
130 Liberty Street
New York, New York

Supplemental Investigation
Summary Report

Cell System Sampling Summary Results

Prepared for:

Lower Manhattan Development Corporation

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



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February 10, 2005

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1. INTRODUCTION

TRC Environmental Corporation (TRC) was contracted and authorized by the Lower Manhattan Development Corporation (LMDC) to conduct a *Supplemental Investigation* (SI) of previously inaccessible spaces in the building located at 130 Liberty Street (the Building). The intent of the SI is to address the additional sampling recommendations presented in The Louis Berger Group, Inc. (Berger) *Initial Building Characterization Report* dated September 14, 2004. This Summary Report presents the results of the supplemental investigation and testing of the previously inaccessible cell systems within the Building.

1.1 Background

The Building is located across the street and south of the WTC site and is the 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* for additional background information.

1.2 Scope of Work

In the *Initial Building Characterization Report*, Berger identified areas that were inaccessible during their investigation including the following locations:

- Curtain Wall Cavity
- Cell Systems within Floors
- Interstitial Spaces within Interior Walls and Column Cavities
- Inside Vertical Shafts
- Exterior Building Surfaces

In addition, Berger recommended performing preliminary waste characterization.

This supplemental investigation summary presents the results of additional inspection and sampling performed by TRC of cell systems within the Building. The cell systems are essentially two layers (one in a North-South orientation and the other in a East-West orientation) of electrical and telecommunication cable ducts that traverse the floor within the floor. The cell system facilitated running electrical and telecommunication cables from the associated closets to terminals within the office. The cell system was accessed via circular access ports located throughout the floor to collect samples.

Supplemental investigations regarding curtain wall cavity, vertical shafts, heating, ventilation, and air conditioning (HVAC) ductwork, fireproofing, interstitial spaces within interior walls and column cavities, exterior building surfaces, waste characterization, and visual inspection of the Building for mold and asbestos containing building materials (ACBM) are addressed in separate summaries.

As part of the supplemental investigation, TRC collected the following samples:

COPC	Asbestos	Lead	Silica	Dioxin	PAH	MMVF
Total Samples	126	106	35	55	55	27

For the cell systems located within the floors of 130 Liberty Street, TRC collected ten representative surface wipe samples for asbestos, lead, polycyclic aromatic hydrocarbons (PAHs), dioxins, and man-made vitreous fibers (MMVF). Asbestos, lead, silica, PAHs, dioxins, and MMVF make up the United States Environmental Protection Agency (USEPA) contaminants of potential concern (COPCs) list. Samples were not collected for silica since it is inherent to the concrete in which the cell system structures are encased.

TRC did not utilize a tiered approach to sample analysis as was done for other SI components tested. All COPCs were analyzed and the results reviewed. Results of this study were compared to the findings in the *Initial Building Characterization Report*, benchmark and background concentrations presented in previous environmental studies as detailed in the following sections.

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/cm2)	>30,000	30,000 to background	Background
Lead (ug/ft2)	>40	40 to 25 (or background)	<25 (or background)
Silica	--	Above background	Background
PAH (mg/m2)	>9	9 to 0.3 (or background)	<0.3 (or background)
MMVF (str/cm2)	>100,000	100,000 to background	Background
Dioxin (ng/m2)	>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/cm²)	6,192
Lead (ug/ft²)	1.78
Silica (ug/ft²)	79.6 (expressed as quartz)
PAH (mg/m²)	<0.29
MMVF (str/cm²)	52
Dioxin (ng/m²)	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 SI is to provide additional information relative to the concentrations of COPCs within previously inaccessible spaces. This SI summary presents the results specifically for the cell system investigation.

The SI of previously inaccessible areas 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 SI 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 cell system characterization in previously inaccessible areas within the Building. 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 wipe samples for the COPCs from the access ports to the cell systems typically located below the carpeting on each floor of the Building. Prior to opening the access port and sampling, the access port cover, adjacent floor and carpet at each location was thoroughly HEPA-vacuumed to provide a cleaned working area. This cleaned work area was then covered with clean polyethylene sheeting that was sealed with duct tape to the cleaned floor. Immediately prior to sampling, the clean polyethylene sheeting was cut to provide access to the sampling location.

Asbestos and MMVF wipe samples were collected from within the cell system access port 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:

COPC	Analytical Method
Asbestos	ASTM 6480-99
Lead	USEPA SW 846 7420
Silica	NIOSH 7500 (XRD)
Dioxin	USEPA SW 846-8290
PAH	USEPA SW 846-8270C
MMVF	EMSL MSD 0310

All samples were properly labeled as per the SAQAPP. 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).

3. RESULTS

3.1 Asbestos

Ten asbestos wipe, one blank, and one duplicate sample were collected on various floors of the Building as detailed below. Samples were divided up by Zone, as described in the *Initial Building Characterization Report*. Zones 2 and 3 apply to TRC’s study and are defined as follows:

Zone 2: Office space located at or below the 24th Floor that may have been subjected to dust entering the Building through the Gash, HVAC system (and possibly circulated through the HVAC system), vertical shafts, or broken windows.

Zone 3: Office space located above the 24th Floor that may have been impacted by dust distributed through the HVAC system, vertical shafts, or broken windows.

Wipe sample results ranged from less than 2,390 structures per square centimeter (str/cm²) to 593,000 str/cm². The arithmetic mean concentration for these ten results was 62,986 str/cm² using one half the detection limit for non-detected sample results. Only one sample exceeded the Tier I Indoor Air Assessment at a concentration of 593,000 str/cm². Sample results are provided in the attached Table 1.

Asbestos Sample ID	Floor	Zone
GM-ASB-W-29-Cell-001	29	3
GM-ASB-W-20-Cell-002	20	2
GM-ASB-W-15-Cell-003	15	2
GM-ASB-W-18-Cell-004	18	2
GM-ASB-W-12-Cell-005	12	2
GM-ASB-W-10-Cell-006	10	3
GM-ASB-W-8-Cell-007	8	3
GM-ASB-W-7-Cell-008	7	3
GM-ASB-W-9-Cell-009	9	2
GM-ASB-W-11-Cell-010	11	2

A limited data validation was performed on the wipe 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 appeared 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 SI results.

TRC reviewed the *Deutsche Bank Damage Assessment report: Contamination Report Pursuant to Testing Protocol-09, Cell System and Risers Data Report* by RJ Lee Group, Inc. dated May 2003. The average and maximum asbestos concentrations of samples collected in the non-gash areas of the building were 10,700,000 str/cm² and 1,033,000,000 str/cm², respectively. The concentrations reported in the RJ Lee report are significantly higher than the concentrations found in this SI.

3.2 Lead

Ten lead wipe, one blank and one duplicate samples were collected at the same locations as asbestos, listed in Section 3.1. Wipe sample results ranged from less than 16 ug/ft² to 18,226 ug/ft² with an arithmetic mean of 3,171 ug/ft². Sample results are provided in the attached Table 2.

A limited data validation was performed on the sample results in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (July 2002). In general, the data appeared to be valid as reported and may be used for decision-making purposes. Potential uncertainty exists for all detected lead results due to variability in the field duplicate results.

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 consistent with (although somewhat lower than) the SI results.

RJ Lee's *TP-09 Cell Systems and Risers Summary Report* indicated average and maximum lead concentrations of samples in the non-gash areas of this report were 14,151 ug/ft² and 190,000 ug/ft², respectively. These results are almost two orders of magnitude higher than the results of this SI.

3.3 Dioxin

Ten dioxin wipe, one blank, and one duplicate samples were collected at the same locations as asbestos, listed 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 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 toxicity equivalent factors (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 0.34 nanograms per square meter (ng/m²) to 4.84 ng/m² with an arithmetic average of 2.17 ng/m². All results were below the USEPA Tier I value with the mean slightly above the Tier III value of 2 ng/m². Sample results are provided in the attached Table 3.

A limited data validation was performed on the wipe and two of the three bulk 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 appeared to be valid as reported and may be used for decision-making purposes. Select results were qualified as non-detects due to blank contamination. Potential low bias exists for all results in sample GM-DIOXIN-W_12-Cell-005QA/WC due to a holding time exceedance. Potential uncertainty exists for the results 1,2,3,4,6,7,8-HpCDD, OCDD,2,3,7,8-TCDF, 2,3,4,7,8-PeCDF, OCDF, total PeCDDs, total HpCDDs, and total HpCDFs in samples GM-DIOXIN-W-12-Cell-005 and GM-DIOXIN-W-12-Cell-005 QA/QC due to variability in the field duplicate results. There were no adverse effects on the data usability on the basis of these issues as the affected results were still significantly below the project action level and did not affect the TEQ results.

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 generally higher than the concentrations found in the SI.

RJ Lee collected 1,552 dioxin/furan samples as outlined in the *TP-09 Cell Systems and Risers Data Report*. The results indicated average and maximum dioxin/furan results in the non-gash areas were 1,590 ng/m² and 29,504 ng/m², respectively. Results of this study were approximately three orders of magnitude higher than the concentrations found in the SI.

3.4 Polycyclic Aromatic Hydrocarbons (PAHs)

Ten PAH wipe, one field blank, and one duplicate samples were collected at the same locations as asbestos, listed in Section 3.1. The carcinogenic PAHs results were used to calculate the benzo(a)pyrene (BaP) equivalent to measure the relative potency. All BaP equivalent results were 40.44 micrograms per square meter (ug/m²). Sample results are provided in the attached Table 4.

A limited data validation was performed on the wipe 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 appeared to be valid as reported and may be used for decision-making purposes. Select results were qualified as non-detects due to blank contamination. There was no adverse affect on the data usability as these non-detect results were still below the Indoor Air Assessment Tier I level. Total PAH results provided in Table 4 that were affected by the change in result status are designated with a “J” indicating the value is an estimate. This change in designation does not affect the BaP equivalent calculations.

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/m² (from Zone 1) to a maximum concentration of 11,555 ug/m² (in Zone 2). These results are greater than three orders of magnitude above the results of the SI.

3.5 Man Made Vitreous Fibers (MMVF)

Ten MMVF wipe, one field blank, and one duplicate samples were collected on various floors of the Building as asbestos, listed in Section 3.1. Results ranged from 944 str/cm² to 1,476 str/cm² with an arithmetic average of 1,172 str/cm². This is approximately two orders of magnitude less than the USEPA Tier I value of 100,000 str/cm². Sample results are provided in the attached Table 5.

A limited data validation was performed on the wipe 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 appeared to be valid as reported and may be used for decision-making purposes.

4. FINDINGS

Sample results were compared to criteria provided in Section 1.2 and 1.3 and identified on the bottom of each table. This Supplemental Investigation has identified average asbestos and lead concentrations on surface dust within the cell systems that exceed the benchmark criteria provided in the May 2003 and September 2002 USEPA WTC Indoor Environmental Assessment studies, April 2003 Background Study, but are generally lower than the concentrations identified in the *Initial Building Characterization Report*. The elevation of the average asbestos concentration above the USEPA Tier I value is attributed to one potential anomaly of 593,000 str/cm². Dioxins and PAHs were found to be relatively low compared to the Initial Building Characterization Report, RJ Lee's studies, and the USEPA Tier I levels, which represent a one-year risk-based residential value. SI cell system MMVF results were also found to be below the USEPA Tier I level.

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 surfaces of the cell systems located within the Building. Concentrations were generally lower than the COPC levels of 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 cell systems be handled in a manner that complies with applicable laws.

6. REFERENCES

Damage Assessment, 130 Liberty Street Property, Contamination Report Pursuant to Testing Protocol-09, Cell System and Risers, Summary Report. RJ Lee Group, Inc., May 2003.

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.

Sampling, Analysis, and Quality Assurance Project Plan, Supplement Investigation of 130 Liberty Street, New York, New York. TRC Environmental Corp., November 15, 2004.

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.

Cell Systems
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Asbestos	1
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Table 1
 Cell Systems - Asbestos
 Asbestos Wipe (SW 6480-99)

LMDC
 130 Liberty Street
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Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	ASBESTOS (structures/cm ²)
GM-ASB-W-29-Cell-001	030422802-0001	11/16/2004	Wipe	29	Cell Structure	<2,390
GM-ASB-W-20-Cell-002	030422802-0002	11/16/2004	Wipe	20	Cell Structure	<2,440
GM-ASB-W-15-Cell-003	030422802-0003	11/16/2004	Wipe	15	Metal	<2,440
GM-ASB-W-18-Cell-004	030422802-0004	11/16/2004	Wipe	18	Metal	<2,440
GM-ASB-W-12-Cell-005	030422802-0005	11/16/2004	Wipe	12	Metal	<2,440
GM-ASB-W-12-Cell-005QA/QC	030422802-0006	11/16/2004	Wipe	12	Metal	<2,440
GM-ASB-W-10-Cell-006	030422802-0007	11/16/2004	Wipe	10	Metal	22,800
GM-ASB-W-8-Cell-007	030422802-0008	11/16/2004	Wipe	8	Metal	593,000
GM-ASB-W-7-Cell-008	030422802-0009	11/16/2004	Wipe	7	Metal	5,590
GM-ASB-W-9-Cell-009	030422802-0010	11/16/2004	Wipe	9	Metal	<2,390
GM-ASB-W-11-Cell-010	030422802-0011	11/16/2004	Wipe	11	Metal	<2,390
GM-ASB-W-000-Cell-FB1	030422802-0012	11/16/2004	Wipe	FB	Blank	Blank

Measured surface area is 285 cm².

	<u>str/cm²</u>
Arithmetic Mean (ND=1/2)	62,986
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. 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 2
 Cell Systems- Lead
 Lead Wipe (ICP 6010B)

LMDC
 130 Liberty Street
 New York, New York
 February 10, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Lead (ug/ft ²)	Lead (ug/m ²)
KD-Pb-W-29-Cell-001	010404067-0001	11/18/2004	Wipe	29	8,903	95,834
KD-Pb-W-29-Cell-001QA/QC	010404067-0002	11/18/2004	Wipe	29	18,226	196,181
KD-Pb-W-20-Cell-002	010404067-0003	11/18/2004	Wipe	20	3,097	33,333
KD-Pb-W-18-Cell-004	010404067-0004	11/18/2004	Wipe	15	1,903	20,486
KD-Pb-W-15-Cell-003	010404067-0005	11/18/2004	Wipe	18	3,355	36,111
GM-Pb-W-12-Cell-005	010404067-0006	11/18/2004	Wipe	12	1,229	13,229
GM-Pb-W-10-Cell-006	010404067-0007	11/18/2004	Wipe	10	6,516	70,139
GM-Pb-W-8-Cell-007	010404067-0008	11/18/2004	Wipe	8	4,968	53,472
GM-Pb-W-7-Cell-008	010404067-0009	11/18/2004	Wipe	7	<16	<172
GM-Pb-W-9-Cell-009	010404067-0010	11/18/2004	Wipe	9	1,600	17,222
GM-Pb-W-11-Cell-010	010404067-0011	11/18/2004	Wipe	11	135	1,458
GM-Pb-W-000-Cell-Fblank	010404067-0012	11/18/2004	Wipe	FB	<2	<22

Measured surface area is 0.31 ft².

Arithmetic Mean (ND=1/2)	ug/ft ² 3,171
May 2003 Benchmark ¹	25
April 2003 Background Assessment ²	1.78
September 2002 WTC Indoor Assessment ³	
Tier I	>40
Tier II	40 to 25 (or background)
Tier III	<25 (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 3
 Cell Systems - Dioxin
 Dioxin (SW 846-8290)

LMDC
 130 Liberty Street
 New York, New York
 February 10, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	WHO TEQ (ND=1/2; ng/m2)
GM-Dioxin-W-29-Cell-001	G220-23-1B	11/17/2004	Wipe	29	1.06
GM-Dioxin-W-20-Cell-002	G220-23-2B	11/17/2004	Wipe	20	3.05
GM-Dioxin-W-18-Cell-003	G220-23-3B	11/17/2004	Wipe	18	0.81
KD-Dioxin-W-15-Cell-004	G220-23-4B	11/17/2004	Wipe	15	1.75
GM-Dioxin-W-12-Cell-005	G220-23-5B	11/17/2004	Wipe	12	2.64
GM-Dioxin-W-10-Cell-006	G220-23-6B	11/17/2004	Wipe	10	2.95
GM-Dioxin-W-8-Cell-007	G220-23-7B	11/17/2004	Wipe	8	0.75
GM-Dioxin-W-7-Cell-008	G220-23-8B	11/17/2004	Wipe	7	1.78
GM-Dioxin-W-9-Cell-009	G220-23-9B	11/17/2004	Wipe	9	2.11
GM-Dioxin-W-011-Cell-010	G220-23-10B	11/17/2004	Wipe	11	4.84
GM-Dioxin-W-000-Cell-FB1	G220-23-11B	11/17/2004	Wipe		0.34
GM-Dioxin-W-12-Cell-005 QA/QC	G220-31-1B	11/17/2004	Wipe	12	2.31 J

Arithmetic Mean	<u>ng/m2</u> 2.17
May 2003 Benchmark ¹	2.0
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:

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 4
 Cell Systems - Polycyclic Aromatic Hydrocarbons (PAHs)
 PAH Wipe (SW 846-8270C)

LMDC
 130 Liberty Street
 New York, New York
 February 10, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	PAH (ug/m2)	Benzo(a)Pyrene Equivalent (ug/m2)
GM-PAH-W-29-Cell-001	G220-21-1B	11/18/2004	Wipe	29	17.5 J	<40.44
GM-PAH-W-20-Cell-002	G220-21-2B	11/18/2004	Wipe	20	21 J	<40.44
KD-PAH-W-15-Cell-003	G220-21-3B	11/18/2004	Wipe	15	35 J	40.44
GM-PAH-W-18-Cell-004	G220-21-4C	11/18/2004	Wipe	18	38.5 J	40.44
GM-PAH-W-12-Cell-005	G220-21-5B	11/18/2004	Wipe	12	91 J	40.44
GM-PAH-W-10-Cell-006	G220-21-6B	11/18/2004	Wipe	10	21 J	<40.44
GM-PAH-W-8-Cell-007	G220-21-7B	11/18/2004	Wipe	8	21 J	<40.44
GM-PAH-W-18-Cell-004 QA/QC	G220-21-12B	11/18/2004	Wipe	18	17.5 J	<40.44
GM-PAH-W-7-Cell-008	G220-21-8B	11/18/2004	Wipe	7	24.5 J	<40.44
GM-PAH-W-9-Cell-009	G220-21-9B	11/18/2004	Wipe	9	21 J	<40.44
GM-PAH-W-011-Cell-010	G220-21-10B	11/18/2004	Wipe	11	98 J	<40.44
GM-PAH-W-000-Cell-FB1	G220-21-11B	11/18/2004	Wipe		87.5	56.19

Each area sampled is 285 cm2.
 Benzo(a)Pyrene Equivalent determined using 1/2 the detection limit.

	ug/m2 - BaP Equivalent
BaP Arithmetic Mean (ND=1/2)	40
May 2003 Benchmark ¹	150
April 2003 Background Assessment ²	--
<u>September 2002 WTC Indoor Assessment³</u>	
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. 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 5
 Cell Systems - Man Made Vitreous Fibers (MMVF)
 MMVF Bulk (EMSL MSD 0310)

LMDC
 130 Liberty Street
 New York, New York
 February 10, 2005

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	MMVF (str/cm2)
GM-MMVF-W-29-Cell-001	360401096	11/18/2004	Wipe	29	968
GM-MMVF-W-20-Cell-002	360401096	11/18/2004	Wipe	20	1,210
KD-MMVF-W-18-Cell-004	360401096	11/18/2004	Wipe	18	1,161
KD-MMVF-W-15-Cell-003	360401096	11/18/2004	Wipe	15	944
GM-MMVF-W-12-Cell-005	360401096	11/18/2004	Wipe	12	1,427
GM-MMVF-W-011-Cell-010	360401096	11/18/2004	Wipe	11	1,161
GM-MMVF-W-10-Cell-006	360401096	11/18/2004	Wipe	10	1,476
GM-MMVF-W-10-Cell-006 QA/QC	360401096	11/18/2004	Wipe	10	1,427
GM-MMVF-W-9-Cell-009	360401096	11/18/2004	Wipe	9	1,137
GM-MMVF-W-8-Cell-007	360401096	11/18/2004	Wipe	8	847
GM-MMVF-W-7-Cell-008	360401096	11/18/2004	Wipe	7	1,403
GM-MMVF-W-000-Cell-FB1	360401096	11/18/2004	Wipe		ND

Each area sampled is 285 cm2.

	<u>str/cm2</u>
Arithmetic Mean (ND=1/2)	1,173.40
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 2002.