environment.

Benefits

• The direct exam is inexpensive and can be performed quickly.

• A useful test for initial site sampling.

• Direct sampling may reveal indoor reservoirs of spores that have not yet become airborne.

Disadvantages

• Areas of fungal growth are often small and scattered, so they may not all be picked up. Multiple sampling will help overcome this problem.

• Health problems related to indoor microbial growth are generally caused by the inhalation of substantial numbers of airborne spores, sometimes over a long period of time. The presence of biological materials on a particular surface may not be a direct indication of what is in the air.

• This method detects both viable and non-viable spores but cannot distinguish between them. It is advisable to combine direct exam samples with culture methods if knowing viability is important to your project.

• Tape lifts are not able to be cultured.

• If a direct examination of a swab sample is taken, a follow up by culture is possible.

• Direct examinations of dirt/soil and dust samples cannot be performed reliably.

• Fungi usually cannot be identified to species and sometimes not even to genus with this method. For example, *Aspergillus* sp. and *Penicillium* sp. are normally reported together due to the similarities in spore morphology unless fruiting structures are present that allows for a better identification.

Materials used

 Sterile culturette/swab with appropriate buffer solution to collect and transport specimen

Latex/nitrile gloves

The swab sample taken from the cold air return grill on level one was positive for Aspergillus, Pithomyces/Ulocladium, pollen and fibrous particulate. Cleaning HVAC return and supply ductwork is advised.

Scope and purpose:

There are no thresholds for mold contamination levels. This is all individual difference and the health affects should be considered by a health specialist.

NOTE:

Please download the mold remediation specifications from our website <u>www.houseinvestigations.com</u>. The website has the full New York City Guidelines for mold remediation. This report is not attached to this report. If you cannot download this report call us at 216-924-8378 (cell) and we will send you a copy or email you a copy. You can also email Marko Vovk at <u>Clevelandmold@AOL.com</u> and request a copy.

VOC TESTING

Volatile Organic Compounds (VOCs) are gases given off by a number of indoor sources. Concentrations of most volatile organic compounds is higher in indoor than outdoor air.

Formaldehyde is one of the most common VOCs. Formaldehyde is a colorless gas with an unpleasant smell. It is common in many building materials such as plywood, particleboard, and glues. Formaldehyde can also be found in some drapes and textiles, in addition to certain types of foam insulation.

Other sources of VOCs include the burning of fuels such as gas, wood and kerosene, as well as tobacco products. VOCs can also come from personal care products (perfume and hair spray), cleaning agents, dry cleaning fluid, paints, lacquers, varnishes, hobby supplies, and from copying and printing machines.

VOCs can be released from products while you are using them and to some degree while they are in storage. However, the amounts given off tend to decrease as the product ages and dries out. VOCs include a variety of chemicals that can cause eye, nose and throat irritation, headache, nausea, dizziness, and skin problems. Higher concentrations may cause irritation of the lungs, as well as damage to the liver, kidney, or central nervous system.

Some VOCs are suspected to cause cancer in humans and have been shown to cause cancer in animals. The health effects caused by VOCs depend on the level and length of exposure.

At the time of inspection, we performed limited VOC testing. VOC analysis was done using the TO-15 canister. We performed a one-hour grab sample in the family room on level one. We have attached the laboratory results. You can compare data with NIOSH of OSHA exposure limits on the <u>http://cdc.gov/niosh/nmam/nmammenu.html</u> <u>or http://osha.gov/dts/sltc/methods/toc.html</u>

A total of 63 different compounds were tested. Some compound detected were, Freon 114 (1,2 Dichloretetrafluoroenthan). Ethanol, Isopropyl alcohol(2-Propanal),Freon 113 (1,1,2,Trichhlorotifluoroethan),Acetone, 2-Butanone (MEK), Ethyl acetate, Toluene, Xylene (Par & meta), 4- Ethyitoluene, 1,3,5 – Trimethylbenzene, 1,2,4 Trimethylbenzene, and many others at much lower levels as indicated in the attached laboratory results.

Note: Some Isopropyl alcohol may have been from one of our trace testing cases. We use Isopropyl alcohol to clean microbial testing equipment. For this reason the TO-15 test was performed prior to our microbial testing.

Note: Many room air purifiers help in the removal of indoor VOC's.

SILICA TESTING

We took a one four-grab air sample from the kitchen on level two. The test that was done was (*Silica*, *Crystalline Analysis of Dust Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified) issue 4, 3-15-03)Please refer to the attached laboratory analysis.*

This test can distinguish and analyze the three different crystalline forms (polymorphs), quartz, cristobalite, and tridymite. The bulk sample is analyzed first in order to determine whether interferences are present, and if so, which alternative analytical line is most appropriate Because the analysis is based on only one analytical peak and therefore requires collection of a settled dust or high volume bulk sample representative of the air samples taken. Such bulks may be difficult to obtain or difficult to match analytically in terms of particle size. Uses absorption corrections to account for low recoveries in some matrices. Absorption corrections can over- or under- compensate. Calls for use of NIST-traceable Standard Reference Material (SRM) to prepare quartz are cristobalite standards. (NIOSH provides tridymite SRM.) Uses peak height. Calibration curve indicated is linear model statistically weighted according to variance. Linear curve does not take into account reduced sensitivity at low analyte levels.⁷

The attached results show low levels of Silica, Quartz and Cristobalite Tridymite.

Full Particle Identification testing

One twelve by twelve inch sample was taken for full particle identification testing. The sample was taken at the back stair at the back door landing. The seven page lab report is attached. The following are the main contents identified in this sample. In the sample, the dust was brocken down to the percent of content.

Nuisance Particulate:

• Fibrous glass <1%

The Agency for Toxic Substances and Disease Registry (ATSDR) prepared this briefing paper to provide support for public health decisions regarding residences close to the World Trade Center site that may have elevated levels of fibrous glass in air and settled dust. Fibrous glass is a name for manufactured fibers made of glass. Other names for fibrous glass are fiberglass and glass fibers. There are two types of fibrous glass: continuous filament glass and glass wool. Continuous filament glass is used to make fiberglass fabrics that reinforce plastics, foams, and other materials in boats, automobile bodies, and other products. Glass wool is the principal material in fiberglass insulation widely used in U.S. houses and buildings. Fibrous glass belongs to a larger group of materials called synthetic vitreous fibers. Rock wool and slag wool are also synthetic vitreous fibers. They are made from rock or slag (a by-product of smelting processes) by a process similar to that used to make glass wool. Like glass wool, rock wool and slag wool are used for thermal and sound insulation. Air concentrations of fibers in workplaces producing or using materials made of fibrous glass or other synthetic vitreous fibers are generally below 0.1 fibers/cc for fibers with lengths > 5 µm and widths less than 5 µm. Higher concentrations have been measured when insulation materials were installed or removed in closed places. Indoor air concentrations of synthetic vitreous fibers have been estimated at 100 to 1,000 times less than concentrations in occupational workplaces producing or using materials made of fibrous glass or other synthetic vitreous fibers. Occupational exposure to synthetic vitreous fibers has been associated with acute irritation of the skin, eyes, and upper respiratory tract. Possible health hazards from long-term exposure to airborne fibrous glass, rock wool, or slag wool include effects associated with occupational exposure to asbestos (lung scarring, lung cancer, and mesothelioma), but available evidence from epidemiologic and animal studies indicates that these materials are less potent than asbestos. Epidemiologic studies of fibrous glass, rock wool, and slag wool workers provide no consistent evidence for increased risks of mortality from nonmalignant respiratory disease, lung cancer, or pleural mesothelioma. Lung tissue scarring, lung tumors, and mesotheliomas have been observed in rodents exposed to glass wool, rock wool, or slag wool fibers by intratracheal, intrapleural, or intraperitoneal administration, but these lesions were not observed in several studies of rodents exposed to glass wool fibers by inhalation. Results from recent animal research suggest that glass wool, rock wool, and slag wool are less potent than asbestos in producing tissue scarring and tumors due, at least in part, to their relatively rapid rates of dissolution in lung tissue. At chronic exposure levels below currently recommended occupational exposure limits of 1 fiber/cc,

⁷ US Department of labor

elevated risks for developing nonmalignant or malignant respiratory disease are not expected. The International Agency for Research on Cancer has most recently concluded (in 2001) that insulation glass wool, rock (stone) wool, and slag wool, as well as continuous filament glass, are not classifiable as to carcinogenicity to humans because of the inadequate evidence of carcinogenicity in humans and the relatively low biopersistence of these materials. As of April 2002, the monograph supporting the IARC conclusion has yet to be publicly released. The US Department of Health and Human Services' National Toxicology Program concluded in 1994 and 2001 that glass wool (respirable size) is reasonably anticipated to be a human carcinogen based on sufficient evidence of carcinogenicity in experimental animals. The most recently recommended acceptable exposure levels of airborne fibrous glass in US workplaces were adopted by the American Conference of Governmental Industrial Hygienists in 2001. The recommended Threshold Limit Values-Time-Weighted Averages (TLVs-TWAs) are 1 fiber/cc for continuous filament glass fibers, with an A4, not classifiable as a human carcinogen, designation, and 1 fiber/cc for glass wool, rock wool, slag wool, and special-purpose glass fibers, with an A3, confirmed animal carcinogen with unknown relevance to humans, designation Background and Environmental Exposures Following the collapse of the World Trade Center, the US Department of Health and Human Services (DHHS) collected air and dust samples inside and outside of selected residences around and near the World Trade Center site. One objective of this sampling was to determine if residents are being exposed to concentrations of materials that may be of public health concern. The samples were tested for asbestos, silica, gypsum, mica, fibrous glass, and calcite. Fibrous glass was detected in some of the air and dust samples. The Agency for Toxic Substances and Disease Registry (ATSDR), a DHHS agency, prepared this briefing paper to provide support for public health decisions regarding residences close to the World Trade Center site that may have elevated levels of fibrous glass in air and settled dust. Fibrous glass is a name for manufactured fibers made from hot and liquid (molten) glass or sand. The molten material is allowed to cool and solidify so that fibers are formed. Other names for fibrous glass are fiberglass and glass fibers⁸.

• mineral wool <1%

Slag wool is an example of how a single toxin can become a significant health hazard when inhaled deep into a rescuer's lungs. It comes from mineral wool, is water-repellent, fireproof and used in making insulation. It's an inorganic substance, a furnace product of molten rock formed by streams of hot air or steam, or spun on high-speed spinning wheels in a process that you could compare to making candy floss. The final product is a mass of finely intertwined fibers with a typical diameter of six to 10 micrometers. Tons of it was used in the construction of the World Trade Center. It can be absorbed into the body by inhalation, prolonged exposure can lead to longterm effects on the respiratory tract, and it's considered a possible carcinogen to humans. Any of these toxins can be deadly individually. Consider what they can do to a rescuer when mixed together and inhaled for several hours or days.

- Mold <1%
- pollen <1%

Common Particulate:

Cellulosic

- Processed 2%
- Natural <1%
- Wood <1%
- paper dust 1 %
- starch <1 %
- Rust (iron oxides) 3 %
- Paint dust 4 %
- Quartz 10 %
- Calcite / Dolomite 30 %
- clay and Feldspars 18%
- mica 3%

⁸ U.S. Department of Health and Human Services] Public Health Service Agency for Toxic Substances and Disease Registry June 14, 2002

• Gypsum / Anhydrite 15%

Unidentified:

• Inert Organics 4%

<u>Undefined</u>

• In organics 3%

Interesting fact pertaining to the full particle identification.:

When the WTC towers began to collapse, the 45,000–50,000 square foot floors, designed to bear 100 lbs. per square foot, were subjected to the force of 2,000 lbs. per square foot. The building's more than 200,000 tons of steel super structure, 43,600 massive windows (comprising 600,000 square feet of glass) and 423,000 cubic yards of concrete fell to the ground, including the North tower's 360' tall, 353-ton antenna.

Tim and his colleagues witnessed the devastating effects of the collapse of the World Trade Center structures. The massive weight and compounding energy caused each of the structures to collapse in less than 16 seconds, pulverizing the non-metallic elements of the towers into fine dust, with some particles less than 100 microns in diameter.

What Tim inhaled in that fine dust, as shown by researchers, included office contents, cleaning chemicals, copier and computer components, asbestos (chrysotile), lead, mercury, dioxins, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons, cement, glass fibers, slag wool, quartz, micas, talc, calcite, dolomite and gypsum.⁹

• In our limited testing, we identified most of the contaminants that Tim was exposed to. We did not identify the others because our limited and budget driven scope of work did not include testing for these. If desired additional testing can be done.

EXECUTIVE SUMMARY

It is my professional opinion that;

1. Some dust contamination exists. Dust content can be just normal house dust¹⁰I, building material dust, wind driven dust from many other sources¹¹,

⁹ By A. J. Heightman From the Editor: WTC Effects Deserve the World's Attention

¹⁰ The dust which collects in houses is composed of atmospheric dust combined with dust generated by the inhabitants, mostly from sloughed skin cells. It can be removed with a broom, dusting cloth, vacuum cleaner or by a swipe of one's hand. In average, approximately 6 mg/m²/day^[1] of house dust are formed in private households.

¹¹ The destruction of the World Trade Center (WTC) on 11 September 2001 caused the largest acute environmental disaster that ever has befallen New York City (Claudio 2001; Landrigan 2001). The combustion of more than 90,000 L of jet fuel at temperatures above 1,000°C released a dense and intensely toxic atmospheric plume containing soot, metals, volatile organic compounds (VOCs), and hydrochloric acid. The collapse of the towers pulverized cement, glass, and building contents and

biological, chemical and more. During our inspection dust was be seen in ductwork, interstitial wall spaces, above ceilings and stairwells. Dust can also be expected to be in other hidden, concealed and not readily accessible areas. During our analysis, as indicated in this report, only several dust testing parameters were included. Budget driven inspections will always limit the amount of environmental testing. Dust cleaning should be done to all HVAC systems, air shafts, common areas, and the interior condominium unit. Due to continued dust generation and dust infiltration from other sources, continual dust maintenance should be implemented. Good hygiene, filtration, and proper building maintenance should all help diminish indoor dust.

FACT: Many of contents found in the full particle identification analysis were similar to the World Trade Center dust. Many documented source indicate that this dust is dangerous and not healthy.

FACT: This building was exposed to of one of the biggest dust vents in history. Some dust from this event will most probably linger for decades. FACT: Although our testing results did not conclude in extreme amounts of contaminates, contaminates that were found can cause health issues. We are not medical professionals and all people have different tolerances.

- 2. Chrysotile asbestos¹² also known as white asbestos was found during the inspector's personal protection monitoring results. The back thirteen story stairwell was dust contaminated. A twelve by twelve inch floor dust sample was taken at the back door stair landing locations as indicated in the upper report. At this time, it is our professional opinion to perform additional asbestos testing in this building. Many New York City licensed asbestos consultants work in New York City. It is advised to employee one of these professionals to perform additional testing. EMLS laboratories are downtown and are capable in performing the analysis. We have attached the laboratory results.
- 3. Lead dust¹³ was encountered in the condominium unit. At this time, it is advised to clean dust with proper protocols to minimize exposure. We have attached the laboratory results.

generated thousands of tons of particulate matter (PM) composed of cement dust, glass fibers, asbestos, lead, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), organochlorine pesticides, and polychlorinated furans and dioxins (Clark et al. 2003; Lioy et al. 2002; McGee et al. 2003). These materials dispersed over lower Manhattan, Brooklyn, and for miles beyond. They entered nearby office, school, and residential buildings. Much remained at the site to form Ground Zero, a six-story pile of smoking rubble that burned intermittently for more than 3 months. <u>Environmental Health Perspectives</u> <u>Volume 112, Number 6, May 2004</u>

¹² Chrysotile asbestos, the fibrous variety of the mineral serpentine, is by far the most important type of asbestos. It forms in metamorphic rock, that is, rock that has been altered by intense heat and pressure. Chrysotile is a less dusty material and is more easily eliminated from the human body than <u>amphiboles</u>. It is also the only type of asbestos used today. The industry now only markets dense and non-friable materials in which the chrysotile fiber is encapsulated in cement or resin. From <u>Stacey Lloyd</u>,

¹³ Lead-based paint is a major source of lead poisoning for children and can also affect adults. In children, lead poisoning can cause irreversible brain damage and can impair mental functioning. It can retard mental and physical development and reduce attention span. It can also retard fetal development even at extremely low levels of lead. In adults, it can cause irritability, poor muscle coordination, and nerve damage to the sense organs and nerves controlling the body. Lead poisoning may also cause problems with reproduction (such as a decreased sperm count). It may also increase blood pressure. Thus, young children, fetuses, infants, and adults with high blood pressure are the most vulnerable to the effects of lead. Consumer Product Safety Commission

- 4. Testing for fungal spores was conducted using both viable and non-viable methods. The fungi encountered indoors were found to be minimal. We recommend you continue to control moisture events. We recommend you continue to control indoor humidity levels. We have attached the laboratory results.
- 5. The fibrous particulate and insect fragments were higher indoors than outdoors. Dust cleaning is advised.
- 6. At the time of inspection, airborne silica within the penthouse condominiums unit was found to be low. These conditions can change with time, opening windows, aerosolizing indoor dust and performing construction work. We have attached the laboratory results.
- 7. At the time of inspection, VOC's levels were not high. These conditions can change with time, opening windows, pressure changes, performing building maintenance and etc. We have attached the laboratory results and research results
- 8. The cell tower frequencies are unknown. At the time of inspection, testing for frequencies, EMFs and other was not performed. The exterior living area is very close to this cell tower and appears to be line with the horizon. Cell towers emit frequencies and waves in the horizon direction.
- 9. The cooling tower condition is unknown. At the time of inspection, testing for potential bacterial and fungal contaminates was not performed. The building management should keep records of these tests.
- 10. Our testing and inspection was time limited, budget driven and only a snap shot in time. Environmental conditions can change hourly, daily and seasonally. If desired additional testing can be done. Additional testing could repeat old tests with more samples taken, and include other tests such as; (Respirable Dust-NIOSH 600, Mercury badge or NIOSH 6900, PAH-NIOSH 5506, PCB-NIOSH 5503, and more.)
- 11. The building brick, cooling tower, roof, water tower, windows and etc will require future maintenance. It is advised to consult with building maintenance to determine if and substantial repairs will occur the may cause assessments.
- 12. The interior of this condominium unit appeared to be in adequate shape. Some repairs and maintenance can be expected.

DISCLAIMER

This inspection should be considered partial, time-limited, non-destructive, and strictly opinion oriented. All opinions were generated from visual and non-destructive testing. We can also at some future date, generate a more extensive report with other observed conditions from our field notes, digital photographs, and additional inspections. We can at some future date conduct a full building inspection of all building components such as attic, roof, plumbing, interiors, floors, walls, joists, beams, headers, stairs, exterior, grounds, garage, stairs, heating, cooling, plumbing, HVAC, electrical, appliances, lead paint, radon gas, IAQ, trace, environmental contaminants, pest, or any other building inspection related field constituents. We cannot be held liable for misunderstanding or the omission of any item pertaining to the above said structure. We encourage that you obtain second opinions as we do all our clients for all our inspections. This report is not intended for third parties and is not transferable. Third parties should obtain their own reports from their own inspectors. This report is not intended to be; a design mitigation repair, an exact repair estimate, an full environmental inspection, a load study, a determination of footing size or footing depth, a determination of possible future conditions, a determination of future wall settlement, a code

inspection, a full dust evaluation, and engineering calculation, a prediction of settlement, a run-off study, a boring inspection, a water table evaluation, and underground sewer exploration, basement seepage exploration a camera study, or any other technically exhaustive inspection that may require a more precise investigation. Furthermore, this inspection only includes visual conditions that can promote fungal development, fungal amplification, and musty odors. . These images are used to write this report. Furthermore, this is not a full microbial assessment. We can in the future conduct additional sampling for additional fees. I have taken over 500 digital images

If you have any questions pertaining to this matter, please feel free to contact me at 216-924-TEST / 216-431-TEST / 216-521-0790 FAX.

Respectfully submitted,

Though & Carl

Marko E. Vovk Civil Engineer / ASHI Certified / CIE / Building Scientist We have been paid a sum of 2,500 for this inspection, laboratory testing and report.

Report Date: Tuesday, September 12, 2006 Project Information: Level one main kitchen and small dining area.

Altitude: 30 (Feet) Barometric Pressure: 29.889 (in.Hg) Atmospheric Pressure: 14.680 (psia)

1. Main Kitchen level one

	STATE POINT DATA											
1	Air Flow	Dry	Wet	Relative	Humidity	Specific	Enthalpy	Dew	Density	Vapor	Absolute	
	(Standard)	Bulb	Bulb	Humidity	Ratio	Volume		Point		Pressure	Humidity	
	(cfm)	(°F)	(°F)	(%)	(gr/lb)	(cu.ft./lb)	(Btu/lb)	(°F)	(lb/cu.ft.)	(in.Hg)	(gr/cu.ft.)	
1	1,000	70.700	61.400	59.3	66.7	13.585	27.378	55.8294	0.0743	0.4493	4.910	

2. Dew Pointg 55.8 F

STATE POINT DATA										
Air Flow	Dry	Wet	Relative	Humidity	Specific	Enthalpy	Dew	Density	Vapor	Absolute
(Standard)	Bulb	Bulb	Humidity	Ratio	Volume		Point		Pressure	Humidity
(cfm)	(°F)	(°F)	(%)	(gr/lb)	(cu.ft./lb)	(Btu/lb)	(°F)	(lb/cu.ft.)	(in.Hg)	(gr/cu.ft.)
1,000	120.000	76.284	13.0	66.6	14.847	39.407	55.8000	0.0680	0.4488	4.488
Process: Connect States										
			Total	Sensible	Latent	Moisture		Sensible	Enthalpy/	
Start Point Name			Energy	Energy	Energy	Difference		Heat Ratio	Humidity Ratio	
		(Btu/hr)	(Btu/hr)	(Btu/hr)	(lb/hr)			(Btu/lb / lb/lb)		
Main Kitchen level one		54,130	54,181	-51	0.0		1.001	N/A		

3. Exterior N Ground Zero Side

Air Flow	Dry	Wet	Relative	Humidity	Specific	Enthalpy	Dew	Density	Vapor	Absolute
(Standard)	Bulb	Bulb	Humidity	Ratio	Volume	.,	Point		Pressure	Humidity
(cfm)	(°F)	(°F)	(%)	(gr/lb)	(cu.ft./lb)	(Btu/lb)	(°F)	(lb/cu.ft.)	(in.Hg)	(gr/cu.ft.)
1,000	78.600	68.589	60.6	89.2	13.858	32.837	63.8520	0.0731	0.5980	6.440
Process: Connect States										
		Total	Sensible	Latent	Moisture		Sensible	Enthalpy/		
Start Point Name			Energy	Energy	Energy	Difference		Heat Ratio	Humidity Ratio	
		(Btu/hr)	(Btu/hr)	(Btu/hr)	(lb/hr)			(Btu/lb / lb/lb)		
Exterior N Ground Zero Side			0	-1	1	0.0		-999.000	N/A	

4. Dew Point 63.8 F

STATE POINT DATA											
Air Flow	Dry	Wet	Relative	Humidity	Specific	Enthalpy	Dew	Density	Vapor	Absolute	
(Standard)	Bulb	Bulb	Humidity	Ratio	Volume		Point	-	Pressure	Humidity	
(cfm)	(°F)	(°F)	(%)	(gr/lb)	(cu.ft./lb)	(Btu/lb)	(°F)	(lb/cu.ft.)	(in.Hg)	(gr/cu.ft.)	
1,000	120.000	79.797	17.3	89.4	14.924	43.031	63.9000	0.0679	0.5990	5.991	
Process: Connect States											
			Total	Sensible	Latent	Moisture		Sensible	Enthalpy/		
Start Point Name			Energy	Energy	Energy	Difference		Heat Ratio	Humidity Ratio		
		(Btu/hr)	(Btu/hr)	(Btu/hr)	(lb/hr)			(Btu/lb / lb/lb)			
Exterior N Ground Zero Side			45,876	45,768	108	0.1		0.998	N/A		