130 Liberty Street

New York, New York

Supplemental Investigation Summary Report

Interior Wall Interstitial Space Sampling Summary Results

Prepared for:
Lower Manhattan Development Corporation
One Liberty Plaza, 20th Floor, New York, NY 10006

LMDC
Lower Manhattan
Development Corporation

Prepared By:

TRC
Customer-Focused Solutions

TRC Environmental Corp.
1430 Broadway, 10th Floor
New York, New York 10018

February 10, 2005

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 interior wall interstitial spaces within the Building.

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* 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 SI summary presents the results of additional inspection and sampling performed by TRC of the previously inaccessible interior wall interstitial spaces within the Building. SIs regarding curtain wall cavity, heating, ventilation, and air conditioning (HVAC) ductwork, cell systems within floors, fireproofing, 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 interior wall interstitial spaces within 130 Liberty Street, TRC collected ten representative surface wipe samples for asbestos, lead, silica, polycyclic aromatic hydrocarbons (PAHs), man-made vitreous fibers (MMVF), and dioxins analysis. In addition, three bulk samples were collected for asbestos. Asbestos, lead, silica, PAHs, dioxins, and MMVF make up the United States Environmental Protection Agency (USEPA) contaminants of potential concern (COPCs) list.

TRC utilized a tiered approach to sample analysis. All asbestos and lead wipe samples were analyzed and the results reviewed. Results of this study were compared to the findings in the *Initial Building Characterization Report* and benchmark and background concentrations presented in previous environmental studies as detailed in the following sections. If surface concentrations of asbestos and lead were found to be similar to the *Initial Building Characterization Report* and elevated when compared to benchmark and background concentrations, further analysis for the remaining COPCs was not conducted. If surface concentrations of asbestos and lead were found to be less than the *Initial Building Characterization Report*, benchmark, and background concentrations, further analysis for the remaining COPCs was conducted.

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:

	Settled Dust		
COPC	**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/cm^2. Levels above 10,000 str/cm^2 are considered generally above background. Levels above 100,000 str/cm^2 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 interior wall interstitial space 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 interstitial space characterization in previously inaccessible areas within the Building. These tasks were implemented in accordance with the *Sampling Analysis and Quality Assurance Project Plan* (SAQAPP) developed by TRC dated November 15, 2004.

TRC collected representative wipe and bulk samples for the COPCs from the interior wall interstitial spaces subsequent to establishment of a clean contained area. Prior to any sampling, sampling locations were selected that were previously undisturbed representative areas (i.e. not impacted by previous investigations or cleaning protocols). The following procedure was utilized to access the interstitial cavity spaces:

1. The wallboard to be cut was surveyed with a stud finder and anticipated cut lines marked to provide multiple openings at a sample location.

2. A rotary cutting tool was utilized to cut ¾ of the depth of the sheetrock along the cut line to ensure that the wallboard backing paper was not penetrated.

3. The area was cleaned and a tent containment was created around the work area. The contained work area was maintained under positive pressure. This work area was then visually inspected, and air samples collected for asbestos and lead.

4. Upon receipt of successful clearance air samples, the wallboard cut line was sprayed with water, then the remaining depth cut with a utility knife and wallboard removed into the tent containment to access the interstitial cavity space.

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:

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

Bulk asbestos samples were analyzed per method New York State Environmental Laboratory Approval Program (NYS ELAP) 198.1.

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 field blank, and three bulk samples 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.

In all of the ten wipe samples, no asbestos was detected. However, asbestos was detected, at 1.57% (chrysotile), in one of the three asbestos bulk samples collected from the second floor. This sample was collected from an uncontained area on the second floor that had a pre-existing large penetration of the sheetrock. Therefore this dust and associated result are more representative of general interior conditions, than an un-impacted interior wall interstitial space. Sample results are provided in the attached Tables 1 and 2.

Asbestos Sample ID	Floor	Location	Zone
Wipe Samples			
KD-7-W-INT.WALL-ASB-001I	7	Sheetrock GF-56	2
KD-26-W-INT.WALL-ASB-001I	26	Sheetrock GF-56	3
KD-4-W-INT.WALL-ASB-002I	4	Sheetrock DC-23	2
KD-20-W-INT.WALL-ASB-003I	20	Sheetrock CB-34	2
KD-16-W-ASB-INT.WALL-004I	16	Sheetrock HG-56	2
KD-14-W-ASB-INT.WALL-005I	14	Sheetrock AB-24	2
KD-10-W-ASB-INT-007I	10	Sheetrock GF-56	2

Asbestos Sample ID	Floor	Location	Zone
KD-2-W-INT.WALL-ASB-008I	2	Sheetrock HG-45	2
KD-24-WIPEINT.WALL-ASB-009I	24	Sheetrock, NW Area AB-45	3
KD-29-WIPEINT.WALL-ASB-010I	29	Sheetrock wall, NE area GH-78	3
Bulk Samples			
KD-7-ASB-INT.DUST-001I	7	FG-56	2
KD-02-BULK-INT.WALL-DUST-007I	2	G-3	2
ZD-29-BULK-INTWALL-DUST-001I	29	NE area GH-78	3

A limited data validation was performed on the sample results 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 Berger's *Initial Building Characterization Report*. Berger collected 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 places 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/cm^2 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/cm^2 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/cm^2 (from Floors 5, 24, 25, 28, 34, and 41) to a maximum concentration of 4,879,200 structures/cm^2 (from Floor 2). These results are considerably higher than the non-detect asbestos concentrations found in this SI.

TRC reviewed the *Deutsche Bank Damage Assessment report: Contamination Report Pursuant to Testing Protocol-06, Interior Wall Cavities 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 this report were 827,000 str/cm^2 and 61,410,000 str/cm^2, respectively. These results are all significantly higher than the non-detect asbestos concentrations found in the interstitial walls of this SI.

TRC reviewed the *Test Report on Wall Cavities "Wall Cell Protocol"* by Young Laboratories, Inc. dated September 27, 2004, which is part of the *Insurer's Expert Report Related to the Deutsche Bank's 130 Liberty Street Claims.* In this report, samples were

collected from the interior wall cavity wallboard surfaces from three different wall types: floor to slab, non-insulated floor to ceiling, and insulated floor to ceiling using the TEM microvacuum method. The results are as follows:

Wall Type	n	Minimum str/cm^2	Maximum str/cm^2	Average str/cm^2	Non detects %
Floor to slab	30	<1,596	67,602	8,534	26.7
Non-insulated floor to ceiling	24	<1,596	20,345	3,015	66.7
Insulated floor to ceiling	30	<1,596	215,412	10,505	43.3

Compared to the wipe sample results of this SI, these results on average are higher.

3.2 Lead

Ten lead wipe and one field blank samples were collected at the same locations as asbestos detailed in Section 3.1. Wipe sample results ranged from less than 10 ug/ft^2 to 24 ug/ft^2 with an arithmetic average of 8 ug/ft^2. Sample results are provided in the attached Table 3.

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.

According to Berger's 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/m^2 (32.52 ug/ft^2) to 10,900 ug/m^2 (1,012.6 ug/ft^2). Lead results from samples collected below the plenum ranged from 150 ug/m^2 (13.92 ug/ft^2 - in Zone 3) to 101,000 ug/m^2 (9,383.2 ug/ft^2 - in Zone 1). These results are considerably higher than the lead concentrations found in the interstitial walls of this SI.

TRC reviewed the *TP-06 Interior Wall Cavities Data Report*, which reported the average and maximum lead concentrations of samples collected in the non-gash areas of this report were 171.9 ug/ft^2 and 1,630 ug/ft^2, respectively. These results are considerably higher than the lead concentrations found in the interstitial walls of this SI.

According to the *Test Report on Wall Cavities "Wall Cell Protocol"* lead results of bulk dust samples collected from the stud trays are as follows:

Wall Type	n	Minimum ug/g	Maximum ug/g	Average ug/g	Non detects %
Floor to slab	30	<3.8	420	73	22.2
Non-insulated floor to ceiling	24	13	100	40	0
Insulated floor to ceiling	30	<3.7	<51	9.6	100

Lead bulk dust samples collected from the wallboard surfaces are as follows:

Wall Type	n	Minimum ug/g	Maximum ug/g	Average ug/g	Non detects %
Floor to slab	30	<2.5	83	16	66.7
Non-insulated floor to ceiling	24	<2.8	4.1	2.5	87.5
Insulated floor to ceiling	30	<3.3	11	3.3	70

Lead bulk dust samples were not collected from the interstitial wall cavities in this SI; however, these results confirm the presence of low levels of lead in the interstitial walls.

3.3 Silica

Ten silica wipe and one field blank samples were collected on various floors of the Building as detailed in Section 3.1. The silica sample results ranged from less than 0.055 mg/ft^2 to 2.42 mg/ft^2 with an arithmetic average of 0.55 mg/ft^2. Sample results are provided in the attached Table 4.

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.

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/m^2 (0.46 mg/ft^2 - from Zone 2) to a maximum concentration of 10,000,000 ug/m^2 (929 mg/ft^2 - in Zone 1). These results are at least two orders of magnitude greater than the silica concentrations found within the interstitial walls.

TRC reviewed the *TP-06 Interior Wall Cavities Data Report*, which reported the average and maximum lead concentrations of samples collected in the non-gash areas of this report were 171.9 ug/ft^2 and 1,630 ug/ft^2, respectively. These results are generally

consistent (within one order of magnitude) with the silica concentrations found in the interstitial walls of this SI.

According to the *Test Report on Wall Cavities "Wall Cell Protocol"* crystalline silica results of samples collected from the wallboard surface results are as follows:

Wall Type	n	Minimum ug/ft^2	Maximum ug/ft^2	Average ug/ft^2	Non detects %
Floor to slab	30	<92	815	327	16.7
Non-insulated floor to ceiling	26	<92	1,296	244	38.5
Insulated floor to ceiling	34	<92	574	170	23.5

Silica results are generally consistent (within one order of magnitude) with the silica concentrations found in this SI.

3.4 Dioxin

Ten dioxin wipe and one field blank sample were collected at the same locations where asbestos wipe samples were collected 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 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. Dioxin TEQ results ranged from 0.84 nanograms per square meter (ng/m^2) to 1.87 ng/m^2 with an arithmetic average of 1.10 ng/m^2. This average concentration is below the USEPA Tier III Benchmark concentration. Sample results are provided in the attached Table 5.

A limited data validation was performed on the sample results 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 were no adverse affects on the data usability on the basis of these issues as the affected results were still significantly below the USEPA Tier I residential health-risk based benchmark value.

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/m^2 (from Zone 2) to a maximum concentration of 214 ng/m^2 (in Zone 5). The results of this study were at least an order of magnitude greater than the concentrations detected in this SI.

RJ Lee collected 175 dioxin/furan samples as outlined in the *TP-06 Interior Wall Cavities Data Report*. The results indicated average and maximum dioxin/furan results in the non-gash area were 46.1 ng/m^2 and 1,568.9 ng/m^2, respectively. The dioxin/furan concentrations reported in the RJ Lee report are up to three orders of magnitude greater than the concentrations found in this SI.

According to the *Test Report on Wall Cavities "Wall Cell Protocol"* dioxin results of samples collected from the wallboard surface results are as follows:

Wall Type	n	Minimum pg/g	Maximum pg/g	Average pg/g	Non detects %
Floor to slab	30	0.2	153	13	0
Non-insulated floor to ceiling	24	0	1.7	0.37	4.2
Insulated floor to ceiling	29	0	32	3.6	3.4

Dioxin bulk dust samples collected from the stud tray are as follows:

Wall Type	n	Minimum pg/g	Maximum pg/g	Average pg/g	Non detects %
Floor to slab	9	1.2	62	17	0
Non-insulated floor to ceiling	11	0	24	5.1	54.5
Insulated floor to ceiling	14	0	2.3	0.43	50.0

Dioxin bulk dust samples were not collected from the interstitial wall cavities in this SI; however, these results confirm the presence of low levels of dioxins in the interstitial walls.

3.5 Polycyclic Aromatic Hydrocarbons (PAHs)

Ten PAH wipe and one field blank samples were collected at the same locations where asbestos wipe samples were collected 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. No PAHs were detected in the interior walls and all BaP equivalent wipe results were less than 57.8 micrograms per square meter (ug/m^2). Sample results are provided in the attached Table 6.

A limited data validation was performed on the sample results 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. Potential low bias exists for anthracene and benzo(a)pyrene in the samples KD-24-W-IntWall-PAH-009I and KD-29-W-IntWall-PAH-010I due to low LCS recoveries. This has minimal effect on the data usability since all results are still approximately two orders of magnitude lower than USEPA Tier I residential health-risk based benchmark value.

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). The PAH concentrations reported in the *Initial Building Characterization Report* were greater than the non-detect concentrations found in this SI.

RJ Lee collected 167 dioxin/furan samples as outlined in the *TP-06 Interior Wall Cavities Data Report*. The results indicated average and maximum PAH results in the non-gash area were 15.0 ug/m^2 and 184.1 ug/m^2, respectively. The PAH concentrations reported in the RJ Lee report are greater than the non-detect concentrations found in this SI.

3.6 Man Made Vitreous Fibers (MMVF)

Ten MMVF wipe and one field blank sample were collected at the same locations where asbestos wipe samples were collected as detailed in section 3.1. The MMVF wipe results ranged from 15.17 str/cm^2 to 641.3 str/cm^2, with an arithmetic mean of 142.19 str/cm^2.

This average is approximately three orders of magnitude less than the USEPA Tier I benchmark 1-year risk based concentration. Sample results summary is provided in the attached 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). In general, the data appeared to be valid as reported and may be used for decision-making purposes.

4. FINDINGS

This Supplemental Investigation has identified that none of the COPCs exceed the Tier I value in the September 2002 WTC Indoor Air Assessment study. Asbestos was not detected in any of the wipe samples; however, it was identified to be present in one out of three bulk dust samples collected. This bulk dust sample was collected from a second floor interior wall interstitial space that had a previous sheetrock penetration. Therefore this result is not representative of an un-impacted interior wall interstitial space; rather it should be considered representative of general interior dust conditions. The average lead, silica, MMVF and dioxin results exceed the April 2003 Background Study criteria but were found to be less than the USEPA Tier I Benchmark concentrations. PAHs were not detected in any of the samples collected.

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 concentrations within the dust on the surfaces of the interior walls interstitial spaces were at least an order of magnitude less than the COPC levels for the dust in the accessible areas discussed in the *Initial Building Characterization Report* and the *Interior Wall Cavities Data Report.* No asbestos or PAHs were detected on the wipe samples collected from the interior wall interstitial spaces. Lead, silica, MMVF and dioxin arithmetic average results were less than Tier I USEPA Benchmark concentrations but exceeded the USEPA residential background criteria. The results of the sampling and testing performed for this Supplemental Investigation revealed low levels of contaminants in connection with the Building deconstruction, which are inconsistent with previous studies. Therefore, TRC recommends review of the results by federal, state, and local regulators and that the interior wall interstitial spaces be handled in a manner that complies with applicable laws.

6. REFERENCES

Damage Assessment, 130 Liberty Street Property, Contamination Report Pursuant to Testing Protocol-06, Interior Wall Cavities Data 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.

Test Report on Wall Cavities "Wall Cell Protocol" at the Deutsche Bank Building 130 Liberty Street, New York, New York. Young Laboratories, Inc., September 27, 2004.

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.

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

TABLE OF CONTENTS

Table 1
Interior Wall Interstitial Spaces - Asbestos
Asbestos Wipe (SW 6480-99)

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

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	Asbestos (structures/cm^2)
KD-7-W-INT.WALL-ASB-001I	030423849-0001	12/2/2004	Wipe	7	Sheetrock, GF-56	<6,250
KD-26-W-INT.WALL-ASB-001I	030423849-0002	12/2/2004	Wipe	26	Sheetrock, GF-56	<6,250
KD-4-W-INT.WALL-ASB-002I	030423849-0003	12/2/2004	Wipe	4	Sheetrock, DC-23	<6,250
KD-20-W-INT.WALL-ASB-003I	030423849-0004	12/2/2004	Wipe	20	Sheetrock, CB-34	<6,250
KD-16-W-ASB-INT.WALL-004I	030423849-0006	12/2/2004	Wipe	16	Sheetrock,n HG-56	<6,250
KD-14-W-ASB-INT.WALL-005I	030423849-0007	12/2/2004	Wipe	14	Sheetrock, AB-24	<6,250
KD-10-W-ASB-INT-007I	030423849-0009	12/2/2004	Wipe	10	Sheetrock,n GF-56	<6,250
KD-2-W-INT.WALL-ASB-008I	030423849-0011	12/2/2004	Wipe	2	Sheetrock, HG-45	<6,250
KD-24-WIPEINT.WALL-ASB-009I	030423953-0003	12/3/2004	Wipe	24	Sheetrock, NW Area AB-45	<6,250
KD-29-WIPEINT.WALL-ASB-010I	030423953-0004	12/3/2004	Wipe	29	Sheetrock, NE area GH-78	<6,970
KD-000-W-INT.WALL-ASB-000	030423849-0013	12/2/2004	Wipe			Blank

	str/cm2
Arithmetic Mean (ND=1/2)	None detected
May 2003 Benchmark[1]	n/a
April 2003 WTC Background Study[2]	6,192
September 2002 WTC Indoor Assessment[3]	
Tier I	>30,000
Tier II	>30,000 to background
Tier III	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 2
Interior Wall Interstitial Spaces - Asbestos
Asbestos Bulk PLM (NYS ELAP 198.1)

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

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	Asbestos (percent)
KD-7-ASB-INT.DUST-001I	030423846-0001	12/2/2004	Bulk	7	FG-56	NAD
KD-02-BULK-INT.WALL-DUST-007I	030423846-0009	12/2/2004	Bulk	2	G-3	1.57%
ZD-29-BULK-INTWALL-DUST-001I	030423956-0001	12/3/2004	Bulk	29	NE area GH-78	NAD

Table 3
Interior Wall Interstitial Spaces - Lead
Lead Wipe (SW 846, 7420)

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

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	Lead (ug/ft2)	Lead (ug/m2)
KD-26-W-PB-INTWALL-001I	030423947-0001	12/2/2004	Wipe	26	Sheetrock, tent location GF-56	<10	<108
KD-7-W-PB-INTWALL-001I	030423947-0002	12/2/2004	Wipe	7	Sheetrock, tent location GF-56	24	258
KD-20-W-PB-INTWALL-003I	030423947-0003	12/2/2004	Wipe	20	Sheetrock, tent location CB-34	<10	<108
KD-4-W-PB-INTWALL-002I	030423947-0004	12/2/2004	Wipe	4	Sheetrock, tent location DC-23	<10	<108
KD-16-W-PB-INTWALL-004I	030423947-0005	12/2/2004	Wipe	16	Exterior wall tent location HG-56	<10	<108
KD-14-W-PB-INT.WALL-005I	030423947-0006	12/2/2004	Wipe	14	Sheetrock, tent location AB-24	<10	<108
KD-10-W-PB-INTWALL-007I	030423947-0008	12/2/2004	Wipe	10	Sheetrock, tent location GF-56	<10	<108
KD-2-W-PB-INTWALL-008I	030423947-0009	12/2/2004	Wipe	14	Sheetrock, tent location HG-45	<10	<108
KD-000-W-PB-000-FBLANK	030423947-0011	12/2/2004			Blank	<10	<108
KD-24-WIPE-INTWALLLEAD-009I	030423954-0003	12/3/2004	Wipe	24	Sheetrock, NW Area A-4	16	172
KD-29-WIPE-INTWALLLEAD-010I	030423954-0005	12/3/2004	Wipe	29	Sheetrock, NE Area GH-78	<10	<108

	ug/ft2
Arithmetic Mean (ND=1/2)	8
May 2003 Benchmark[1]	25
April 2003 WTC Background Study[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 4
Interior Wall Interstitial Spaces - Silica
Silica Wipe (NIOSH 7500, XRD)

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

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	Silica (mg/ft2)
KD-24-W-INT.WALL-SILICA-009I	040425315-0001	12/3/2004	Wipe	24	CB-45	0.084
KD-29-W-INT.WALL-SILICA-010I	040425315-0002	12/3/2004	Wipe	29	HG-78	2.420
KD-7-W-INT.WALL-SILICA-001I	040425316-0001	12/2/2004	Wipe	7	GF-56	1.340
KD-4-W-INT.WALL-SILICA-002I	040425316-0002	12/2/2004	Wipe	4	DC-23	0.356
KD-20-W-INT.WALL-SILICA-003I	040425316-0003	12/2/2004	Wipe	20	DC-24	0.255
KD-16-W-INT.WALL-SILICA-004I	040425316-0004	12/2/2004	Wipe	16	GH-56	0.055
KD-14-W-INT.WALL-SILICA-005I	040425316-0005	12/2/2004	Wipe	14	AB-34	0.065
ZD-26-W-INT.WALL-SILICA-006I	040425316-0006	12/2/2004	Wipe	26		0.260
KD-000-W-SILICA-BLANK-000	040425316-0007	12/2/2004	Wipe		Blank	0.000
KD-10-W-INT.WALL-SILICA-007I	040425316-0008	12/2/2004	Wipe	10	GF-56	0.515
KD-2-W-INT.WALL-SILICA-008I	040425316-0009	12/2/2004	Wipe	2	GF-56	0.196

	mg/ft2
Arithmetic Mean	0.55
May 2003 Benchmark[1]	n/a
April 2003 WTC Background Study[2]	>0.0796 (expressed as quartz)
September 2002 WTC Indoor Assessment[3]	
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.* 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
Interior Wall Interstitial Spaces - 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	Location	TEQ (ND=1/2; ng/m2)
ZD-26-W-DX-Int.Wall-001I	G220-29-1C	12/2/2004	Wipe	26	GF-56	1.07
KD-7-W-DX-Int.Wall-001I	G220-29-2C	12/2/2004	Wipe	7	GF-56	0.84
KD-20-W-DX-Int.Wall-003I	G220-29-3C	12/2/2004	Wipe	20	DC-23	0.89
KD-4-W-DX-Int.Wall-002I	G220-29-4C	12/2/2004	Wipe	4	DC-23	1.24
KD-16-W-DX-Int.Wall-004I	G220-29-6C	12/2/2004	Wipe	16	GH-56	0.87
KD-14-W-DX-Int.Wall-005I	G220-29-7C	12/2/2004	Wipe	14	AB-34	1.02
KD-10-W-DX-Int.Wall-007I	G220-29-10C	12/2/2004	Wipe	10	GF-56	0.84
KD-2-W-DX-Int.Wall-008I	G220-29-11C	12/2/2004	Wipe	2	GF-56	1.03
KD-000-W-Dx-000-Fblank	G220-29-12C	12/2/2004	Wipe		Blank	1.36
KD-24-W-Int.Wall DX-009I	G220-30-3B	12/3/2004	Wipe	24	A-4	1.87
KD-29-W-Int.Wall DX-010I	G220-30-5B	12/3/2004	Wipe	29	GH-78	1.32

	ng/m2
Arithmetic Mean	1.10
May 2003 Benchmark[1]	2.0
April 2003 WTC Background Study[2]	0.693
September 2002 WTC Indoor Assessment[3]	
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 6
Interior Wall Interstitial Spaces - Polycyclic Aromatic Hydrocarbons (PAH)
PAH (SW 846-8290)

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

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	PAH (ug/m2)	Benzo(a)Pyrene Equivalent (ug/m2)
ZD-26-W-PAH-Int.Wall-001I	G220-27-1B	12/2/2004	Wipe	26	Sheetrock, GF-56	<800	<57.8
KD-7-W-PAH-Int.Wall-001I	G220-27-2B	12/2/2004	Wipe	7	Sheetrock, GF-56	<800	<57.9
KD-20-W-PAH-Int.Wall-003I	G220-27-3B	12/2/2004	Wipe	20	Sheetrock, CB-34	<800	<57.10
KD-4-W-PAH-Int.Wall-002I	G220-27-4B	12/2/2004	Wipe	4	Sheetrock, DC-23	<800	<57.11
KD-16-W-PAH-Int.Wall-004I	G220-27-6B	12/2/2004	Wipe	16	Sheetrock, HG-56	<800	<57.12
KD-14-W-PAH-Int.Wall-005I	G220-27-7B	12/2/2004	Wipe	14	Sheetrock, AB-24	<800	<57.13
KD-10-W-PAH-Int.Wall-007I	G220-27-10B	12/2/2004	Wipe	10	Sheetrock, GF-56	<800	<57.14
KD-2-W-PAH-Int.Wall-008I	G220-27-12B	12/2/2004	Wipe	2	Sheetrock, HG-45	<800	<57.15
KD-24-W-PAH-Int.Wall-009I	G220-28-3B	12/2/2004	Wipe	24	Sheetrock, CB-45	<800	<57.16
KD-29-W-PAH-Int.Wall-010I	G220-28-5B	12/2/2004	Wipe	29	Sheetrock, HG-78	<800	<57.17
KD-000-PAH-W-Blank-000	G220-28-6B	12/2/2004	Wipe		Blank	<800	<57.18

	ug/m2 - BaP Equivalent
BaP Arithmetic Mean (ND=1/2)	<57.8
May 2003 Benchmark[1]	150
April 2003 WTC Background Study[2]	--
September 2002 WTC Indoor Assessment[3]	
Tier I	>9,000
Tier II	9,000 to 300 (or background)
Tier III	<300 (or background)

Benzo(a)pyrene Equivalent using 1/2 the detection limit.

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 7
Interior Wall Interstitial Spaces - Man Made Vitreous Fibers
MMVF Wipe (EMSL MSD 0310)

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

Sample ID	Lab Sample ID	Sample Date	Sample Type	Floor	Location	MMVF (str/cm2)
KD-7-Int.Wall-MMVF-001	360401138-0001	12/2/2004	Wipe	7	GF-56	234.40
KD-4-Int.Wall-MMVF-002	360401138-0002	12/2/2004	Wipe	4	DC-23	41.40
KD-20-Int.Wall-MMVF-003	360401138-0003	12/2/2004	Wipe	20	DC-23	27.60
KD-16-Int.Wall-MMVF-004	360401138-0004	12/2/2004	Wipe	16	GH-56	27.60
KD-14-Int.Wall-MMVF-005	360401138-0005	12/2/2004	Wipe	14	AB-34	172.40
KD-26-Int.Wall-MMVF-006	360401138-0006	12/2/2004	Wipe	26	GF-56	641.30
KD-10-Int.Wall-MMVF-007	360401138-0007	12/2/2004	Wipe	10	GF-56	20.70
KD-2-Int.Wall-MMVF-008	360401138-0008	12/2/2004	Wipe	2	GF-56	20.70
KD-000-W-MMVF-Blank-000	360401138-0009	12/2/2004	Wipe		Blank	ND
KD-24-wipe-Int.Wall-MMVF-009I	360401139-0001	12/3/2004	Wipe	24	A-4	15.17
KD-29-wipe-Int.Wall-MMVF-010I	360401139-0002	12/3/2004	Wipe	29	GH-78	220.60

	str/cm2
Arithmetic Mean (ND=1/2)	142.19
May 2003 Benchmark[1]	n/a
April 2003 WTC Background Study[2]	--
September 2002 WTC Indoor Assessment[3]	
Tier I	>100,000
Tier II	100,000 to background
Tier III	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.