
**130 Liberty Street
New York, New York**

**Supplemental Investigation
Summary Report**

Building Netting Sampling Summary Results

Prepared for:

Lower Manhattan Development Corporation

One Liberty Plaza, 20th Floor, New York, NY 10006



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1. INTRODUCTION

TRC Environmental Corporation (TRC) was contracted and authorized by the Lower Manhattan Development Corporation (LMDC) to conduct a preliminary investigation of netting that envelopes North, East, and West sides of the building located at 130 Liberty Street (the Building). The intent of the investigation is to address handling and disposal options for the Building netting during the Building deconstruction process. This Summary Report presents the results of the Building netting testing.

1.1 Background

The Building is located across the street and south of the WTC site and is a former office building comprised of 40 stories and approximately 1.5 million square feet. The massive debris generated from the collapse of the South Tower of the WTC broke approximately 1,500 windows, curtain wall, and structural components creating a gash (Gash Area) in the Building's exterior exposing portions of the interior north side of the Building between the 7th and 24th floors. The debris demolished the plaza in front of the Building, exposing the basement and subbasement (Basement A and Basement B) areas and ruptured a diesel fuel tank in the basement, the contents of which burned. The Gash Area and broken windows exposed the interior of the Building to the elements.

As a result of the collapse of the World Trade Center (WTC) on September 11, 2001, a combination of soot, dust, dirt, debris, and contaminants settled in and on the Building. See the *Initial Building Characterization Report* (The Louis Berger Group, September 2004) for additional background information.

Subsequent to the events of September 11, 2001, netting was installed over the face of the East, West and North (with exception of the Gash Area) sides of the building. This report describes results of the sampling and analysis of the exterior netting.

1.2 Scope of Work

This investigation summary presents the results of inspection and sampling performed by TRC of the Building netting that covers the North, East, and West Building facades.

For the building netting at 130 Liberty Street, TRC collected ten representative surface microvacuum samples for asbestos and ten representative wipe samples for lead, silica, and man-made vitreous fibers (MMVF) analysis. Ten bulk samples were collected for dioxins and polycyclic aromatic hydrocarbons (PAHs). Asbestos, lead, silica, PAHs, dioxins, and MMVF make up the United States Environmental Protection Agency

(USEPA) contaminants of potential concern (COPCs) list.

As part of the preliminary waste characterization, TRC collected two composite samples for Toxicity Characteristic Leaching Protocol (TCLP) and Resource Conservation and Recovery Act (RCRA) characteristics.

1.3 Previous Environmental Studies

Several studies concerning WTC-related contaminants have been performed by, or with the review of, the federal, state, and local regulatory authorities in the aftermath of the events of September 11, 2001. In particular, the USEPA has been responsible for studies associated with the development of the EPA's list of COPCs, as discussed in this section.

The USEPA COPC Committee developed, in their *World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health Based Benchmarks, Peer Review Draft (September 2002)*, a tiered approach to evaluate the health risks posed by contaminants that might be present in an indoor environment (air and settled dust) for residential reoccupancy. For each COPC, three levels were developed:

Tier I - Level above which, after elimination of potential indoor sources (combustion by-products, stored chemicals, etc.), aggressive clean-up action should be taken expeditiously along with follow-up sampling to confirm attainment of Tier III level.

Tier II - Range where diligent cleaning should continue, after elimination of potential indoor sources (combustion by-products, stored chemicals, etc.), with follow-up sampling to confirm attainment of Tier III level.

Tier III - Level below which the risk is negligible or consistent with the New York City background level found in the USEPA Background Study as identified below.

These levels were established for residential reoccupancy. The Tier I screening level was intended to be protective of a resident who may have been exposed to WTC-related contaminants in their residence for one year. The Tier III clearance level was intended to be protective of a resident who is exposed to WTC-related contaminants in their residence for 30 years, which was the upper-bound estimate for residency in one dwelling. For COPCs in settled dust, the tiered values are as follows:

COPC	Settled Dust		
	Tier I	Tier II	Tier III
Asbestos (str/cm ²)	>30,000	30,000 to background	Background
Lead (ug/ft ²)	>40	40 to 25 (or background)	<25 (or background)
Silica	--	Above background	Background
PAH (mg/m ²)	>9	9 to 0.3 (or background)	<0.3 (or background)
MMVF (str/cm ²)	>100,000	100,000 to background	Background
Dioxin (ng/m ²)	>120	120 to 4 (or background)	<4 (or background)

These levels were developed to be risk-based levels for residential settings. While the USEPA residential benchmark and background concentrations relate to residential settings and are not directly applicable to a commercial deconstruction project, these studies can be used to put the results of this supplemental investigation into relative context.

Subsequent to peer review of the September 2002 report, the USEPA COPC Committee developed, in their *World Trade Center Indoor Environmental Assessment: Selecting Health-Based Benchmarks (May 2003)* report, health based benchmarks that reflected only the Tier III levels.

The USEPA, Region 2, also developed the *World Trade Center Background Study Report (April 2003)*. The objective of this study was to determine and/or estimate indoor baseline levels or background concentrations for the presence of specific contaminants in residential buildings unaffected by the WTC disaster. The average background concentrations for COPCs in settled dust on hard surfaces are summarized below.

COPC	Average Background
Asbestos (str/cm ²)	6,192
Lead (ug/ft ²)	1.78
Silica (ug/ft ²)	79.6 (expressed as quartz)
PAH (mg/m ²)	<0.29
MMVF (str/cm ²)	52
Dioxin (ng/m ²)	0.693

Based on the text by Millette and Hays, *Settled Asbestos Dust Sampling and Analysis*, levels of asbestos in settled dust as determined by the microvacuum techniques are considered low if less than 1,000 str/cm². Levels above 10,000 str/cm² are considered generally above background. Levels above 100,000 str/cm² are considered high and in the range of significant accidental release from an abatement site.

1.4 Purpose and Objectives

The objective of the Building netting investigation is to provide preliminary information relative to the concentrations of COPCs.

This investigation is intended to assist in determining what measures and protocols may be required in support of the 130 Liberty Street cleaning and deconstruction plan. In particular, the results of the investigation are intended to provide reference information allowing for informed decisions to be made regarding appropriate cleaning and deconstruction methods. These decisions include the development and implementation of engineering controls to contain the work zone (i.e., to ensure no exposure to the surrounding community during the cleaning and deconstruction) and appropriate methods for the disposal or recycling of materials generated by the cleaning and deconstruction activities. Using the available characterization results, LMDC, its consultants, and the selected deconstruction contractor can develop and implement appropriate deconstruction protocols and safety precautions for the cleaning and deconstruction process to ensure the health and safety of workers and the surrounding community.

2. METHODOLOGY

This section presents the methodologies implemented for the Building netting characterization. These tasks were implemented in general accordance with the *Sampling Analysis and Quality Assurance Project Plan* (SAQAPP) developed by TRC dated November 15, 2004.

TRC collected representative microvacuum or wipe samples for the COPCs from the dust that settled on the Building netting. Building netting sampling was conducted on the West, East, and, North Building faces at street level. Samples collected from higher elevations were done via the use of a scaffold and only on the Building’s West side.

Asbestos and MMVF wipe samples were collected following American Society for Testing and Materials (ASTM) 6480-99. Lead and silica wipe samples were collected following the United States Department of Housing and Urban Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Appendix 13.1. Dioxin and PAH samples were collected following ASTM D6661-01. Samples were analyzed as per the following methods:

	Analytical Method
COPC	
Asbestos	ASTM D5755-03
Lead	ICP 6010B
Silica	NIOSH 7500 (XRD)
Dioxin	USEPA SW 846 8290
PAH	USEPA SW 846 8270C
MMVF	EMSL MSD 0310
TCLP	
Volatiles	SW 846 8260B
Semi-volatiles	SW 846 8270C
Metals	SW 846 6010B & 7470A
Pesticides	SW 846 8081A
Herbicides	SW 846 8151A
RCRA	
Ignitability	SW 846 1010
Corrosivity	SW 846 9045C
Reactive Cyanide	SW 846 CHAP7
Reactive Sulfide	SW 846 CHAP7

Asbestos, lead, silica, and MMVF samples were delivered to the EMSL Analytical Inc. laboratory, an independent New York State Department of Health certified laboratory (NYSDOH ELAP # 11506). PAH and dioxin samples were delivered to Paradigm

Analytical Labs in Wilmington, North Carolina (NYSDOH ELAP # 11685). TCLP and RCRA characteristics samples were delivered to Accutest Laboratories, located in Dayton, New Jersey, an independent laboratory certified under the New York State Department of Health Environmental Laboratory Approval Program (NYSDOH ELAP # 10983).

3. RESULTS

3.1 Asbestos

Ten asbestos microvacuum and two blank samples were collected from street level and at higher elevations designated by the Building floor as detailed below. Samples were collected from Zone 6, exterior façade building materials, as described in the *Initial Building Characterization Report*.

Asbestos Sample ID	Floor	Location
1-021005 MICRO VAC-S/E CATWALK-KD	1	South East corner - catwalk
2-021005 MICRO VAC-N/E CATWALK-KD	1	North East corner - catwalk
3-021005 MICRO VAC-NORTH BSMT "B"-KD	B	North side basement level "B"
4-021005 MICRO VAC-NORTH BSMT "A"-KD	A	North side street level "A"
5-021005 MICRO VAC-S/W CATWALK-KD	1	South West corner - catwalk
1-ASB-FL40-033005	40	West side between columns 6 and 7
2-ASB-FL36-033005	36	West side between columns 6 and 7
3-ASB-FL32-033005	32	West side between columns 6 and 7
4-ASB-FL16-033005	16	West side between columns 6 and 7
5-ASB-FL8-033005	8	West side between columns 6 and 7

Sample results ranged from less than 627 structures per square centimeter (str/cm²) to 439,000 str/cm², with an arithmetic mean of 102,504 str/cm². Three of the ten samples exceeded the Tier I Indoor Assessment value of 30,000 str/cm². Sample results are provided in the attached Table 1.

A limited data validation was performed the microvacuum samples in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review EPA 540/R-99/008* (October 1999). In general, the data appear to be valid as reported and may be used for decision-making purposes.

TRC reviewed the *Initial Building Characterization Report*. This report presents the results of 40 supplemental screening samples of the settled dust from porous and non-porous surfaces and analyzed for asbestos using TEM. The samples were collected from various locations within the Building, including, but not limited to carpeting, counters, vent units, and above the ceiling tiles. The results revealed detectable levels of asbestos above the residential background level of 6,192 structures/cm² identified in the EPA

World Trade Center Background Study Report Interim Final (April 2003). The highest concentrations of asbestos were identified in the first and second floors, fifth floor mechanical room, and the 40th/41st floor mechanical room. Asbestos was detected in dust at concentrations in excess of 6,192 structures/cm² in 24 of the 31 floors sampled by TEM analysis (77%). The samples containing asbestos ranged from a minimum concentration of less than 891 structures/cm² (from Floors 5, 24, 25, 28, 34, and 41) to a maximum concentration of 4,879,200 structures/cm² (from Floor 2). These results are generally greater than the netting investigation results.

3.2 Lead

Ten wipe and one duplicate sample was collected from street level and at higher elevations designated by the Building floor as detailed in Section 3.1. The sample results ranged from 173 ug/ft² to 948 ug/ft² with an arithmetic average of 444 ug/ft². All ten samples exceeded the Tier I Indoor Assessment value of 40 ug/ft². Sample results are provided in the attached Table 2.

A limited data validation was performed the samples in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (July 2002). In general, the data appear to be valid as reported and may be used for decision-making purposes.

According to the *Initial Building Characterization Report*, there was significant variation in the lead testing results collected from the Building dust samples. Lead was detected in 122 of 125 samples tested. Lead results of samples collected above the plenum ranged from 350 ug/m² (32.52 ug/ft²) to 10,900 ug/m² (1,012.6 ug/ft²). Lead results from samples collected below the plenum ranged from 150 ug/m² (13.92 ug/ft² - in Zone 3) to 101,000 ug/m² (9,383.2 ug/ft² - in Zone 1). These results are generally greater than the results of this investigation.

3.3 Silica

Ten wipe and one duplicate sample was collected from street level and at higher elevations designated by the Building floor as detailed in Section 3.1. The silica sample results ranged from 0.1 milligrams per square foot (mg/ft²) to 1,238 mg/ft² with an arithmetic average of 201.3 mg/ft². Sample results are provided in the attached Table 3.

A limited data validation was performed the samples in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data*

Review (July 2002). In general, the data appear to be valid as reported and may be used for decision-making purposes.

According to the *Initial Building Characterization Report*, there was significant variation in the quartz, a natural form of silica, testing results collected from the Building dust samples. Quartz was detected in 115 of the 118 samples tested. The samples containing quartz ranged from a low concentration of 500 ug/m² (0.4645 mg/ft² - from Zone 2) to a maximum concentration of 10,000,000 ug/m² (929.03 mg/ft² - in Zone 1). These results are greater than the netting investigation results.

3.4 Dioxin

Ten wipe and one duplicate sample was collected from street level and at higher elevations designated by the Building floor as detailed in Section 3.1. The World Health Organization (WHO) has established a convention whereby the results for all dioxin compounds are expressed as a toxicity equivalency concentration (TEQ). The TEQ is based upon toxicity equivalent factors (TEF) referenced to 2,3,7,8 TCDD, which is the most toxic of the dioxin compounds. The TEQ is computed by multiplying the concentration of each compound by the TEF. The products of the individual concentrations and the TEFs are then added to obtain the TEQ for that sample. For this investigation, one-half of the detection limit was used for compounds that were not detected. TEQ results ranged from 0.21 nanograms per square meter (ng/m²) to 2.56 ng/m² with an arithmetic average of 1.32 ng/m². These results are all below the Tier III Indoor Assessment value of 4 ng/m². Sample results are provided in the attached Table 4.

A limited data validation was performed the samples in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review EPA 540/R-99/008* (October 1999). In general, the data appear to be valid as reported and may be used for decision-making purposes. For samples collected in February and sample 4A-Dix-FL16-033005, all positive results for 2,3,7,8-TCDF above the reporting limit were confirmed on a secondary column. The confirmatory result for 2,3,7,8-TCDF was used in the calculation of the TEQ as the initial result may be affected by coeluting interference. The TEQ for these samples was recalculated during the validation process, which are reflected in Table 4.

According to the *Initial Building Characterization Report*, there was significant variation in the dioxin testing results collected from the Building dust samples. Dioxin was detected in all 124 samples tested. The samples containing dioxin ranged from a low concentration of 1 ng/m² (from Zone 2) to a maximum concentration of 214 ng/m² (in

Zone 5). These results are consistent with the highly variable nature of WTC dust. Results of this study were higher than the concentrations found in this investigation by at least one order of magnitude.

3.5 Polycyclic Aromatic Hydrocarbons (PAHs)

Ten wipe and one duplicate sample was collected from street level and at higher elevations designated by the Building floor as detailed in Section 3.1. The carcinogenic PAHs results were used to calculate the benzo(a)pyrene (BaP) equivalent to measure the relative potency. The BaP equivalent is computed by multiplying the concentration of each compound by the TEF. The products of the individual concentrations and the TEFs are then added to obtain the BaP equivalent for that sample. For this investigation, one-half of the detection limit was used for compounds that were not detected. BaP equivalent results ranged from 21.77 micrograms per square meter (ug/m^2) to 74.48 ug/m^2 with an arithmetic average of 33.29 ug/m^2 . All ten sample results were below the Tier III Indoor Assessment value of 300 ug/m^2 . Sample results are provided in the attached Table 5.

A limited data validation was performed the samples in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review EPA 540/R-99/008* (October 1999). In general, the data appear to be valid as reported and may be used for decision-making purposes. Potential low bias exists for all samples due to an elevated cooler temperature and, for the samples collected in February, a slight holding time exceedance. As a result, positive and non-detect results for all PAHs in all samples were qualified as estimated (J/UJ).

According to the *Initial Building Characterization Report*, there was significant variation in the PAH testing results collected from the Building dust samples. The samples containing PAH ranged from a low concentration of 3 ug/m^2 (from Zone 1) to a maximum concentration of 11,555 ug/m^2 (in Zone 2). These results are generally greater than the results of this investigation.

3.6 Man Made Vitreous Fibers (MMVF)

Ten MMVF wipe and one duplicate sample were collected from street level and at higher elevations designated by the Building floor as detailed in Section 3.1. The sample results ranged from less than 0.014 str/cm^2 to 162.04 str/cm^2 with an arithmetic average of 42.9 str/cm^2 . Results and the average were at least three orders of magnitude less than the Tier

I Indoor Assessment of 100,000 str/cm². Sample results summary is provided in the attached Table 6.

A limited data validation was performed the samples in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review EPA 540/R-99/008* (October 1999). In general, the data appear to be valid as reported and may be used for decision-making purposes. As a result of the detected MMVF relative percent difference (RPDs) exceeding the acceptance limits between the field duplicate pair, the positive results for fibrous glass and total MMVF were qualified as estimated (J).

3.7 Toxicity Characteristic Leaching Protocol (TCLP)

Two composite bulk sample of the Building netting was collected. Results were compared to 40 CFR 261.24 Maximum Concentration of Contaminants for the Toxicity Characteristics. No results exceed the laboratory reporting limit. TCLP samples results are presented in Table 7.

A limited data validation was performed on the samples in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review EPA 540/R-99/008* (October 1999) and the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (July 2002). In general, the data appear to be valid as reported and may be used for decision-making purposes. For sample 1-TCLP-COMP-033005 potential low biases exists for all parameters results due to holding time and/or cooler temperature exceedance. These qualifications have a minor impact on the data usability since the affected results were significantly below the project action levels. Due to the temperature exceedance, positive and nondetect results were qualified as estimated (J/UJ).

3.8 Resource Conservation and Recovery Act (RCRA) Characteristics

Two composite bulk sample of the Building netting was collected. Results were compared to 40 CFR 261 parts 21 through 23. In addition, the cyanide and sulfide reactivity results were compared to SW 846 Chapter 7, Characteristics Introduction and Regulatory Definitions Interim Guidance Values. The RCRA Characteristic sample results did not exhibit the characteristics of reactivity, ignitability, or corrosivity. RCRA characteristic samples results are presented in Table 8.

A limited data validation was performed on the samples in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*

EPA 540/R-99/008 (October 1999) and the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (July 2002). In general, the data appear to be valid as reported and may be used for decision-making purposes. Potential uncertainty exists for the corrosivity results in all samples and potential low bias exists for the reactive cyanide and reactive sulfide results sample NETTING COMPOSITE-021505 due to a holding time exceedance. For sample 1-TCLP-COMP-033005, potential low bias exists for the remaining parameters results due to holding time and/or cooler temperature exceedance. With the exception of reactive sulfide, these qualifications have a minor impact on the data usability since the affected results were significantly below the project action levels. The reactive sulfide was only two times less than the project action level in both samples and may have been adversely affected by the holding time exceedance; this result should be used with caution in the decision making purposes.

4. FINDINGS

Building netting sample results were compared to criteria provided in Section 1.2 and 1.3 and identified on the bottom of each table as well as the results of previous studies.

This investigation has identified average asbestos and lead concentrations on the Building netting that exceed the benchmark criteria provided in the May 2003 and September 2002 USEPA WTC Indoor Environmental Assessment studies, April 2003 Background Study, and are generally consistent (although generally lower) with the concentrations identified in the *Initial Building Characterization Report*.

Silica concentrations on the Building surface exceeded the April 2003 Background Study, and are generally consistent (although generally lower) with the concentrations identified in the *Initial Building Characterization Report*. Dioxin TEQs, PAH BaP equivalents, and MMVF were all below the Tier I Indoor Assessment Values, which represent a one-year risk-based residential value. Dioxins and PAHs were relatively lower than the concentrations identified in the *Initial Building Characterization Report*.

Overall, samples collected at elevation (above the 8th Floor) were found to be lower on average (with the exception of PAH samples) than those collected at ground level or lower.

TCLP and RCRA Characteristics sampling results were below the applicable 40 CFR 261 and SW 846 Chapter 7 criteria.

While the USEPA residential benchmark and background concentrations relate to residential settings and are not directly applicable to a commercial deconstruction project, these studies can be used to put the results of this supplemental investigation into relative context.

5. CONCLUSIONS AND RECOMMENDATIONS

COPCs were found within the dust on the Building netting surfaces. Concentrations were generally lower than the COPC levels for the dust in the accessible areas discussed in the *Initial Building Characterization Report*, however multiple samples and some arithmetic average results exceeded the USEPA residential health-based benchmark and background criteria. The results of the sampling and testing performed for this Supplemental Investigation revealed levels of contaminants that should be considered in connection with the deconstruction of the Building. Therefore, TRC recommends review of the results by federal, state, and local regulators and that the Building netting be handled in a manner that complies with applicable laws.

6. REFERENCES

Initial Building Characterization Study Report, 130 Liberty Street, New York, New York. The Louis Berger Group, Inc., September 14, 2004.

Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part A). Interim Final. Office of Emergency and Remedial Response, Washington, D.C. United States Environmental Protection Agency, December 1989.

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Settled Asbestos Dust Sampling and Analysis. James R. Millette, Steven M. Hays, 1994.

World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Contaminants of Potential Concern (COPC) Committee. United States Environmental Protection Agency, May 2003.

World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Contaminants of Potential Concern (COPC) Committee of the World Trade Center Indoor Air Taskforce Working Group. Peer Review Draft, September 2002.

World Trade Center Background Study Report, Interim Final. United States Environmental Protection Agency, Region 2, April 2003.

Building Netting Samples
LMDC
130 Liberty Street
New York, New York
April 22, 2005

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Table 1
 Exterior Netting - Asbestos Microvacuum Sampling Results
 Asbestos Microvacuum (ASTM D5755-03)

LMDC
 130 Liberty Street
 New York, New York
 April 22, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	ASBESTOS (structures/cm ²)
1-021005 MICRO VAC-S/E CATWALK-KD	030503485-0001	2/10/2005	MV	1	South East corner - catwalk	439,000
2-021005 MICRO VAC-N/E CATWALK-KD	030503485-0002	2/10/2005	MV	1	North East corner - catwalk	439,000
3-021005 MICRO VAC-NORTH BSMT "B"-KD	030503485-0003	2/10/2005	MV	B	North side basement level "B"	8,360
4-021005 MICRO VAC-NORTH BSMT "A"-KD	030503485-0004	2/10/2005	MV	A	North side street level "A"	23,000
5-021005 MICRO VAC-S/W CATWALK-KD	030503485-0005	2/10/2005	MV	1	South West corner - catwalk	96,100
6-021005 MICRO VAC-BLANK-KD	030503485-0006	2/10/2005	MV		BLANK	Blank
1-ASB-FL40-033005	030508387-0001	3/30/2005	MV	40	West side between columns 6 and 7	<627
2-ASB-FL36-033005	030508387-0002	3/30/2005	MV	36	West side between columns 6 and 7	14,700
3-ASB-FL32-033005	030508387-0003	3/30/2005	MV	32	West side between columns 6 and 7	<1260
4-ASB-FL16-033005	030508387-0004	3/30/2005	MV	16	West side between columns 6 and 7	<1570
5-ASB-FL8-033005	030508387-0005	3/30/2005	MV	8	West side between columns 6 and 7	3,150
6-ASB-BL-033005	030508387-0006	3/30/2005	MV		West side between columns 6 and 7	Blank

Arithmetic Mean (1/2ND)	<u>str/cm2</u> 102,504
May 2003 Benchmark ¹	n/a
April 2003 Background Assessment ²	6,192
<u>September 2002 WTC Indoor Assessment³</u>	
Tier I	>30,000
Tier II	>30,000 to background
Tier III	Background

References:

¹World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Contaminant Potential Concern (COPC) Committee. United States Environmental Protection Agency, May 2003.

²World Trade Center Background Study Report, Interim Final. United States Environmental Protection Agency, Region 2, April 2003.

³World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Contaminants of Potential Concern (COPC) Committee of the World Trade Center Indoor Air Taskforce Working Group. Peer Review Draft, September 2002.

Table 2
 Exterior Netting - Lead Microvacuum Sampling Results
 Lead Wipe (ICP 6010B)

LMDC
 130 Liberty Street
 New York, New York
 April 22, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	Lead (ug/ft2)	Lead (ug/m2)
1-Lead-020805	010500464-0001	2/8/2005	Wipe	1	South East corner - catwalk	603	6,491
2-Lead-020805	010500464-0002	2/8/2005	Wipe	1	North East corner - catwalk	649	6,986
3-Lead-020805	010500464-0003	2/8/2005	Wipe	B	North side basement level "B"	689	7,416
4-Lead-020805	010500464-0004	2/8/2005	Wipe	A	North side street level "A"	613	6,598
5-Lead-020805	010500464-0005	2/8/2005	Wipe	1	Above loading door S/W - catwalk	360	3,875
1-Lead-FL40-033005	010501109-0001	3/30/2005	Wipe	40	West side between columns 6 and 7	223	2,400
2-Lead-FL36-033005	010501109-0002	3/30/2005	Wipe	36	West side between columns 6 and 7	173	1,862
3-Lead-FL32-033005	010501109-0003	3/30/2005	Wipe	32	West side between columns 6 and 7	236	2,540
4-Lead-FL16-033005	010501109-0004	3/30/2005	Wipe	16	West side between columns 6 and 7	204	2,196
5-Lead-FL16-033005	010501109-0005	3/30/2005	Wipe	16	West side between columns 6 and 7	185	1,991
6-Lead-FL8-033005	010501109-0006	3/30/2005	Wipe	8	West side between columns 6 and 7	948	10,204

Arithmetic Mean	<u>ug/ft2</u> 444
May 2003 Benchmark ¹	25
April 2003 Background Assessment ²	1.78
<u>September 2002 WTC Indoor Assessment³</u>	
Tier I	>40
Tier II	40 to 25 (or background)
Tier III	<25 (or background)

J - Value is estimated due to a high recovery in the quantitation limit standard.

References:

¹World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Contaminants of Potential Concern (COPC) Committee. United States Environmental Protection Agency, May 2003.

²World Trade Center Background Study Report, Interim Final. United States Environmental Protection Agency, Region 2, April 2003.

³World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Contaminants of Potential Concern (COPC) Committee of the World Trade Center Indoor Air Taskforce Working Group. Peer Review Draft, September 2002.

Table 3
 Exterior Netting - Silica Wipe Sample Results
 Silica Wipe (NIOSH 7500, Issue 3)

LMDC
 130 Liberty Street
 New York, New York
 April 22, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	Silica (mg/ft ²)	Percent Silica
1-Silica-020805	040502295-0001	2/8/2005	Wipe	1	South East corner - catwalk	250.8	27.8
2-Silica-020805	040502295-0002	2/8/2005	Wipe	1	North East corner / catwalk	410.8	28.9
3-Silica-020805	040502295-0003	2/8/2005	Wipe	B	North side basement level "B"	90.0	26.9
4-Silica-020805	040502295-0004	2/8/2005	Wipe	A	North side street level "A"	7.2	3.0
5-Silica-020805	040502295-0005	2/8/2005	Wipe	1	SW corner catwalk - above loading dock	4.9	4.3
1-SIL-FL40-033005	040505350-0001	3/30/2005	Wipe	40	West side between columns 6 and 7	0.9	0.016
2-SIL-FL36-033005	040505350-0002	3/30/2005	Wipe	36	West side between columns 6 and 7	0.1	0.007
3-SIL-FL32-033005	040505350-0003	3/30/2005	Wipe	32	West side between columns 6 and 7	0.7	0.015
4-SIL-FL16-033005	040505350-0004	3/30/2005	Wipe	16	West side between columns 6 and 7	9.2	0.304
4A-SIL-FL16-033005	040505350-0005	3/30/2005	Wipe	16	West side between columns 6 and 7	8.2	0.204
5-SIL-FL8-033005	040505350-0006	3/30/2005	Wipe	8	West side between columns 6 and 7	1,238	27.8

Arithmetic Mean	<u>mg/ft²</u> 201.25
May 2003 Benchmark ¹	n/a
April 2003 Background Assessment ²	0.0796
<u>September 2002 WTC Indoor Assessment³</u>	
Tier I	--
Tier II	above background
Tier III	background

References:

- ¹ *World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks*. Contaminant Potential Concern (COPC) Committee. United States Environmental Protection Agency, May 2003.
- ² *World Trade Center Background Study Report, Interim Final*. United States Environmental Protection Agency, Region 2, April 2003.
- ³ *World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks*. Contaminants of Pot Concern (COPC) Committee of the World Trade Center Indoor Air Taskforce Working Group. Peer Review Draft, September 2002.

Table 4
 Exterior Netting - Dioxin Microvacuum Sample Results
 Dioxin/ Wipe (Method 8290)

LMDC
 130 Liberty Street
 New York, New York
 April 22, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	WHO TEQ (ND=1/2;
1-Dioxin-020605	G220-32-1C	2/10/2005	Wipe	1	1ST FL EXT BLDG. MESH/NET AROUND EXT	1.47
2-Dioxin-020605	G220-32-2C	2/10/2005	Wipe	1	1ST FL EXT BLDG. MESH/NET AROUND EXT	2.39
3-Dioxin-020605	G220-32-3C	2/10/2005	Wipe	B	BSMT "B" EXT BLDG. MESH/NET AROUND EXT	0.83
4-Dioxin-020605	G220-32-4C	2/10/2005	Wipe	A	BSMT "A" EXT BLDG. MESH/NET AROUND EXT	1.59
5-Dioxin-020605	G220-32-5E	2/10/2005	Wipe	1	1ST FL EXT BLDG. MESH/NET AROUND EXT	1.15
1-Dix-FL40-033005	G220-38-1B	3/30/2005	Wipe	40	West side between columns 6 and 7	0.55
2-Dix-FL26-033005	G220-38-2B	3/30/2005	Wipe	36	West side between columns 6 and 7	0.56
3-Dix-FL32-033005	G220-38-3B	3/30/2005	Wipe	32	West side between columns 6 and 7	0.58
4-Dix-FL16-033005	G220-38-4B	3/30/2005	Wipe	16	West side between columns 6 and 7	2.56
4A-Dix-FL16-033005	G220-38-5B	3/30/2005	Wipe	16	West side between columns 6 and 7	0.21
5-Dix-FL8-033005	G220-38-6B	3/30/2005	Wipe	8	West side between columns 6 and 7	1.49

Arithmetic Mean (ND=1/2)	ng/m2 1.32
May 2003 Benchmark ¹	2
April 2003 Background Assessment ²	0.693
<u>September 2002 WTC Indoor Assessment³</u>	
Tier I	>120
Tier II	120 to 4 (or background)
Tier III	<4 (or background)

References:

- ¹ *World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks.* Contaminants of Potential Concern (COPC) Committee. United States Environmental Protection Agency, May 2003.
- ² *World Trade Center Background Study Report, Interim Final.* United States Environmental Protection Agency, Region 2, April 2003.
- ³ *World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks.* Contaminants of Potential Concern (COPC) Committee of the World Trade Center Indoor Air Taskforce Working Group. Peer Review Draft, September 2002.

Table 5
 Exterior Netting - Polycyclic Aromatic Hydrocarbons (PAH) Wipe Sample Results
 PAH Wipe (SW 846-8270C)

LMDC
 130 Liberty Street
 New York, New York
 April 22, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	Benzo(a)anthracene Equivalent (ug/m2)	
1-PAH-020805	G220-33-1B	2/8/2005	Wipe	1	South East corner - catwalk	46.39	J
2-PAH-020805	G220-33-2B	2/8/2005	Wipe	1	North East corner / catwalk	23.10	J
3-PAH-020805	G220-33-3B	2/8/2005	Wipe	B	North side basement level "B"	23.06	J
4-PAH-020805	G220-33-4B	2/8/2005	Wipe	A	North side street level "A"	36.66	J
5-PAH-020805	G220-33-1B	2/8/2005	Wipe	1	Above loading door S/W - catwalk	33.67	J
1-PAH-FL40-033005	G220-37-1B	3/30/2005	Wipe	40	West side between columns 6 and 7	22.20	J
2-PAH-FL36-033005	G220-37-2B	3/30/2005	Wipe	36	West side between columns 6 and 7	26.55	UJ
3-PAH-FL32-033005	G220-37-3B	3/30/2005	Wipe	32	West side between columns 6 and 7	25.05	J
4-PAH-FL16-033005	G220-37-4B	3/30/2005	Wipe	16	West side between columns 6 and 7	21.77	J
4A-PAH-FL16-033005	G220-37-5B	3/30/2005	Wipe	16	West side between columns 6 and 7	26.55	J
5-PAH-FL8-033005	G220-37-6B	3/30/2005	Wipe	8	West side between columns 6 and 7	74.48	J

Benzo(a)pyrene (BaP) Equivalent using 1/2 the detection limit for non-detected values.

U - No compounds used to calculate BaP Equivalent were greater than the quantitation limits.

J - Result qualified as estimated.

	ug/m2 - BaP Equivalent
Arithmetic Mean (ND=1/2)	33.29
May 2003 Benchmark ¹	150
April 2003 Background Assessment ²	--
September 2002 WTC Indoor Assessment ³	
Tier I	>9,000
Tier II	9,000 to 300 (or background)
Tier III	<300 (or background)

References:

¹World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. C Concern (COPC) Committee. United States Environmental Protection Agency, May 2003.

²World Trade Center Background Study Report, Interim Final. United States Environmental Protection Agency, Region 2, April 2003.

³World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Contamina (COPC) Committee of the World Trade Center Indoor Air Taskforce Working Group. Peer Review Draft, September 2002.

Table 6
 Exterior Netting - Man Made Vitreous Fibers (MMVF) Wipe Sample Results
 MMVF Wipe (EMSL MSD 0310)

LMDC
 130 Liberty Street
 New York, New York
 April 22, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	MMVF (structures/cm2)
1-MMVF-020805	360500128-0001	2/8/2005	Wipe	1	South East corner - catwalk	115.34
2-MMVF-020805	360500128-0002	2/8/2005	Wipe	1	North East corner - catwalk	162.04
3-MMVF-020805	360500128-0003	2/8/2005	Wipe	B	North side basement level "B"	50.36
4-MMVF-020805	360500128-0004	2/8/2005	Wipe	A	North side street level "A"	67.58
5-MMVF-020805	360500128-0005	2/8/2005	Wipe	1	South West corner - catwalk	32.15
1-MMVF-FL40-033005	360500313-0001	3/30/2005	Wipe	40	West side between columns 6 and 7	0.013 J
2-MMVF-FL36-033005	360500313-0002	3/30/2005	Wipe	36	West side between columns 6 and 7	< 0.014
3-MMVF-FL32-033005	360500313-0003	3/30/2005	Wipe	32	West side between columns 6 and 7	< 0.017
4-MMVF-FL16-033005	360500313-0004	3/30/2005	Wipe	16	West side between columns 6 and 7	0.758 J
4A-MMVF-FL16-033005	360500313-0005	3/30/2005	Wipe	16	West side between columns 6 and 7	1.39 J
5-MMVF-FL8-033005	360500313-0006	3/30/2005	Wipe	8	West side between columns 6 and 7	1.04 J

J - Result qualified as estimated.

	<u>str/cm2</u>
Arithmetic Mean (ND=1/2)	42.9
May 2003 Benchmark ¹	n/a
April 2003 Background Assessment ²	--
<u>September 2002 WTC Indoor Assessment³</u>	
Tier I	>100,000
Tier II	100,000 to background
Tier III	background

References:

¹World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Contaminants of Potential Concern (COPC) Committee. United States Environmental Protection Agency, May 2003.

²World Trade Center Background Study Report, Interim Final. United States Environmental Protection Agency, Region 2, April 2003.

³World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Contaminants of Potential Concern (COPC) Committee of the World Trade Center Indoor Air Taskforce Working Group. Peer Review Draft, September 2003.

Table 7
Exterior Netting TCLP Sample Results

LMDC
130 Liberty Street
April 22, 2005

	Toxicity Regulatory Level (mg/L)	COMPOSITE - 021505 N90814-1 14-Feb-05	1-TCLP-COMP- 033005 N94737-1 30-Mar-05
VOC (mg/L)			
1,1-Dichloroethene	0.7	< 0.005	< 0.005 J
1,2-Dichloroethane	0.5	< 0.005	< 0.005 J
1,4-Dichlorobenzene	7.5	< 0.005	< 0.005 J
2-Butanone (MEK)	200	< 0.05	< 0.05 J
Benzene	0.5	< 0.005	< 0.005 J
Carbon tetrachloride	0.5	< 0.005	< 0.005 J
Chlorobenzene	100	< 0.005	< 0.005 J
Chloroform	6	< 0.005	< 0.005 J
Tetrachloroethene	0.7	< 0.005	< 0.005 J
Trichloroethene	0.5	< 0.005	< 0.005 J
Vinyl chloride	0.2	< 0.025	< 0.025 J

	Toxicity Regulatory Level (mg/L)	COMPOSITE - 021505 N90814-1 14-Feb-05	1-TCLP-COMP- 033005 N94737-1 30-Mar-05
Metals (mg/L)			
Arsenic	5	< 0.5	< 0.5 J
Barium	100	< 1	< 1 J
Cadmium	1	< 0.005	< 0.005 J
Chromium	5	< 0.01	< 0.01 J
Lead	5	< 0.5	< 0.5 J
Selenium	1	< 0.5	< 0.5 J
Silver	5	< 0.01	< 0.01 J
Mercury	0.2	< 0.0002	< 2E-04 J

mg/L - Milligrams per liter
TCLP - Toxicity Characteristic Leaching Protocol
VOC - Volatile Organic Compounds (TCLP SW 846 8260B)
Metals (TCLP SW 846 6010B and 7470A)

	Toxicity Regulatory Level (mg/L)	NETTING COMPOSITE - 021505 N90814-1 14-Feb-05	1-TCLP-COMP- 033005 N94737-1 30-Mar-05
Herbicides (mg/L)			
2,4-D	10	< 0.005	< 0.005 J
2,4,5-TP (Silvex)	1	< 0.0015	< 0.002 J

	Toxicity Regulatory Level (mg/L)	NETTING COMPOSITE - 021505 N90814-1 14-Feb-05	1-TCLP-COMP- 033005 N94737-1 30-Mar-05
SVOC (mg/L)			
2-Methylphenol	--	< 0.05	< 0.05 J
3&4-Methylphenol	--	< 0.05	< 0.05 J
Pentachlorophenol	100	< 0.2	< 0.2 J
2,4,5-Trichlorophenol	400	< 0.05	< 0.05 J
2,4,6-Trichlorophenol	2	< 0.05	< 0.05 J
1,4-Dichlorobenzene	7.5	< 0.02	< 0.02 J
2,4-Dinitrotoluene	0.13	< 0.02	< 0.02 J
Hexachlorobenzene	0.13	< 0.02	< 0.02 J
Hexachlorobutadiene	0.5	< 0.02	< 0.02 J
Hexachloroethane	3	< 0.05	< 0.05 J
Nitrobenzene	2	< 0.02	< 0.02 J
Pyridine	5	< 0.02	< 0.02 J

	Toxicity Regulatory Level (mg/L)	NETTING COMPOSITE - 021505 N90814-1 14-Feb-05	1-TCLP-COMP- 033005 N94737-1 30-Mar-05
Pesticides (mg/L)			
gamma-BHC (Lindane)	0.4	< 0.0002	< 2E-04 J
Chlordane	0.03	< 0.005	< 0.005 J
Endrin	0.02	< 0.0002	< 2E-04 J
Heptachlor	0.008	< 0.0002	< 2E-04 J
Heptachlor epoxide	0.008	< 0.0002	< 2E-04 J
Methoxychlor	10	< 0.0005	< 5E-04 J
Toxaphene	0.5	< 0.0025	< 0.003 J

Herbicides (TCLP SW 846 8151)
SVOC - Semi-Volatile Organic Compounds (TCLP SW 846 8270C)
Pesticides (TCLP SW 846 8081A)
J - Value is an estimate.

Table 8
 Exterior Netting RCRA Characteristics Sample Results

LMDC
 130 Liberty Street
 April 22, 2005

RCRA	Toxicity Regulatory Level	NETTING COMPOSITE - 021505 N90814-1 14-Feb-05	1-TCLP-COMP- 033005 N94737-1 30-Mar-05
Ignitability/Flashpoint (Deg. F)	<140	> 200	> 200
Cyanide Reactivity (mg/kg)	250	< 11 J	< 5 J
Sulfide Reactivity (mg/kg)	500	246 J	< 50 J
Corrosivity as pH	2-12.5	5.67 NC J	5.27 NC J

mg/kg - Milligrams per kilogram (parts per million)

NC - Non-corrosive

J - Value is an estimate.