Ambient and Indoor Sampling for Public Health Evaluations of Residential Areas Near World Trade Center, New York, New York (November 4 - December 11, 2001)

Results were compared to dust and air levels found in homes located in "non-impacted" areas and to indoor asbestos standards. At each sampled building, attempts were made to sample in a common area, two residences, and an adjacent outdoor location.

Dust:

If PLM was less than 1%*, confirmation by TEM was performed.

If TEM was less than 1%, no further action was taken.

If TEM was greater than 1%, further action was taken.

If PLM was greater than 1%, confirmation by TEM was unnecessary and further action was taken.

Air:

If PCM was less than 0.003 f/cc, no further action was taken.**

If PCM was greater than 0.003 f/cc, confirmation by TEM was performed.

If TEM was less than 0.01 f/cc, no further action was taken.

If TEM was greater than 0.01 f/cc (did not occur), further action would have been needed.

If PCM is greater than 0.01* f/cc, confirmation by TEM was performed.**

* A material is considered to be *asbestos-containing material* if it contains more than 1% asbestos using the PLM method.

When asbestos was detected, only Chrysotile asbestos was found.

** 0.003 is the upper range (0.001 - 0.003) of background indoor air fiber concentrations determined in non-impacted areas.

*** Asbestos clearance criteria. Rules of the City of New York, Title 15, Chapter 1.

Results for Asbestos in Air and Settled Dust

Building Number	Location	Asbestos in Dust	Asbestos in Dust	Fibers in Air	Asbestos in Air
Residential Buildings in Lower Manhattan					
	Building 1				
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]
1	Outside	ND	Not Sampled	0.001	NA
1	Common	Not Sampled	Not Sampled	<.001	NA
1	Res 1	ND	Not Sampled	0.006	<.001
1	Res 2	ND	Not Sampled	<.001	NA
Building 1 Notes: PCM results at Res 1 exceeded 0.003 f/cc. Asbestos fibers were not detected in this sample by TEM analysis.					
	There was not enough material left to analyze the outdoor and residential dust samples by TEM.				
	Building 2				
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]
2	Outside	<1	1.2	0.003	NA
2	Common	ND	Not Sampled	0.005	<.001
2	Res 1	ND	Not Sampled	<.001	NA
2	Res 2	ND	Not Sampled	0.002	NA
2	Window Sill	<1	<1	NA	NA
2	Outside X	1.3	NA	Not Sampled	NA
Building 2 Notes: DEP inspected and found asbestos-containing material in the outdoor location which was then professionally abated.					
	PCM results exceeded 0.003 f/cc in the common area. Asbestos fibers were not detected in this sample by TEM analysis.				
	There was not enough material left to analyze the indoor dust samples by TEM.				
	Building 3				
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]

3	Outside	Not Sampled	Not Sampled	<.001	NA					
3	Common	Not Sampled	Not Sampled	<.001	NA					
3	Res 1	Not Sampled	Not Sampled	<.001	NA					
3	Res 2	Not Sampled	Not Sampled	<.001	NA					
3	Res 2 X	Not Sampled	Not Sampled	<.001	NA					
	Building 4									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
4	Outside	Not Sampled	Not Sampled	0.001	NA					
4	Common	ND	<1	0.001	NA					
4	Res 1	ND	<1	<.001	NA					
4	Res 2	ND	<1	0.001	NA					
4	Outside X	Not Sampled	Not Sampled	<.001	NA					
4	Common X	Not Sampled	Not Sampled	0.001	NA					
	Building 5									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
5	Outside	3.4	NA	0.002	NA					
5	Common	Not Sampled	Not Sampled	0.002	NA					
5	Res 1	<1	<1	0.002	NA					
5	Res 2	ND	<1	<.001	NA					
5	Outside X	Not Sampled	Not Sampled	0.003	NA					
Building 5 Notes: Upon reinspection DEP found no visible dust in the outdoor area at this location.										
	Building 6									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
6	Outside	Not Sampled	Not Sampled	<.001	NA					
6	Common	ND	<1	<.001	NA					
6	Res 1	ND	ND	<.001	NA					
6	Res 2	ND	ND	<.001	NA					
6	Res 2 X	Not Sampled	Not Sampled	0.002	NA					
	Building 7									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
7	Outside	ND	1.7	<.001	NA					
7	Common	ND	ND	0.001	NA					
7	Res 1	ND	ND	0.001	NA					
7	Res 2	ND	ND	<.001	NA					
7	Window Sill	ND	ND	NA	NA					
Building 7 Notes: DEP reinspected, collected samples, and found no asbestos-containing material.										
	Building 8									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
8	Outside	Not Sampled	Not Sampled	0.001	NA					
8	Common	ND	ND	0.002	NA					
8	Res 1	ND	ND	0.003	NA					
8	Res 2	ND	ND	0.002	NA					
	Building 9									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
9	Outside	Not Sampled	Not Sampled	<.001	NA					
9	Common	ND	ND	0.001	NA					
9	Res 1	ND	<1	0.001	NA					
9	Res 2	ND	<1	0.003	NA					
9	Common X	Not Sampled	Not Sampled	0.001	NA					
	Building 10									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
10	Outside	ND	ND	0.001	NA					
10	Common	ND	1.5	0.002	NA					

10	Res 1	ND	ND	0.001	NA					
10	Res 2	ND	ND	0.001	NA					
Building 10 Notes: The original sample from this location was re-analyzed and found to contain asbestos at levels less than 1% by TEM analysis;										
	DOH and DEP inspected the common area based on the original result and found no visible dust at this location.									
	Building 11									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
11	Outside	Not Sampled	Not Sampled	<.001	NA					
11	Common	ND	ND	<.001	NA					
11	Res 1	ND	<1	<.001	NA					
11	Res 2	ND	1.5	<.001	NA					
11	Common X	Not Sampled	Not Sampled	<.001	NA					
Building 11 Notes: Residence 2 was unoccupied when tested and referred to DEP for reinspection.										
	According to the landlord the apartment was cleaned prior to reoccupancy.									
	Building 12									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
12	Outside	Not Sampled	Not Sampled	<.001	NA					
12	Common	ND	ND	<.001	NA					
12	Res 1	ND	ND	0.001	NA					
12	Res 2	ND	ND	<.001	NA					
	Building 13									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
13	Outside	Not Sampled	Not Sampled	0.001	NA					
13	Common	ND	ND	0.001	NA					
13	Res 1	ND	ND	0.003	NA					
13	Res 2	ND	ND	0.002	NA					
	Building 14									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
14	Outside	Not Sampled	Not Sampled	<.001	NA					
14	Common	ND	ND	0.003	NA					
14	Res 1	ND	ND	0.001	NA					
14	Res 2	ND	ND	<.001	NA					
14	Res 1 X	Not Sampled	Not Sampled	<.001	NA					
	Building 15									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
15	Outside	ND	1.9	<.001	NA					
15	Common	ND	ND	0.001	NA					
15	Res 1	ND	<1	<.001	NA					
15	Res 2	ND	ND	<.001	NA					
Building 15 Notes: DEP inspected and found asbestos-containing material which was then professionally abated.										
	Building 16									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
16	Outside	ND	ND	<.001	NA					
16	Common	ND	ND	<.001	NA					
16	Res 1	Not Sampled	Not Sampled	Not Sampled	NA					
16	Res 2	ND	ND	<.001	NA					
16	Res 2 X	ND	NA	Not Sampled	NA					
	Building 17									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
17	Outside	Not Sampled	Not Sampled	<.001	NA					
17	Common	ND	ND	<.001	NA					
17	Res 1	ND	ND	<.001	NA					
17	Res 2	ND	ND	<.001	NA					

	Building 18									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
18	Outside	ND	ND	<.001	NA					
18	Common	ND	ND	<.001	NA					
18	Res 1	ND	ND	0.002	NA					
18	Res 2	ND	ND	0.002	NA					
	Building 19									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
19	Outside	ND	Not Sampled	<.001	NA					
19	Common	ND	ND	overloaded	<.006					
19	Res 1	ND	ND	<.001	NA					
19	Res 2	ND	ND	<.001	NA					
Building 19 Notes:	There was not enough material left to analyze the outdoor dust sample by TEM.									
	The overloaded air sample was analyzed by TEM and no asbestos fibers were detected.									
	Building 20									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
20	Outside	Not Sampled	Not Sampled	<.001	NA					
20	Common	ND	ND	<.001	NA					
20	Res 1	ND	ND	<.001	NA					
20	Res 2	ND	ND	<.001	NA					
20	Outside X	Not Sampled	Not Sampled	<.001	NA					
	Building 21									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
21	Outside	Not Sampled	Not Sampled	<.001	NA					
21	Common	ND	ND	<.001	NA					
21	Res 1	ND	ND	<.001	NA					
21	Res 2	ND	ND	<.001	NA					
	Building 22									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
22	Outside	ND	ND	<.001	NA					
22	Common	ND	ND	0.001	NA					
22	Res 1	ND	ND	<.001	NA					
22	Res 2	ND	ND	<.001	NA					
22	Res 2 X	Not Sampled	Not Sampled	<.001	NA					
	Building 23									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
23	Outside	Not Sampled	Not Sampled	<.001	NA					
23	Common	ND	ND	<.001	NA					
23	Res 1	ND	ND	<.001	NA					
23	Res 2	ND	ND	<.001	NA					
	Building 24									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
24	Outside	ND	ND	0.002	NA					
24	Common	ND	<1	0.001	NA					
24	Res 1	ND	ND	0.001	NA					
24	Res 2	ND	ND	0.005	<.001					
24	Res 2 X	Not Sampled	Not Sampled	0.005	<.001					
Building 24 Notes:	PCM results exceeded 0.003 f/cc in Residence 2 in two samples;									
	Asbestos fibers were not detected in either sample by TEM analysis.									
	Building 25									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
25	Outside	Not Sampled	Not Sampled	<.001	NA					
25	Common	ND	ND	<.001	NA					

25	Res 1	ND	ND	<.001	NA					
25	Res 2	ND	ND	0.001	NA					
	Building 26									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
26	Outside	Not Sampled	Not Sampled	0.001	NA					
26	Common	ND	ND	0.004	<.001					
26	Res 1	ND	ND	0.001	NA					
26	Res 2	ND	ND	0.012	<.001					
Building 26 Notes: PCM results exceeded 0.003 f/cc in the common area and Residence 2;										
	Asbestos fibers were not detected in either sample by TEM analysis.									
	Building 27									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
27	Outside	ND	<1	<.001	NA					
27	Common	ND	<1	<.001	NA					
27	Res 1	ND	<1	<.001	NA					
27	Res 2	ND	ND	<.001	NA					
	Building 28									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
28	Outside	ND	ND	<.001	NA					
28	Common	ND	ND	0.001	NA					
28	Res 1	ND	Not Sampled	<.001	NA					
28	Res 2	ND	ND	0.002	NA					
Building 28 Notes: There was not enough material left to analyze the Residence 1 dust sample by TEM.										
	Building 29									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
29	Outside	ND	ND	<.001	NA					
29	Common	ND	ND	<.001	NA					
29	Res 1	ND	ND	<.001	NA					
29	Res 2	ND	ND	<.001	NA					
	Building 30									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
30	Outside	Not Sampled	Not Sampled	Not Sampled	NA					
30	Common	Not Sampled	Not Sampled	Not Sampled	NA					
30	Res 1	ND	ND	<.001	NA					
30	Res 2	ND	ND	<.001	NA					
Comparison Buildings Above 59th Street										
	Building 31									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
31	Outside	Not Sampled	Not Sampled	<.001	NA					
31	Common	ND	ND	<.001	NA					
31	Res 1	ND	ND	<.001	NA					
31	Res 2	ND	ND	<.001	NA					
31	Outside X	Not Sampled	Not Sampled	0.001	NA					
	Building 32									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
32	Outside	Not Sampled	Not Sampled	<.001	NA					
32	Common	ND	ND	0.002	NA					
32	Res 1	ND	ND	<.001	NA					
32	Res 1 X	Not Sampled	Not Sampled	0.001	NA					
	Building 33									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					

33	Outside	Not Sampled	Not Sampled	Not Sampled	NA					
33	Common	Not Sampled	Not Sampled	Not Sampled	NA					
33	Res 1	ND	ND	<.001	NA					
	Building 34									
		PLM [%]	TEM [%]	PCM [f/cc]	TEM [f/cc]					
34	Outside	Not Sampled	Not Sampled	<.001	NA					
34	Common	ND	ND	<.001	NA					
34	Res 1	ND	Not Sampled	0.002	NA					
34	Res 1 X	Not Sampled	Not Sampled	0.003	NA					
Building 34 Notes: There was not enough material left to analyze the Residence 1 dust sample by TEM.										
Notes										
	Definitions of Abbreviations:									
	PLM is Polarized Light Microscopy									
	% is percent of volume									
	TEM is Transmission Electron Microscopy									
	PCM is Phase Contrast Microscopy									
	f/cc is fibers per cubic centimeter									
	Res 1 is Residential Unit 1									
	Res 2 is Residential Unit 2									
	X is a co-located sample									
	ND is not detected									
	NA is not analyzed									
	ACM is asbestos-containing material									
	DEP is the New York City Department of Environmental Protection									
	DOH is the New York City Department of Health									
	Samples were not taken in some locations because:									
		No dust available to collect;								
		No consent from building management to do monitoring in outdoor or common areas;								
		Unknown, reason was not specified on survey or chain of custody form.								