

Interim Final WTC Residential Confirmation Cleaning Study

Volume 2



110 Liberty St.
New York, NY



U.S Environmental Protection Agency, Region 2
New York City Response and Recovery Operations

290 Broadway
New York, NY 10007-1866

May 2003

Table of Contents

Volume 2

Attachments

<i>Title</i>	<i>Section</i>
Personal Monitoring Data	A
The Work Plan and Changes to the Work Plan	B
Site Map	C
Floor Plans	D
Health and Safety Plan, Changes and Issues	E
Scope A- Lower Manhattan Cleaning Procedures	F
Sampling and Analysis Plan	G
Synopsis of Cleaning Methods by Building Area and Fact Sheets	H
HVAC Cleaning Procedures	I
Key for Analytical Tables and Reporting of Analytical Results	J
Summary of Mercury Vapor Results Using the Lumex® Vapor Analyzer	K
Photo Documentation	L

A

Attachment A

Personal Monitoring Data

Silica Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7500, Flow Rate 2.5 L/min, Required Volume 400 to 1,000 L)

SILICA													
Sample Number	Location	Quartz		Cristobalite **		Tridymite		Gypsum		Calcite		Portlandite	
		(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)
PEL* mg/m ³			0.1		0.05		0.05		5		5		5
SPS-9094-A-062502-CA	Common-JN	0.027	0.029	0.317	0.337	0.09	0.096	0.31	0.033	0.058	0.062	0.034	0.036
SPS-9094-A-062502-JB	5C	0.099	0.108	0.359	0.393	<.02	<.022	<.02	<.022	<.02	<.022	<.02	<.022
SPS-9094-A-062502-FB	BLANK	<.005	N/A	<.020	N/A	<.020	N/A	N/A	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-062502-LB	LOT BLANK	0.013	N/A	0.395	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-062602-BA	Common-BA	0.011	0.016	0.047	0.067	<.02	<.029	<.02	<.014	<.02	0.014	<.02	<.014
SPS-9094-A-062602-SC	Common	<.01	<.009	0.035	0.031	<.02	<.018	<.02	<.009	<.02	<.009	<.02	<.014
SPS-9094-A-062602-FB	BLANK	<.01	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-062602-LB	LOT BLANK	0.007	N/A	0.109	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-062702-GR	5D	<.005	<.043	<.20	<.017	<.02	<.017	<.02	<.017	<.02	<.017	<.02	<.017
SPS-9094-A-062702-NF	5C	0.011	0.009	0.209	0.179	0.104	0.089	0.023	0.02	0.021	0.018	0.02	0.017
SPS-9094-A-062702-FB	BLANK	<.005	N/A	0.021	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-062702-LB	LOT BLANK	<.005	N/A	0.021	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-062802-JB	5D/2B	<.005	<.004	<.02	<.016	<.02	<.016	<.02	<.016	<.02	<.016	<.02	<.016
SPS-9094-A-062802-JN	5C	0.005	0.004	0.095	0.078	0.029	0.024	<.02	<.016	<.02	<.016	<.02	<.016
SPS-9094-A-062802-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-062802-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-062902-SC	5C	<.005	<.003	<.02	<.01329	<.02	<.01329	<.02	<.013	<.02	<.013	<.02	<.013
SPS-9094-A-062902-GR	2B	0.016	0.012	<.02	<.01490	<.02	<.01490	0.045	0.034	<.02	<.015	<.02	<.015
SPS-9094-A-062902-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-062902-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-063002-JB	2B/4C	0.012	0.008	<.02	<.01412	<.02	<.01412	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-063002-WA	4D	<.005	<.003	<.02	<.01338	<.02	<.01338	<.02	<.013	<.02	<.013	<.02	<.013
SPS-9094-A-063002-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-063002-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070102-JN	4D	<.005	<.004	0.034	0.028	0.032	0.027	<.02	<.017	<.02	<.017	<.02	<.017
SPS-9094-A-070102-GR	4C	<.005	<.004	<.02	<.017	<.02	<.017	<.02	<.017	<.02	<.017	<.02	<.017
SPS-9094-A-070102-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070102-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070202-JB	4C	<.006	0.004	0.025	0.016	<.02	<.013	<.02	<.013	<.02	<.013	<.02	<.013
SPS-9094-A-070202-SC	4D/5A	<.005	<.003	0.029	0.018	<.02	<.013	<.02	<.013	<.02	<.013	<.02	<.013
SPS-9094-A-070202-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070202-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070302-JN	4C	<.005	<.007	<.02	<.027	<.02	<.027	<.02	<.027	<.02	<.027	<.02	<.027

AS - The lowest reportable value is equivalent to the Analytical Sensitivity which is calculated from the lowest reproducible concentration of silica detectable by the Instrument.
 N/A - Not Applicable

Silica Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7500, Flow Rate 2.5 L/min, Required Volume 400 to 1,000 L)

SILICA													
Sample Number	Location	Quartz		Cristobalite **		Tridymite		Gypsum		Calcite		Portlandite	
		(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)
PEL* mg/m ³			0.1		0.05		0.05		5		5		5
SPS-9094-A-070302-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070302-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070802-GR	4C/4B	<.005	<.003	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-070802-BA	5A	<.005	<.003	<.02	<.013	<.02	<.013	<.02	<.013	<.02	<.013	<.02	<.013
SPS-9094-A-070802-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070802-LB	LOT BLANK	0.011	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070902-JN	5A	0.032	0.022	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-070902-JB	4B	<.005	<.003	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-070902-FB	BLANK	0.1	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-070902-LB	LOT BLANK	0.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071002-GR	4B	<.020	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-071002-SC	5A	<.050	<.032	<.02	<.013	<.02	<.013	<.02	<.014	<.02	<.013	<.02	<.013
SPS-9094-A-071002-FB	BLANK	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071002-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071102-BA	3D	0.013	0.009	<.02	<.014	<.02	<.014	0.018	0.012	<.02	<.014	<.02	<.014
SPS-9094-A-071102-JB	3C	0.007	0.005	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-071102-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071102-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071202-GR	3C	<.005	<.004	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-071202-JN	3D/MATRESS	<.005	<.003	<.02	<.013	<.02	<.013	0.013	0.009	<.013	<.013	<.02	<.013
SPS-9094-A-071202-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071202-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071302-RH	4A/MATRESS	<.005	<.006	<.02	<.022	<.02	<.022	0.012	0.013	<.02	<.022	<.02	<.022
SPS-9094-A-071302-SC	4D/4A	<.005	<.005	<.02	<.022	<.02	<.022	<.02	<.022	<.02	<.022	<.02	<.022
SPS-9094-A-071302-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071302-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071502-GR	3A	<.005	<.003	<.02	<.013	<.02	<.013	<.02	<.013	<.02	<.013	<.02	<.013
SPS-9094-A-071502-BA	2A	0.009	0.006	<.02	<.014	<.02	<.014	0.012	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-071502-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071502-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071602-JB	3A	<.005	<.004	<.02	<.014	<.02	<.014	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071602-JN	2A	<.005	<.004	<.02	<.014	<.02	<.014	<.02	N/A	<.02	N/A	<.02	N/A

AS - The lowest reportable value is equivalent to the Analytical Sensitivity which is calculated from the lowest reproducible concentration of silica detectable by the Instrument.
 N/A - Not Applicable

Silica Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7500, Flow Rate 2.5 L/min, Required Volume 400 to 1,000 L)

SILICA													
Sample Number	Location	Quartz		Cristobalite **		Tridymite		Gypsum		Calcite		Portlandite	
		(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)
PEL* mg/m ³			0.1		0.05		0.05		5		5		5
SPS-9094-A-071602-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-071602-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-071702-GR	3A	<.005	<.003	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-071702-SC	MATRESS	<.005	<.004	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-071702-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071702-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071802-JB	3A/4A	0.03	0.02	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014	<.02	<.014
SPS-9094-A-071802-JN	MATRESS	0.005	0.004	<.02	<.016	<.02	<.016	<.02	<.014	<.02	<.016	<.02	<.015
SPS-9094-A-071802-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071802-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071902-NF	CHIRO	<.005	<.004	<.02	<.017	<.02	<.017	0.024	0.02	<.02	<.017	<.02	<.017
SPS-9094-A-071902-BA	MATRESS	<.005	<.003	<.02	<.013	<.02	<.013	<.02	<.013	<.02	<.013	<.02	<.013
SPS-9094-A-071902-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-071902-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072002-SC	MATRESS	<.005	<.003	<.02	<.013	<.02	<.013	0.018	0.012	<.02	<.013	<.02	<.013
SPS-9094-A-072002-RH	CHIRO	<.005	<.003	<.02	<.014	<.02	<.014	0.023	0.016	<.02	<.014	<.02	<.014
SPS-9094-A-072002-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072002-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072202-NF	CHIRO	<.005	<.004	<.02	<.014	<.02	<.014	0.014	0.01	<.02	<.014	<.02	<.014
SPS-9094-A-072202-JN	MATRESS	<.005	<.004	<.02	<.014	<.02	<.014	0.01	0.007	<.02	<.014	<.02	<.014
SPS-9094-A-072202-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072202-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072302-SC	3D	<.005	<.003	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-072302-NF	CA/THAI/3B	<.005	<.003	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-072302-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072302-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072402-NF	CHIRO	<.005	<.003	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-072402-JN	4C/CA	<.005	<.003	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-072402-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072402-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072502-SC	CA/5C	<.005	<.003	<.02	<.003	<.02	<.013	0.011	0.007	<.02	<.013	<.02	<.013
SPS-9094-A-072502-BA	3B	<.005	<.003	<.02	<.003	<.02	<.014	<.01	0.007	<.02	<.014	<.02	<.014
SPS-9094-A-072502-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	<as	<.02	N/A

AS - The lowest reportable value is equivalent to the Analytical Sensitivity which is calculated from the lowest reproducible concentration of silica detectable by the instrument.

N/A - Not Applicable

Silica Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7500, Flow Rate 2.5 L/min, Required Volume 400 to 1,000 L)

SILICA													
Sample Number	Location	Quartz		Cristobalite **		Tridymite		Gypsum		Calcite		Portlandite	
		(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)
PEL* mg/m ³			0.1		0.05		0.05		5		5		5
SPS-9094-A-072502-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	<as	<.02	N/A
SPS-9094-A-072602-JN	5C/THAI	<.005	<.003	<.02	<.013	<.02	<.013	<.01	<.007	<.02	<.013	<.02	<.013
SPS-9094-A-072602-GR	3B	<.005	<.003	<.02	<.013	<.02	<.013	<.01	<.007	<.02	<.013	<.02	<.013
SPS-9094-A-072602-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072602-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072702-JN	3C	<.005	<.008	<.02	<.032	<.02	<.032	<.01	<.016	<.02	<.032	<.02	<.032
SPS-9094-A-072702-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072902-JB	THAI	<.005	<.003	<.020	<.013	<.02	<.013	<.010	<.007	<.02	<.013	<.02	<.013
SPS-9094-A-072902-SC	3C	<.005	<.003	<.020	<.014	<.02	<.014	0.013	0.009	<.02	<.013	<.02	<.013
SPS-9094-A-072902-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.010	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-072902-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.010	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-073002-BA	THAI	<.005	<.003	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-073002-SC	CHIRO/CA	<.005	<.003	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-073002-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-073002-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-073102-JN	MATRESS	<.005	<.004	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-073102-GR	THAI	<.005	<.004	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-073102-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-073102-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080102-SC	CHIRO	0.011	0.008	<.02	<.014	<.02	<.014	<.01	<.007	0.027	0.019	<.02	<.014
SPS-9094-A-080102-BA	THAI	<.005	<.004	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-080102-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080102-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080202-GR	THAI	<.005	<.004	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-080202-JN	MATRESS/CA	<.005	<.004	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-080202-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080202-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080302-SC	MATRESS	<.005	<.006	<.02	<.023	<.02	<.023	<.01	<.011	<.02	<.023	<.02	<.023
SPS-9094-A-080302-BA	CA	<.005	<.006	<.02	<.023	<.02	<.023	<.01	<.011	<.02	<.023	<.02	<.023
SPS-9094-A-080302-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080302-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080502-GR	THAI	0.011	0.008	<.02	<.015	<.02	<.015	<.01	<.007	<.02	<.015	<.02	<.015
SPS-9094-A-080502-JN	THAI	<.005	<.0004	<.02	<.015	<.02	<.015	<.01	<.007	<.02	<.015	<.02	<.015

AS - The lowest reportable value is equivalent to the Analytical Sensitivity which is calculated from the lowest reproducible concentration of silica detectable by the instrument.

N/A - Not Applicable

Silica Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7500, Flow Rate 2.5 L/min, Required Volume 400 to 1,000 L)

SILICA													
Sample Number	Location	Quartz		Cristobalite **		Tridymite		Gypsum		Calcite		Portlandite	
		(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)
PEL* mg/m ³			0.1		0.05		0.05		5		5		5
SPS-9094-A-080502-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080502-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080602-JN	THAI	<.005	<.004	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-080602-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080702-BA	THAI	<.005	<.002	<.02	<.008	<.02	<.008	<.01	<.004	<.02	<.008	<.02	<.008
SPS-9094-A-080702-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080802-BA	THAI	<.005	<.002	<.02	<.008	<.02	<.008	<.01	<.004	<.02	<.008	<.02	<.008
SPS-9094-A-080802-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-080902-JN	THAI	<.005	<.007	<.02	<.027	<.02	<.027	<.01	<.027	<.02	<.014	<.02	<.027
SPS-9094-A-080902-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-081202-JN	4B	<.005	<.005	<.02	<.02	<.02	<.02	<.01	<.01	<.02	<.02	<.02	0.01
SPS-9094-A-081202-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-081302-SC	5th CA	<.005	<.015	<.02	<.015	<.02	<.015	<.02	<.015	<.02	<.015	<.02	<.015
SPS-9094-A-081302-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-081502-SC	FOOD X	<.005	<.004	<.02	<.017	<.02	<.017	<.01	<.009	<.02	<.017	<.02	<.017
SPS-9094-A-081502-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-081602-SC	FOOD X	<.005	<.004	<.02	<.018	<.02	<.018	<.01	<.009	<.02	<.018	<.02	<AS
SPS-9094-A-081602-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-081902-JN	FOOD X	<.005	<AS	<.02	<AS	<.02	<AS	<.01	<.009	<.02	<.018	<.02	<.018
SPS-9094-A-081902-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-082002-SC	FOOD X	<.005	<.004	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.017	<.02	<.014
SPS-9094-A-082002-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-082102-JN	FOOD X	<.005	<.004	<.02	<.014	<.02	<.014	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-082102-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-082202-SC	FOOD X	<.005	<.004	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-082202-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-082302-JN	FOOD X	<.005	<.007	<.02	<.027	<.02	<.027	<.01	<.013	<.02	<.027	<.02	<.027
SPS-9094-A-082302-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-082602-SC	FOOD X	<.005	<.004	<.02	<.017	<.02	<.017	<.01	0.009	<.02	<.017	<.02	<.017
SPS-9094-A-082602-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-082802-SC	FOOD X	<.005	<.003	<.02	<.013	<.02	<.013	<.01	<.007	<.02	<.013	<.02	<.013
SPS-9094-A-082802-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-082902-JN	FOOD X	<.005	<.003	<.02	<.014	<.02	<.014	<.02	<.007	<.02	<.014	<.02	<.014

AS - The lowest reportable value is equivalent to the Analytical Sensitivity which is calculated from the lowest reproducible concentration of silica detectable by the instrument.

N/A - Not Applicable

Silica Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7500, Flow Rate 2.5 L/min, Required Volume 400 to 1,000 L)

SILICA													
Sample Number	Location	Quartz		Cristobalite **		Tridymite		Gypsum		Calcite		Portlandite	
		(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)	(mg)	(mg/m3)
PEL* mg/m ³			0.1		0.05		0.05		5		5		5
SPS-9094-A-082902-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-083002-SC	FOOD X	<.005	<.009	<.02	<.035	<.02	<.035	<.01	<.018	<.02	<.035	<.02	<.035
SPS-9094-A-083002-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-090302-JN	FOOD X	0.006	0.005	<.02	<.017	<.02	<.015	<.01	<.008	<.02	<.017	<.02	<.017
SPS-9094-A-090302-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-090402-SC	FOOD X	<.005	<.003	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-090402-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-090502-JN	FOOD X	<.005	<.003	<.02	<.013	<.02	<.013	0.01	0.007	<.02	<.013	<.02	<.013
SPS-9094-A-090502-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-090602-SC	5TH CA	<.005	<.008	<.02	<.032	<.02	<.032	<.01	<.016	<.02	<.032	<.02	<.032
SPS-9094-A-090602-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.2	N/A
SPS-9094-A-090902-SC	4A	0.007	0.008	<.02	<.023	<.02	<.023	0.035	0.039	0.071	0.08	<.02	<.023
SPS-9094-A-090902-FB	BLANK	0.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-091302-JN	BARBER	<.005	<.012	<.02	<.047	<.02	<.047	0.01	0.023	<.02	<.047	<.02	<.047
SPS-9094-A-091302-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-091602-JN	BARBER	0.005	0.004	<.02	<.017	<.02	<.017	0.024	0.02	<.02	<.017	<.02	<.017
SPS-9094-A-091602-SC	FOOD X	<.005	<.004	<.02	<.017	<.02	<.017	<.01	<.009	<.02	<.017	<.02	<.017
SPS-9094-A-091602-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	0.024	0.02	<.02	N/A	<.02	N/A
SPS-9094-A-091602-LB	LOT BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	<.009	<.02	N/A	<.02	N/A
SPS-9094-A-091702-JN	BARBER	0.008	0.006	<.02	<.015	<.02	<.015	<.01	<.007	<.02	<.015	<.02	<.015
SPS-9094-A-091702-SC	FOOD X	0.005	0.004	<.02	<.015	<.02	<.015	<.01	<.007	<.02	<.015	<.02	<.015
SPS-9094-A-091702-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	N/A	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-091802-JN	BARBER	<.005	<.004	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-091802-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-091902-SC	FOOD X	<.005	<.003	<.02	<.014	<.02	<.014	<.01	<.007	<.02	<.014	<.02	<.014
SPS-9094-A-091902-FB	BLANK	<.005	N/A	<.02	N/A	<.02	N/A	<.01	N/A	<.02	N/A	<.02	N/A
SPS-9094-A-092402-SC	N-STRS/3RD FL	<.005	<.003	<.02	<.014	<.02	<.014	<.01	<AS	<.02	<.014	<.02	<.014
SPS-9094-A-092402-JN	BARBER	0.005	0.003	<.020	<.013	<.02	<.013	<.01	<AS	<.02	<.013	<.02	<.013
SPS-9094-A-092402-FB	BLANK	<.005	N/A	<.020	N/A	<.02	N/A	<.010	N/A	<.02	N/A	<.02	N/A

***PEL for Quartz, Cristobalite and Tridymite**

The Permissible Exposure Limit for quartz (0.1 mg/m3) was arrived by using 100 in the denominator of the formula specified for quartz at 29CFR 1910.1000 Table Z-3.

The cristobalite and tridymite PELs (0.05 mg/m3) were arrived at by halving the quartz value as specified at 29CFR 1910.1000 Table Z-3.

AS - The lowest reportable value is equivalent to the Analytical Sensitivity which is calculated from the lowest reproducible concentration of silica detectable by the instrument.

N/A - Not Applicable

**Silica Personal Air Sampling Results for the
WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7500, flow Rate 2.5 L/min, Required Volume 400 to 1,000 L)**

***PEL for Quartz, Cristobalite and Tridymite**

The Permissible Exposure Limit for quartz (0.1 mg/m³) was arrived by using 100 in the denominator of the formula specified for quartz at 29CFR 1910.1000 Table Z-3. The cristobalite and tridymite PELs (0.05 mg/m³) were arrived at by halving the quartz value as specified at 29CFR 1910.1000 Table Z-3

****Suspiciously High Values of Cristobalite in EPA WTC Samples**

In this project, EMSL has been using the tertiary peak (non-overlapping with other five phases) for Cristobalite for estimating this phase if it is suspected to be present. Some of the samples do show a strong diffraction peak in the angular region 30.2-32.4 degree 2-theta. However, there are reasons to suggest that these peaks may be due to some other phase, not Cristobalite. Three spectra from the project # 040208995 are enclosed. Each shows a strong peak and the true position for cristobalite superimposed. Clearly, the peaks in these samples are very much displaced to the left with respect to the true position. For comparison purposes, a similar spectra taken on a 50 ug cristobalite standard is also included. EMSL Laboratories is using a disclaimer, that Cristobalite has not been confirmed in these samples and that estimates are only tentative.

***** The PCM was below the NYC reoccupancy standard (.01 f/cc). Therefore, TEM was not run.**

Asbestos Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7400 (PCM); NIOSH 7402 (TEM). Flow Rate 2.0 L/min, Minimum Sample Volume 400 L)

Sample Number	Location	ASBESTOS (f/cc)		Sample Number	Location	ASBESTOS (f/cc)	
PEL 0.1f/cc (PCM)		PCM	TEM	PEL 0.1f/cc (PCM)		PCM	TEM
APS-9094-A-062502-CA	Common-JN	0.024	<.003	APS-9094-A-070802-BA	5A	0.013	<.002
APS-9094-A-062502-JB	5C	0.022	<.003	APS-9094-A-070802-FB	BLANK	<	N/A
APS-9094-A-062502-FB	BLANK	<	N/A	APS-9094-A-070802-LB	LOT BLANK	<	N/A
APS-9094-A-062502-LB	LOT BLANK	<	N/A	APS-9094-A-070902-JB	4B	0.003	<.003
APS-9094-A-062602-BA	Common-BA	0.012	<.003	APS-9094-A-070902-JN	5A	0.002	<.002
APS-9094-A-062602-SC	Common	0.013	<.003	APS-9094-A-070902-FB	BLANK	<	N/A
APS-9094-A-062602-FB	BLANK	<	N/A	APS-9094-A-070902-LB	LOT BLANK	<	N/A
APS-9094-A-062602-LB	LOT BLANK	<	N/A	APS-9094-A-071002-GR	4B	0.022	0.007
APS-9094-A-062702-GR	5D	0.008	****	APS-9094-A-071002-SC	5A	0.031	<.003
APS-9094-A-062702-NF	5C	0.015	<.002	APS-9094-A-071002-FB	BLANK	<	N/A
APS-9094-A-062702-FB	BLANK	<	N/A	APS-9094-A-071002-LB	LOT BLANK	<	N/A
APS-9094-A-062702-LB	LOT BLANK	<	N/A	APS-9094-A-071102-JB	3C	0.022	<.002
APS-9094-A-062802-JB	5D/2B	0.012	<.002	APS-9094-A-071102-BA	3D	0.079	<.008
APS-9094-A-062802-JN	5C	0.016	<.002	APS-9094-A-071102-FB	BLANK	<	****
APS-9094-A-062802-FB	BLANK	<	N/A	APS-9094-A-071102-LB	LOT BLANK	<	****
APS-9094-A-062802-LB	LOT BLANK	<	N/A	APS-9094-A-071202-GR	3C	0.006	****
APS-9092-A-062902-SC	5C	overloaded		APS-9094-A-071202-JN	3D/MATRESS	0.006	****
APS-9094-A-062902-GR	2B	0.006	***	APS-9094-A-071202-FB	BLANK	<	****
APS-9094-A-062902-FB	BLANK	<	***	APS-9094-A-071202-LB	LOT BLANK	<	****
APS-9094-A-062902-LB	LOT BLANK	<	***	APS-9094-A-071302-RH	4A/MATRESS	0.038	<.011
ABS-9094-A-063002-JB	2B/4C	0.007	***	APS-9094-A-071302-SC	4D/4A/CHIRO	0.057	<.012
ABS-9094-A-063002-WA	4D	0.005	***	APS-9094-A-071302-FB	BLANK	<	N/A
APS-9094-A-063002-FB	BLANK	<	***	APS-9094-A-071302-LB	LOT BLANK	<	N/A
APS-9094-A-063002-LB	LOT BLANK	<	***	APS-9094-A-071502-GR	3A	0.018	<.002
APS-9094-A-070102-JN	4D	0.051	<.003	APS-9094-A-071502-BA	2A	0.021	<.002
APS-9094-A-070102-GR	4C	0.027	<.003	APS-9094-A-071502-FB	BLANK	N/A	N/A
APS-9094-A-070102-LB	LOT BLANK	N/A	N/A	APS-9094-A-071502-LB	LOT BLANK	N/A	N/A
APS-9094-A-070202-JB	4C	0.018	<.002	APS-9094-A-071602-JB	3A	0.011	<.002
APS-9094-A-070202-SC	4D/5A	0.016	<.002	APS-9094-A-071602-JN	2A	0.014	<.002
APS-9094-A-070202-FB	BLANK	<	N/A	APS-9094-A-071602-FB	BLANK	N/A	N/A
APS-9094-A-070202-LB	LOT BLANK	<	N/A	APS-9094-A-071602-LB	LOT BLANK	N/A	N/A
APS-9094-A-070302-JN	4C	0.01	<.004	APS-9094-A-071702-GR	3A	0.004	****
APS-9094-A-070302-FB	BLANK	<	N/A	APS-9094-A-071702-SC	MATRESS	0.023	<.003
APS-9094-A-070302-LB	LOT BLANK	<	N/A	APS-9094-A-071702-FB	BLANK	<	N/A
APS-9094-A-070802-GR	4C/4B	0.013	<.002				

*** The PCM was below the NYC reoccupancy standard (.01 f/cc) so TEM was not run.

< - Below the detection limit. This method assumes the limit of detection is 7 f/mm2

N/A - Not Applicable

Asbestos Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7400 (PCM); NIOSH 7402 (TEM). Flow Rate 2.0 L/min, Minimum Sample Volume 400 L)

Sample Number	Location	ASBESTOS (f/cc)		Sample Number	Location	ASBESTOS (f/cc)	
PEL 0.1f/cc (PCM)		PCM	TEM	PEL 0.1f/cc (PCM)		PCM	TEM
APS-9094-A-071702-LB	LOT BLANK	<	N/A	APS-9094-A-072602-LB	LOT BLANK	<	****
APS-9094-A-071802-JB	3A/4A	0.009	***	APS-9094-A-072702-JN	3C	0.039	<.005
APS-9094-A-071802-JN	MATRESS	0.037	<.003	APS-9094-A-072702-FB	BLANK	<	N/A
APS-9094-A-071802-FB	BLANK	N/A	***	APS-9094-A-072902-JB	THAI	0.039	<.004
APS-9094-A-071802-LB	LOT BLANK	N/A	***	APS-9094-A-072902-SC	3C	0.039	overloaded
APS-9094-A-071902-NF	CHIRO	OVERLOADED	0.053	APS-9094-A-072902-FB	BLANK	<	N/A
APS-9094-A-071902-BA	MATRESS	0.013	<.002	APS-9094-A-072902-LB	LOT BLANK	<	N/A
APS-9094-A-071902-FB	BLANK	<	N/A	APS-9094-A-073002-BA	THAI	0.005	****
APS-9094-A-071902-LB	LOT BLANK	<	N/A	APS-9094-A-073002-SC	CHIRO/CA	0.006	****
APS-9094-A-072002-SC	MATRESS	0.017	<.002	APS-9094-A-073002-FB	BLANK	<	****
APS-9094-A-072002-RH	CHIRO	OVERLOADED	>.004	APS-9094-A-073002-LB	LOT BLANK	<	****
APS-9094-A-072002-GR	4A	0.011	<.007	APS-9094-A-073102-JN	MATRESS	0.009	****
APS-9094-A-072002-FB	BLANK	<	***	APS-9094-A-073102-GR	THAI	0.022	****
APS-9094-A-072002-LB	LOT BLANK	<	***	APS-9094-A-073102-FB	BLANK	<	N/A
APS-9094-A-072202-NF	CHIRO	0.019	<.002	APS-9094-A-073102-LB	LOT BLANK	<	N/A
APS-9094-A-072202-JN	MATRESS	0.012	<.002	APS-9094-A-080102-SC	CHIRO	0.009	****
APS-9094-A-072202-JB	4A	0.009	***	APS-9094-A-080102-BA	THAI	0.007	****
APS-9094-A-072202-FB	BLANK	<	N/A	APS-9094-A-080102-FB	BLANK	<	****
APS-9094-A-072202-LB	LOT BLANK	<	N/A	APS-9094-A-080102-LB	LOT BLANK	<	****
APS-9094-A-072302-SC	3D	0.016	<.002	APS-9094-A-080202-GR	THAI	<.002	****
APS-9094-A-072302-NF	CA/THAI/3B	0.021	<.002	APS-9094-A-080202-JN	MATRESS/CA	<.002	****
APS-9094-A-072302-FB	BLANK	<	N/A	APS-9094-A-080202-FB	BLANK	<	****
APS-9094-A-072302-LB	LOT BLANK	<	N/A	APS-9094-A-080202-LB	LOT BLANK	<	****
APS-9094-A-072402-NF	CHIRO	0.048	<.008	APS-9094-A-080302-SC	MATRESS	0.004	****
APS-9094-A-072402-JN	4C/CA	0.049	<.006	APS-9094-A-080302-BA	CA	0.006	****
APS-9094-A-072402-FB	BLANK	<	N/A	APS-9094-A-080302-FB	BLANK	<	****
APS-9094-A-072402-LB	LOT BLANK	<	N/A	APS-9094-A-080302-LB	LOT BLANK	<	****
APS-9094-A-072502-SC	CA/5C	0.034	<.002	APS-9094-A-080502-GR	THAI	0.004	****
APS-9094-A-072502-BA	3B	0.021	<.004	APS-9094-A-080502-JN	THAI	0.005	****
APS-9094-A-072502-FB	BLANK	<	N/A	APS-9094-A-080502-FB	BLANK	<	****
APS-9094-A-072502-LB	LOT BLANK	<	N/A	APS-9094-A-080502-LB	LOT BLANK	<	****
APS-9094-A-072602-GR	3B	0.004	***	APS-9094-A-080602-JN	THAI	0.002	****
APS-9094-A-072602-JB	55 Liberty	0.004	***	APS-9094-A-080602-FB	BLANK	<	****
APS-9094-A-072602-JN	5C/THAI	0.007	***	APS-9094-A-080702-BA	THAI	0.002	****
APS-9094-A-072602-FB	BLANK	<	***	APS-9094-A-080702-FB	BLANK	<	****

*** The PCM was below the NYC reoccupancy standard (.01 f/cc) so TEM was not run.

< - Below the detection limit. This method assumes the limit of detection is 7 f/mm2

N/A - Not Applicable

Asbestos Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study
(Analytical Method NIOSH 7400 (PCM); NIOSH 7402 (TEM). Flow Rate 2.0 L/min, Minimum Sample Volume 400 L)

Sample Number	Location	ASBESTOS (f/cc)		Sample Number	Location	ASBESTOS (f/cc)	
PEL 0.1f/cc (PCM)		PCM	TEM	PEL 0.1f/cc (PCM)		PCM	TEM
APS-9094-A-080802-SC	THAI	0.007	***	APS-9094-A-090402-SC	FOOD X	0.004	N/A
APS-9094-A-080802-FB	BLANK	<	***	APS-9094-A-090402-FB	BLANK	<	N/A
APS-9094-A-080902-JN	THAI	0.006	***	APS-9094-A-090502-JN	FOOD X	<.003	N/A
APS-9094-A-080902-FB	BLANK	<	***	APS-9094-A-090502-FB	BLANK	<	N/A
APS-9094-A-081202-JN	4B	0.016	<.003	APS-9094-A-090602-SC	5TH CA	0.019	<.005
APS-9094-A-081202-FB	BLANK	<	N/A	APS-9094-A-090602-FB	BLANK	<	N/A
APS-9094-A-081302-SC	5TH CA	0.007	***	APS-9094-A-090902-JN	3D	0.011	<.003
APS-9094-A-081302-FB	BLANK	<	***	APS-9094-A-090902-SC	4A	0.018	N/A
APS-9094-A-081502-SC	FOOD X	0.022	<.003	APS-9094-A-090902-FB	BLANK	<	N/A
APS-9094-A-081502-FB	BLANK	<	N/A	APS-9094-A-091002-JN	2A	0.005	N/A
APS-9094-A-081602-SC	FOOD X	0.008	***	APS-9094-A-091002-SC	5C	0.007	N/A
APS-9094-A-081602-FB	BLANK	<	***	APS-9094-A-091002-FB	BLANK	<	N/A
APS-9094-A-081902-JN	FOOD X	0.038	<.003	APS-9094-A-091202-SC	MATTRESS/CHIRO	0.011	<.002
APS-9094-A-081902-FB	BLANK	<	***	APS-9094-A-091202-JN	3C	0.005	<.002
APS-9094-A-082002-SC	FOOD X	0.02		APS-9094-A-091302-JN	BARBER	0.131	<.008
APS-9094-A-082002-FB	BLANK	<	***	APS-9094-A-091602-JN	BARBER	overloaded	0.007
APS-9094-A-082102-JN	FOOD X	0.009	***	APS-9094-A-091602-SC	FOOD X	0.008	N/A
APS-9094-A-082102-FB	BLANK	<	***	APS-9094-A-091602-FB	BLANK	<	N/A
APS-9094-A-082202-SC	FOOD X	0.014	<.002	APS-9094-A-091702-JN	BARBER	overloaded	0.003
APS-9094-A-082202-FB	BLANK	<	N/A	APS-9094-A-091702-SC	FOOD X	0.015	<.003
APS-9094-A-082302-JN	FOOD X	<.005	***	APS-9094-A-091702-FB	BLANK	<	N/A
APS-9094-A-082302-FB	BLANK	<	N/A	APS-9094-A-091802-SC	THAI	0.017	0.002
APS-9094-A-082602-SC	FOOD X	0.022	<.003	APS-9094-A-091802-JN	BARBER	0.033	<.002
APS-9094-A-082602-FB	BLANK	<	N/A	APS-9094-A-091802-FB	BLANK	<	N/A
APS-9094-A-082802-SC	FOOD X	0.02	<.002	APS-9094-A-091902-SC	FOOD X	0.006	<.002
APS-9094-A-082802-FB	BLANK	<	N/A	APS-9094-A-091902-JN	5C/BARBER	0.025	<.002
APS-9094-A-082902-JN	FOOD X	0.007	***	APS-9094-A-091902-FB	BLANK	<	N/A
APS-9094-A-082902-FB	BLANK	<	N/A	APS-9094-A-092402-SC	N-STRS/3RD FL	0.019	<.002
APS-9094-A-083002-SC	FOOD X	0.028	<.006	APS-9094-A-092402-JN	BARBER	0.011	<.002
APS-9094-A-083002-FB	BLANK	<	N/A	APS-9094-A-092402-FB	BLANK	<	N/A
APS-9094-A-090302-JN	FOOD X	0.028	<.003	APS-9094-A-092502-SC	S-STRS/2ND FL	0.007	N/A
APS-9094-A-090302-FB	BLANK	<	N/A	APS-9094-A-092502-FB	BLANK	<	N/A

*** The PCM was below the NYC reoccupancy standard (.01 f/cc) so TEM was not run.

< - Below the detection limit. This method assumes the limit of detection is 7 f/mm2

N/A - Not Applicable

Lead Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study

(Analytical Method NIOSH 7300, Flow Rate 2.0 L/min PEL 50 ug/m³)

Sample Number	Location	LEAD (ug/m ³)	Sample Number	Location	LEAD (ug/m ³)
LPS-9094-A-062502-CA	Common-JN	<.269	LPS-9094-A-070802-FB	BLANK	<.250
LPS-9094-A-062502-JB	5C	0.909	LPS-9094-A-070802-LB	LOT BLANK	0.268
LPS-9094-A-062502-FB	BLANK	<.25	LPS-9094-A-070902-JB	4B	<.169
LPS-9094-A-062502-LB	LOT BLANK	<.25	LPS-9094-A-070902-JN	5A	0.433
LPS-9094-A-062602-BA	Common-BA	<.233	LPS-9094-A-070902-FB	BLANK	<.250
LPS-9094-A-062602-SC	Common	<.347	LPS-9094-A-070902-LB	LOT BLANK	<.250
LPS-9094-A-062602-FB	BLANK	<.25	LPS-9094-A-071002-GR	4B	1.68
LPS-9094-A-062602-LB	LOT BLANK	<.25	LPS-9094-A-071002-SC	5A	0.272
LPS-9094-A-062702-GR	5D	<.238	LPS-9094-A-071002-FB	BLANK	0.328
LPS-9094-A-062702-NF	5C	<.0213	LPS-9094-A-071002-LB	LOT BLANK	0.267
LPS-9094-A-062702-FB	BLANK	<.25	LPS-9094-A-071102-BA	3D	0.234
LPS-9094-A-062702-LB	LOT BLANK	<.25	LPS-9094-A-071102-JB	3C	0.245
LPS-9094-A-062802-JB	5D/2B	<.202	LPS-9094-A-071102-FB	BLANK	<.250
LPS-9094-A-062802-JN	5C	<.202	LPS-9094-A-071102-LB	LOT BLANK	<.250
LPS-9094-A-062802-FB	BLANK	<.25	LPS-9094-A-071202-GR	3C	<.242
LPS-9094-A-062802-LB	LOT BLANK	<.25	LPS-9094-A-071202-JN	3D/MATRESS	<.258
LPS-9094-A-062902-SC	5C	<.211	LPS-9094-A-071202-FB	BLANK	<.25
LPS-9094-A-062902-GR	2B	<.273	LPS-9094-A-071202-LB	LOT BLANK	<.25
LPS-9094-A-062902-FB	BLANK	<.250	LPS-9094-A-071302-SC	Chiro/4D/4A	<.0395
LPS-9094-A-062902-LB	LOT BLANK	<.250	LPS-9094-A-071302-RH	4A/MATRESS	<.0418
LPS-9094-A-063002-FB	BLANK	<.250	LPS-9094-A-071302-FB	BLANK	<.25
LPS-9094-A-063002-LB	LOT BLANK	<.250	LPS-9094-A-071302-LB	LOT BLANK	<.25
LPS-9094-A-063002-JB	2B/4C	<.210	LPS-9094-A-071502-GR	3A	<.209
LPS-9094-A-063002-WA	4D	0.387	LPS-9094-A-071502-BA	2A	<.0214
LPS-9094-A-070102-GR	4C	<.255	LPS-9094-A-071502-FB	BLANK	<.25
LPS-9094-A-070102-FB	BLANK	<.25	LPS-9094-A-071502-LB	LOT BLANK	<.25
LPS-9094-A-070102-LB	LOT BLANK	<.25	LPS-9094-A-071602-JB	3A	<.225
LPS-9094-A-070202-JB	4C	<.207	LPS-9094-A-071602-JN	2A	<.227
LPS-9094-A-070202-SC	4D/5A	<.205	LPS-9094-A-071602-FB	BLANK	<.25
LPS-9094-A-070202-FB	BLANK	<.250	LPS-9094-A-071602-LB	LOT BLANK	<.25
LPS-9094-A-070202-LB	LOT BLANK	<.250	LPS-9094-A-071702-SC	MATRESS	0.277
LPS-9094-A-070302-JN	4C	<.269	LPS-9094-A-071702-GR	3A	<.216
LPS-9094-A-070302-FB	BLANK	<.250	LPS-9094-A-071702-FB	BLANK	<.250
LPS-9094-A-070302-LB	LOT BLANK	<.250	LPS-9094-A-071702-LB	LOT BLANK	<.250
LPS-9094-A-070802-GR	4C/4B	0.244	LPS-9094-A-071802-JN	MATRESS	0.277
LPS-9094-A-070802-BA	5A	0.36	LPS-9094-A-071802-JB	3A/4A	<.208

Lead Personal Air Sampling Results for the WTC Residential Confirmation Cleaning Study

(Analytical Method NIOSH 7300, Flow Rate 2.0 L/min PEL 50 ug/m³)

Sample Number	Location	LEAD (ug/m ³)	Sample Number	Location	LEAD (ug/m ³)
LPS-9094-A-071802-FB	BLANK	<.250	LPS-9094-A-072202-FB	BLANK	<.250
LPS-9094-A-071802-LB	LOT BLANK	<.250	LPS-9094-A-072202-LB	LOT BLANK	<.250
LPS-9094-A-071902-BA	MATRESS	<.206	LPS-9094-A-072302-SC	3D	<.272
LPS-9094-A-071902-NF	CHIRO	0.312	LPS-9094-A-072302-NF	CA/THAI/3B	0.272
LPS-9094-A-071902-FB	BLANK	<.250	LPS-9094-A-072302-FB	BLANK	<.250
LPS-9094-A-071902-LB	LOT BLANK	<.250	LPS-9094-A-072302-LB	LOT BLANK	<.250
LPS-9094-A-072002-RH	CHIRO	0.765	LPS-9094-A-072402-NF	CHIRO	0.328
LPS-9094-A-072002-FB	BLANK	<.250	LPS-9094-A-072402-JN	4C/CA	<.218
LPS-9094-A-072002-LB	LOT BLANK	<.250	LPS-9094-A-072402-FB	BLANK	<.250
LPS-9094-A-072202-NF	CHIRO	<.224	LPS-9094-A-072402-LB	LOT BLANK	<.250

B

Attachment B

The Work Plan and Changes to the Work Plan

Residential Confirmation Cleaning Study
Work Plan

Prepared for and by:

The United States Environmental Protection Agency
2890 Woodbridge Avenue
Edison, New Jersey 08837

May 30, 2002

1. INTRODUCTION

The United States Environmental Protection Agency (EPA) has been tasked to evaluate the effectiveness of various cleaning procedures that may have been utilized in cleaning residential living spaces located in the immediate vicinity of ground zero that are contaminated with dust and debris from the World Trade Center (WTC) attack. The study will involve implementing various vacuuming and cleaning techniques in separate apartments to determine their effectiveness. Comprehensive sampling for Contaminants of Potential Concern (COPC) will be conducted throughout the study to determine which method of cleaning is most effective at dust control. The building located at 110 Liberty Street has been selected for the study. The location of the building in relation to ground zero is shown on Figure 1.0.

1.1 BACKGROUND INFORMATION

The building at 110 Liberty Street is five stories with twelve (12) residential and six commercial spaces and has been unoccupied since September 11, 2001. It is owned by Liberty Street Associates LLC (David M. Baldwin Realty Company, Inc). The building is situated between Liberty and Cedar Steets and has a co-address of 113-117 Cedar Street. The collapse of the WTC severely impacted all spaces in the building with deposition of dust and debris. Windows of residential and commercial spaces facing the WTC were blown out as were the sky lights located in the ceilings of the three, fifth floor dwellings. The building was professionally cleaned shortly after the collapse of the WTC. The cleanup was limited to all residential spaces, the basement and the roof. None of the commercial spaces, except for unit 3A were cleaned. Two of the commercial spaces (Unit 1 and Unit 2) are presently covered with inches of dust. All of the residential rental spaces contain dust of various degrees due to redeposition of dust generated from the work effort at ground zero.

The rental spaces range in size from 1,000 to 1,300 square feet. The residential spaces are of open design and include a kitchen, bathroom and sleeping area. Commercial spaces identified as Unit 1, Unit 2 and Dwelling 3A were used as a chiropractors office, a retail mattress showroom and offices of Baldwin Realty, respectively. Each space is heated by an individual hot water base board system. Window or roof mounted air conditioners are present in the residential space, central systems are present in the commercial space (Unit 1 and Unit 2). Rental spaces are accessible from Liberty or Cedar Streets through common hallways, floors are accessible via an elevator and stairs. The building is presently without electricity and service is not expected to be restored until mid June. Each floor has a trash compactor room and a utility room. A laundry room is located on the second floor. The basement contains the building trash compactor, elevator shaft, electric meter rooms, preparation and storage areas for the Chinese restaurant, and a hair salon.

The study will be conducted on twelve (12) residential and three commercial spaces. The two restaurants and hair salon are not part of the study but will be cleaned by EPA at the completion of the study.

2. PROPOSED PLANS AND PROJECT OBJECTIVES

EPA will evaluate eight cleaning techniques during the study. Fifteen (15) separate units will be identified and evaluated based on the following criteria: exposure to ground zero, type of interior decorating and the location of the unit in the building. Cleaning techniques will be specific to each unit and will consist of basic vacuuming with standard household equipment to use of advanced commercial quality equipment. Wet wiping of horizontal surfaces will be performed in each unit. The use of wet vacuums for cleaning carpets will also be investigated.

Comprehensive sampling for COPC will be conducted prior to, during and after the cleanup. Laboratory data will be evaluated by EPA to determine the efficiency and effectiveness of each cleanup technique as well as possible exposures to individuals performing the task.

The Cleanup Plan details the tasks and procedures to be used during the cleaning of specific units. Tasks will be identified and protocols will be detailed for building assessments, setup of support/decontamination zones, vacuuming/washing and disposal.

The Sampling and Analysis Plan (SAP) presents the detailed procedures and methods for sampling and analysis of bulk, surface and airborne dusts. Sampling will be performed during all phases of the cleanup. A Quality Assurance Project Plan (QAPP) is included in the Sampling and Analysis Plan to ensure that the sampling and analysis are conducted in conformance with EPA Quality Assurance/Quality Control (QA/QC) objectives.

The Health and Safety Plan (HASP) provides the minimum safety requirements that will be implemented during the activities conducted under the Cleanup and Sampling Plans. The Health and Safety Plan satisfies the requirements of 29 CFR 1910.120.

3. CLEANUP PLAN

This Cleanup Plan describes the procedures and protocols to be implemented for the following tasks:

- i) support areas, security
- ii) building and apartment access and assessment;
- iii) photo documentation, and inventories of existing conditions;
- iv) cleaning of common areas, building exteriors, elevator shafts and heating systems;
- v) decontamination areas;
- vi) procedures for interior cleaning;
- vii) procedures for containment and disposal of cleanup wastes.

The sampling program to be implemented is summarized in Section 4. Specific details of sampling activities/protocols/methods performed during the Cleanup are presented in the Sampling and Analysis Plan and associated QAPP. All activities performed under the Cleanup Plan will be performed in accordance with the health and safety protocols presented in the Health and Safety Plan.

1. Support Facilities:

This project will require office space large enough to support numerous activities including public relations, public availability, technical support, communications, data collection and presentation, contractor support and EPA management. Portable trailers cannot be used in the area due to space constraints, therefore office space in the immediate vicinity of the cleanup will be rented for the duration of the study. Security needs will be determined for support areas and the study building.

2. Building Access and Assessment:

Prior to entering the building, EPA will obtain a signed access agreement with the building owner(s) and prior tenant(s). These documents will be prepared by EPA attorneys and signed copies will be kept on file. Once access is obtained the entire building and each apartment will be inspected for safety concerns including: gas/oil/water leaks, perishable foods, rodent/insect infestations, individual or common heating/cooling systems, damaged floors/walls/roofs, common areas, stair ways and elevators. All safety concerns will be noted/evaluated and repaired (if necessary) prior to beginning the cleanup.

3. Photo Documentation and Inventories:

Photo documentation of all building interiors will be conducted and catalogued in an index. The building owner and tenant will be requested to accompany EPA during this event. Inventories of personnel belongings will be developed and owners will be permitted to remove valuables. This documentation is for the benefit of all parties involved. Measurements of the apartment and details of the interior decorating (furniture/carpets etc.) will be obtained to develop a floor plan of the living space. The floor plan will be utilized to locate and document sample locations while the cleanup is progressing. Bulk samples of dust will be obtained (if possible) for laboratory analysis and subsequent evaluation.

4. Cleaning of Common Areas:

EPA will clean building exterior areas (if necessary) prior to beginning interior work. The work will be performed by a subcontractor utilizing vacuum trucks equipped with HEPA filtration. All foyers, stair ways, hall ways, elevators/shafts, and common heating systems will be vacuumed using commercial quality HEPA-filtered vacuums. Cleaning of common areas will begin at the building entrance and proceed to the upper level then return down to the entrance. Plastic curtains will be installed at the interface of clean and non - clean areas to prevent re - deposition of dust due to drafting. If HVAC systems are present, subcontractors specializing in cleaning these units may be utilized. All ventilation ducts will be covered with plastic to minimize recontamination with dust. Wet washing of walls, and ceilings will be performed if dust cannot be removed by vacuuming. The goal of this activity is to provide a dust free area to allow level "D" entry through the common spaces and for construction of equipment storage and decontamination areas. Decontamination areas will be temporary structures built of wood and plastic sheeting to be utilized to don and doff protective equipment when entering or exiting the work areas.

5. Interior Cleaning:

EPA will evaluate eight cleaning techniques on fifteen (15) rental spaces. Each cleaning technique will be tested on two rental units. The eight cleanup techniques will vary through use of different vacuuming systems. Sampling of dust before, during, and after the cleanup will be performed to evaluate the effectiveness of each cleanup technique and worker exposure.

General cleaning procedures which will be employed for all units are as follows: Bulk accumulations of dust and debris (if present) will be manually removed using shovels and commercial quality HEPA-filtered vacuums. All horizontal and vertical surfaces will be vacuumed beginning with the ceilings and working down along the walls to the floor. Windows, electrical outlets, sills, heating/cooling units will be vacuumed as they are encountered. Filters will be replaced on cooling units. After cleaning, A/C units will be sealed with plastic sheeting. Central HVAC intake/discharge registers will be covered with plastic. Horizontal and vertical solid surfaces including floors, appliances, table tops, cabinets (interior/exterior) as well as flat ware, and accent items will be washed with soap and water (if appropriate). Books, files, magazine, porous accent items will be vacuumed and stored in boxes then covered with plastic bags. Items such as clothes, shoes, drapes/curtains, will be HEPA vacuumed (if necessary) and stored in plastic bags for washing/dry-cleaning by the tenant. Carpets and furniture will be dry vacuumed until visibly clean. The tenant will be invited to monitor the cleanup if desired. EPA will furnish protective equipment to tenant(s) during the cleanup. No items will be discarded unless authorized by the tenant. If necessary, work schedules will be modified to accommodate the tenant.

Detailed cleaning procedures and sequencing of work are included as Attachment A.

Four scenarios have been developed to evaluate eight cleanup techniques. Each scenario contains two parts for testing two different cleaning procedures. Each scenario is discussed below:

Scenario 1:

(Selection Criteria): Accumulation of dust on horizontal surfaces should be limited to a dusting. This scenario may represent a typical apartment which was impacted but not totally encompassed in dust.

Test A (Equipment Selection) Cleaning will be conducted in two units using basic residential quality upright vacuums and shop vacuums which are available from Hoover®, Eureka®, Rigid® and Craftsman®.

Test B (Equipment Selection) Cleaning will be conducted in two units with basic vacuums as used in Test A but with the addition of an air filtration device (AFD). The AFD produces a negative pressure differential which will serve to capture dust particles through HEPA filtration that become airborne as a result of the cleaning activities.

Scenario 2:

(Selection Criteria) Same or similar to Scenario 1.

Test A (Equipment Selection) Cleaning will be conducted in two units using HEPA-filtered upright vacuums and HEPA-filtered shop vacuums which are available from Hoover®, Eureka®, Rigid® and Craftsman® companies. The upright vacuums from Hoover® and Eureka® were provided to residents of lower Manhattan, by FEMA and the American Red Cross for cleaning of their occupied space.

Test B (Equipment Selection) Cleaning will be conducted in two units using the same vacuums in Test A but with the addition of an AFD.

Scenario 3:

(Selection Criteria): Same or similar to Scenario 1.

Test A (Equipment Selection) Cleaning will be conducted in two units using commercial quality HEPA-filtered vacuums. These vacuums will be purchased from Nilfisk-Advance™ Vacuum Systems. Vacuums of this type were used by management companies for cleaning residential/commercial spaces in lower Manhattan after the WTC attack.

Test B (Equipment Selection) Cleaning will be conducted in two units using the same vacuums in Test A but with the addition of a AFD.

Scenario 4:

(Selection Criteria) Units have a direct exposure to ground zero. Windows were blown out as a result of the WTC collapse. Accumulation of dust on horizontal surfaces measures in inches. This scenario represents a severely impacted space with heavy accumulations of dust and debris. The two commercial spaces (Units 1 and Unit 2) in the building fit this criteria. Both spaces have wall to wall carpeting and acoustical ceiling tiles.

Test A (Equipment Selection) Cleaning will be conducted in both units using Nilfisk™ HEPA-filtered vacuums. Debris that cannot be vacuumed will be manually removed and disposed of. Due to the excessive amount of dust, a minimum of two AFDs will be used to control airborne dust. Cleaning will continue until all visible dust has been removed.

Test B (Wet Wiping) Additional cleaning of wall surface areas will be conducted to remove any dust residues that may not have been removed by vacuuming. Wiping of the walls with a damp soapy cloth will be performed to remove residual dust that may have adhered to the walls from the force of the collapse.

Test C (Carpet Shampooing) Wall to wall carpeting in both units will be shampooed or steam cleaned using commercial duty equipment.

Scenarios 1, 2 and 3 will be each be tested on four units. Scenario 4 will be tested on the two commercial spaces. Additional evaluation of wet wiping methods will be conducted on the 15th (Dwelling) that has not been proposed for evaluation under the previously proposed scenarios.

Samples will be collected prior to, during and after cleanup in accordance with the SAP to determine the effectiveness of the cleaning. If sample results do not attain cleanup objectives for a specific scenario, the unit will be re-cleaned using the same equipment and re-sampled. If after a second cleaning the results are unsatisfactory the unit will be cleaned using a method proven successful.

6. Disposal of Waste Generated in Cleanup:

Dust/debris, used protective equipment, clogged vacuum filters, expendables and items discarded by the tenant will be double bagged in 6ml plastic bags and deposited in a roll off container placed outside the building. The roll off container will be transported off site when full and replaced with another roll-off container. Water used for hand washing and equipment washing will be disposed into the sanitary sewer.

4. PROJECT SAMPLING

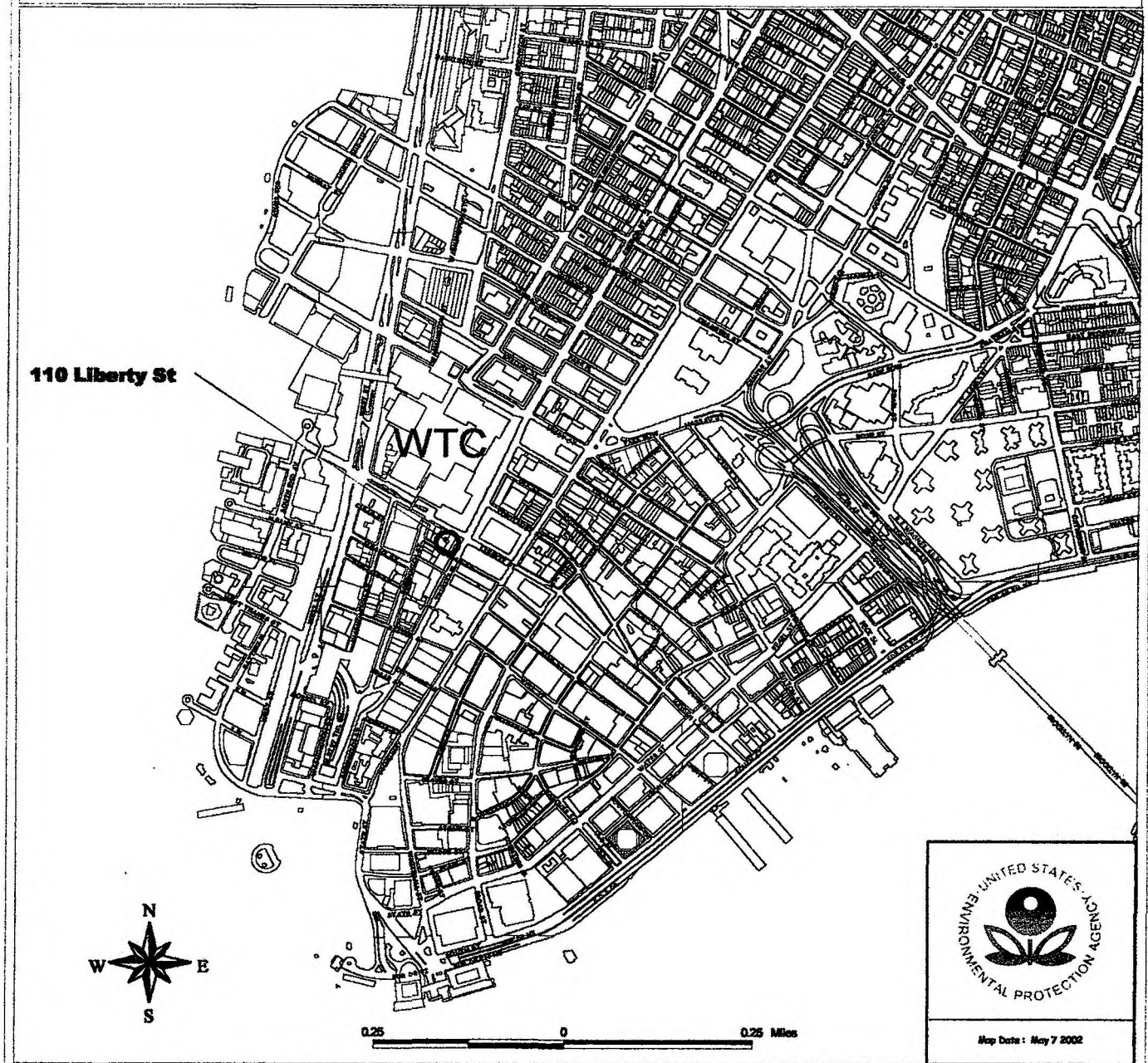
EPA will perform comprehensive sampling before, during and after the cleanup to evaluate the effectiveness of the work and possible worker exposure. Samples of dust collected by wipe, micro vac, and personnel pump sampling techniques will be obtained from porous and nonporous surfaces as well as from workers. Prior to the start of work, bulk samples will be collected (if possible) from each unit. If bulk samples cannot be collected, samples will be obtained using wipe or micro - vac techniques. Samples will be collected from the locations, and analyzed for the parameters shown on the tables included as Attachment B. Specific sampling protocols, methods as well as sample management, data validation and reporting are detailed in the SAP.

5. REPORT PREPARATION

Upon completion of the study a summary report will be prepared discussing the work performed under each scenario. The report will present a synopsis of the work, detailing conditions of the units prior to, during and after the cleanup, duration of the cleanup, problems encountered during cleanup and sampling, sample locations, laboratory data summary tables, and QA/QC documentation. This information will be presented to EPA for evaluation and recommendation.

Figure 1.0

Base Map of Lower Manhattan



Attachment A

Residential Confirmation Cleaning Study Sequence of Activities and Detailed Cleaning Procedures

1. Obtain Access from Owner(s) & Tenants(s):

- i. Meet with owner/tenants to explain the pilot and goals.
- ii. Arrange for owner/tenants to enter rental space to identify items to be discarded or removed (clothes, rugs, furniture) This entry will be after hallways are cleaned and tenants are provided proper PPE.

2. Photo Documentation of Rental Space:

- i. EPA will video and photograph all rental and common spaces before the cleanup begins. (drawers, cabinets, and closets will be opened and areas of damage will be noted)
- ii Inventories of all belongings will be logged and entered into an EPA database.
- iii Heating and air conditioning systems will be identified and photographed..
- iv The interior space will be detailed on a scaled floor plan. Furniture, carpets, beds will be identified, sample locations will be marked.

3. Exterior Cleaning:

NYC is responsible for cleaning roof tops and building exteriors that are covered with dust. Dust will be removed by vacuum and wetted then brushed into bags.

4. Cleaning of Common Spaces:

EPA will initiate the cleanup by vacuuming all common spaces. This includes hallways, utility rooms, laundry rooms, compactor rooms, elevators and elevator shafts. Work will begin from the entrance to the top floors. Windows and screens will be cleaned first. Vacuuming will begin at the ceiling and continue down the walls to the floor. Work will continue to the next floor via stair ways. Utility rooms, compactor rooms and laundry rooms, will be vacuumed as encountered starting from the ceiling working down to the floor. Appliances will be moved to permit complete cleaning. Dryer vents and filters will be replaced or cleaned. When the top hallway is completed vacuuming will continue floor by floor to the building entrance following the same procedures as during the initial cleaning. Isolation barriers will be installed at the stairwell of each floor to minimized recontamination caused by drafting. This barrier will also isolate the common spaces for clearance sampling. Following receipt of acceptable clearance sample results, the floor of the common spaces (hallway) will be covered with construction paper (red rosin), and will be used as storage areas for equipment and supplies, and as passage areas for (level D) workers and visitors.

5. Cleaning of Interior (Residential) Spaces:

EPA will begin cleaning interior spaces beginning at the entrance door of the rental space. Workers will vacuum the foyer areas and construct an isolation barrier to separate this area from the rest of the rental space. The contained foyer area will be considered a clean space for donning PPE. Exteriors of windows/screens will be cleaned first. Interior areas will be cleaned as encountered. Items identified by the tenant(s) for disposal will be consolidated and bagged. Personnel belongings (shoes, clothes, linens etc.) will be vacuumed then bagged for washing/cleaning by the tenant. Vacuuming will begin at the ceiling and continue down the

walls to the floor, working toward the far end of the rental space. Window sills, electrical outlets, mouldings, baseboard heating elements and horizontal surfaces will be vacuumed as encountered. Carpets will be vacuumed 2 times using an agitator bar after removal of gross dust.. Fabric covered furniture will be vacuumed 2 times using a stiff brush attachment after removal of gross dust. Fabric window dressings will be vacuumed 2 times. Window air conditioners will be vacuumed externally then dismantled to be vacuumed internally. Central HVAC intake/discharge registers (if present) will be removed/cleaned to permit interior duct cleaning then replaced and covered with plastic. Appliances such as refrigerators and stoves will be moved to vacuum dust from floor footprint area. Spoiled food (if present in the refrigerator) will be removed at this time. Refrigerator cooling tubes will be brushed and vacuumed. Closet and dresser interiors will be vacuumed. Upon reaching the far end of the rental space vacuuming will continue by reversing the process detailed above. Vacuuming will continue to the entrance area. At this time horizontal surfaces will be wet wiped, solid floors will be moped, flatware and solid objects, will be washed. Flatware, solid objects (electrical equipment, exercise equipment, etc.) will be packaged in boxes and/or covered with plastic. Work will continue to the isolation barrier where all cleaning equipment will be vacuumed and/or washed for use on the next rental space..

6. Cleaning of Interior (Commercial) Spaces:

Two commercial spaces are present in the building, both are grossly contaminated with inches of dust and debris. Both spaces are carpeted and have central air conditioning systems with the exchanger located above tiled ceilings. Entrance to the spaces is via a hallway from Cedar Street and a stairwell from Liberty Street. The heavy accumulation of dust in these spaces requires special considerations. The units will be isolated from both entrance ways by plastic barriers. Vacuum motors and canisters will operate from outside the isolation area. Vacuuming will be accomplished by snaking hoses into the contaminated areas. This procedure will minimize entraining dust into the air. Due to the accumulation of dust, negative air machines will be utilized to manage air born dust. The front windows are presently covered with plywood. Plywood will be removed and window openings will be vacuumed to remove dust and residual debris. Upon completion, plywood and plastic will be installed until the building owner installs permanent windows. Following complete removal of accumulated dust, vacuums will be brought into the space and cleaning will proceed as detailed in the procedures for residential space.

7. Specialized Cleaning Procedures

a. Window Mounted Air Conditioners.

Vacuum exterior surfaces, remove from wall mount and relocate to isolated cleaning area. Cover A/C mount with plastic. Discard filters and open unit to expose interior mechanism. Vacuum cooling fins and interior surfaces. Replace filter, install in mount and cover interior vents with plastic.

b. Roof Mounted A/C

Units cannot be removed; therefore, cleaning will be performed with the unit in place. Remove and replace filters, vacuum interior, inspect exterior exchanger, replace all cleaned parts and cover interior vents with plastic.

c. Refrigerators

Inspect refrigerator, remove and dispose of spoiled food. Move appliance to isolated cleaning area, elevate and clean dust from cooling coils using vacuums and specialized brushes. Clean floor area where appliance was located.

d. Stoves

Move appliance from location, clean floor area. Vacuum storage drawer (if present) and open top of stove to vacuum. Remove exhaust fan light and filters, replace with new. Vacuum first foot of exhaust duct if present.

e. Dishwashers

Remove toe plate and vacuum dust from under appliance.

f. Bathroom Fans

Remove protective cover and wet wipe, remove fan/motor and vacuum. Vacuum first foot of exhaust duct.

g. Hydronic Finned Radiation

Remove protective covers to expose heat elements. Finns are to be vacuumed and brushed to remove dust.

h. Electronic Equipment

Equipment is to be moved to the isolated cleaning area where dust will be removed by blowing air into the cooling slats while vacuuming.

i. Non-perishable canned and bottled goods

These items are to be wet wiped and stored in boxes covered with plastic for the tenant.

j. Carpets

Carpets will be vacuumed twice or until visibly clean. Carpets in the commercial space will be shampooed after vacuuming.

Attachment B

WTC Indoor Air/Environments Monitoring - Sampling and Analytical Procedures for Background and Cleaning Studies

Media	Sampling Points	Analytical Parameters	Sampling Method Proposed	Description	Analytical Method Proposed
Settled Dust Porous Soft Surfaces	Carpets, fabric furniture or drapery in areas of activity (living rooms, family rooms)	Asbestos	ASTM D 5755-95	This is a micro vacuuming method. Three co-located samples will be collected from each location.	ASTM D 5755-95
		Lead	ASTM E 1973-99	This is a micro vacuuming method. Three co-located samples will be collected from each location.	SW-846 6010B
Settled Dust Non-porous Hard Surfaces	Horizontal surfaces of tables or counters and bare floors, ceiling and walls in areas of activity (living rooms, family rooms)	Asbestos	ASTM D 6480-99	Wipe Samples	ASTM D 6480-99 (wipe)
		Lead	HUD Appendix 13.1	Wipe Samples	SW-846 6010B
		Dioxins	ASTM D 6661-01	Wipe Samples	ASTM 6661-01/SW-846 8290
		PAHs	ASTM D 6661-01	Wipe Samples	ASTM 6661-01/SW-846 8270C
		Total Dust	HUD Appendix 13.1**	Wipe Sample collected at one location per unit.	No Formal Method (NIOSH 7500 Modified)
		Silica, calcite, gypsum	HUD Appendix 13.1**	Wipe Samples. All parameters will be collected on one wipe.	NIOSH 7500 (XRD)
		MMVF	ASTM D 6480-99	Samples will be combined with the asbestos sampling.	EMSL MSD.0300
Indoor Air	Areas of known activity (living rooms, family rooms)	Asbestos	NIOSH 7400	Air pump operated at 10L/min for 8 hours to achieve the COPC wkgroup Practical Quantitation Limit (PQL)	PCM NIOSH 7400 followed by TEM AHERA method.
		Lead	NIOSH 7300	Air pump operated at 10L/min for 8 hours to achieve the COPC wkgroup PQL	SW-846 6010B
		PAHs	NIOSH 5515	Air pump operated at 2L/min for 8 hours. Pilot Clean-up study only for worst case scenarios.	SW-846 8270 (Analytical method will be modified to achieve the COPC wkgroup PQL)
		Dioxins	TO-9 (Modified for indoor air)	Air pump operated at 25L/min for 35 hours. This modification is not a proven method. To be conducted during the Pilot Clean-up study only for worst case scenarios.	SW-846 8290
		Silica, calcite, gypsum	NIOSH 7500	Air pump operated at 2.5L/min for 8 hours to achieve the COPC wkgroup PQL	NIOSH 7500 (XRD)
		MMVF	NIOSH 7400	Samples will be combined with the asbestos sampling.	EMSL MSD.0300
Bulk Dust	HVAC systems and AC units (collection of bulk dust sample from the unit air filters). Background study only.	Asbestos	Bulk Sample	Bulk samples will be collected from HVAC or AC window type unit filters, shaken into a plastic bag and transferred into the sample container.	PLM NYS 198.1 followed by TEM NYS 198.4
		Lead	Bulk Sample	(If the volume required is not sufficient for all analyses, the sample will be analyzed for asbestos only.	SW-846 6010B
		PAHs	Bulk Sample	(If the volume required is not sufficient for all analyses, the sample will be analyzed for asbestos only.	SW-846 8270
		Dioxins	Bulk Sample	(If the volume required is not sufficient for all analyses, the sample will be analyzed for asbestos only.	SW-846 8290
		Silica, calcite, gypsum	Bulk Sample	(If the volume required is not sufficient for all analyses, the sample will be analyzed for asbestos only.	NIOSH 7500 (XRD)
		MMVF	Bulk Sample	(If the volume required is not sufficient for all analyses, the sample will be analyzed for asbestos only.	PLM NYS 198.1/EMSL MSD.0300

NOTE: Wipe samples for silica, calcite and gypsum will be collected using the HUD Appendix 13.1 method since no standardized method is available.

WTC Indoor Air/Environment Pre-Cleaning Study Sampling Matrix

Wipe Samples	<i>Asbestos/ MMVF</i>	<i>Lead</i>	<i>Dioxins</i>	<i>PAHs</i>	<i>Silica, Calcite, Gypsum</i>	<i>Total Dust</i>	<i>Total # Samples</i>
Ceilings	1	0	0	0	0	0	1
Walls	1	1	1	1	1	0	5
Bare floor	1	1	1	1	1	0	5
Counter tops or furniture (table tops)	1	1	1	1	1	1	6
Total Wipe Samples/parameter	4	3	3	3	3	1	17

Micro-vacuum Samples	<i>Asbestos/ MMVF</i>	<i>Lead</i>	<i>Dioxins</i>	<i>PAHs</i>	<i>Silica, Calcite, Gypsum</i>	<i>Total Dust</i>	<i>Total # Samples</i>
Carpets or Drapery	3	3	0	0	0	0	6
Fabric Furniture (couch or chair)	3	3	0	0	0	0	6
Total Micro-vacuum Samples/parameter	6	6	0	0	0	0	12

Indoor Air Samples	<i>Asbestos/ MMVF</i>	<i>Lead</i>	<i>Dioxins</i>	<i>PAHs</i>	<i>Silica, Calcite, Gypsum</i>	<i>Total Dust</i>	<i>Total # Samples</i>
Main Living Space(living rooms)	0	0	2	2	0	0	4

Bulk Dust Samples	<i>Asbestos/ MMVF</i>	<i>Lead</i>	<i>Dioxins</i>	<i>PAHs</i>	<i>Silica</i>	<i>pH</i>	<i>Total # Samples</i>
	1	1	1	1	1	1	6

NOTES:

1. MMVF - Man Made Vitreous Fibers.
2. This table does not include the 10% Quality Control samples.
3. The total number of samples presented represents the number of samples to be collected per unit.
4. Dioxins and PAH samples in indoor air will be collected from the 2 commercial spaces. Additional samples may be collected if clean up criteria is not met.

WTC Indoor Air/Environment Cleaning Study Sampling Matrix

Indoor Air Samples	<i>Asbestos/ MMVF</i>	<i>Lead</i>	<i>Dioxins</i>	<i>PAHs</i>	<i>Silica, Calcite, Gypsum</i>	<i>Total Dust</i>	<i>Total # Samples</i>
Monitoring for worker exposure	1	1	0	0	1	0	3

NOTES:

1. MMVF - Man Made Vitreous Fibers
2. This table does not include the 10% Quality Control samples.
Air samples will be collected during the clean up to monitor worker
3. exposure.

WTC Indoor Air/Environment Post Cleaning Study Sampling Matrix

Wipe Samples	<i>Asbestos/ MMVF</i>	<i>Lead</i>	<i>Dioxins</i>	<i>PAHs</i>	<i>Silica, Calcite, Gypsum</i>	<i>Total Dust</i>	<i>Total # Samples</i>
Ceilings	1	0	0	0	0	0	1
Walls	1	1	1	1	1	0	5
Bare floor	1	1	1	1	1	0	5
Counter tops or furniture (table tops)	1	1	1	1	1	1	6
Total Wipe Samples/parameter	4	3	3	3	3	1	17

Micro-vacuum Samples	<i>Asbestos/ MMVF</i>	<i>Lead</i>	<i>Dioxins</i>	<i>PAHs</i>	<i>Silica, Calcite, Gypsum</i>	<i>Total Dust</i>	<i>Total # Samples</i>
Carpets or Drapery	3	3	0	0	0	0	6
Fabric Furniture (couch or chair)	3	3	0	0	0	0	6
Total Micro-vacuum Samples/parameter	6	6	0	0	0	0	12

Indoor Air Samples	<i>Asbestos/ MMVF</i>	<i>Lead</i>	<i>Dioxins</i>	<i>PAHs</i>	<i>Silica, Calcite, Gypsum</i>	<i>Total Dust</i>	<i>Total # Samples</i>
Main Living Space(living rooms)	2	1	0	0	1	0	4

NOTES:

1. MMVF - Man Made Vitreous Fibers
2. This table does not include the 10% Quality Control samples.
3. The total number of samples presented represents the number of samples to be collected per unit.

Changes to the Work Plan

Changes to the Work Plan

1. WET WIPING

1.1 Wet Wipe Using Windex® / Wet Wipe Using Water Only

The work plan initially called for use of soap and water to accomplish wet wiping. Windex® brand was used because it is a commonly used cleaner believed to be readily available in most people's homes. Further, it is non-damaging to most surfaces, from wood to fiberglass. Typically, this soap does not "over-suds." It provides an effective detergent-based protection of surfaces when combined with cold water. This was important, because hot water was not immediately available at the project site. During the project, EPA opted to also evaluate application of wet wipe using water only. Water only was used on the desktop in the Chiropractor's Office, in the bathroom of the Chiropractor's Office, and in the entire Barber Shop. Water only was also used on the vinyl tiles under the carpeted area in the Mattress Store.

1.2 Horizontal Wet Wipe Only / Horizontal and Vertical Wet Wipe

The majority of tests of cleaning methods were accomplished using horizontal wet wipe only, to assist in determination of whether vacuuming without wet wiping would result in acceptable cleaning. However, application of both horizontal and vertical wet wipe was tested in Units 3B and 3C.

Application of both horizontal and vertical wet wiping in Unit 3B was consistent with the procedures called for relative to testing of Scope A, Lower Manhattan Cleaning Procedures. (Attachment F).

Unit 3C was selected for additional tests of the use of both horizontal and vertical wet wiping. The unit was selected for the following reasons:

- The apartment was heavily impacted by WTC dust
 - The apartment was fully furnished and contained many personal belongings, and
 - the test of vacuuming method called for use of equipment without HEPA filter or AFD.
- Additionally, the resident had expressed the intention to return.

1.3 Use of Swiffer® Brand Cloths

EPA opted to evaluate use of Swiffer® brand cloths for application of wet wipe. Swiffer® brand cloths were utilized during the cleaning of residential unit 5D.

2. SCOPE A- LOWER MANHATTAN CLEANING PROCEDURES

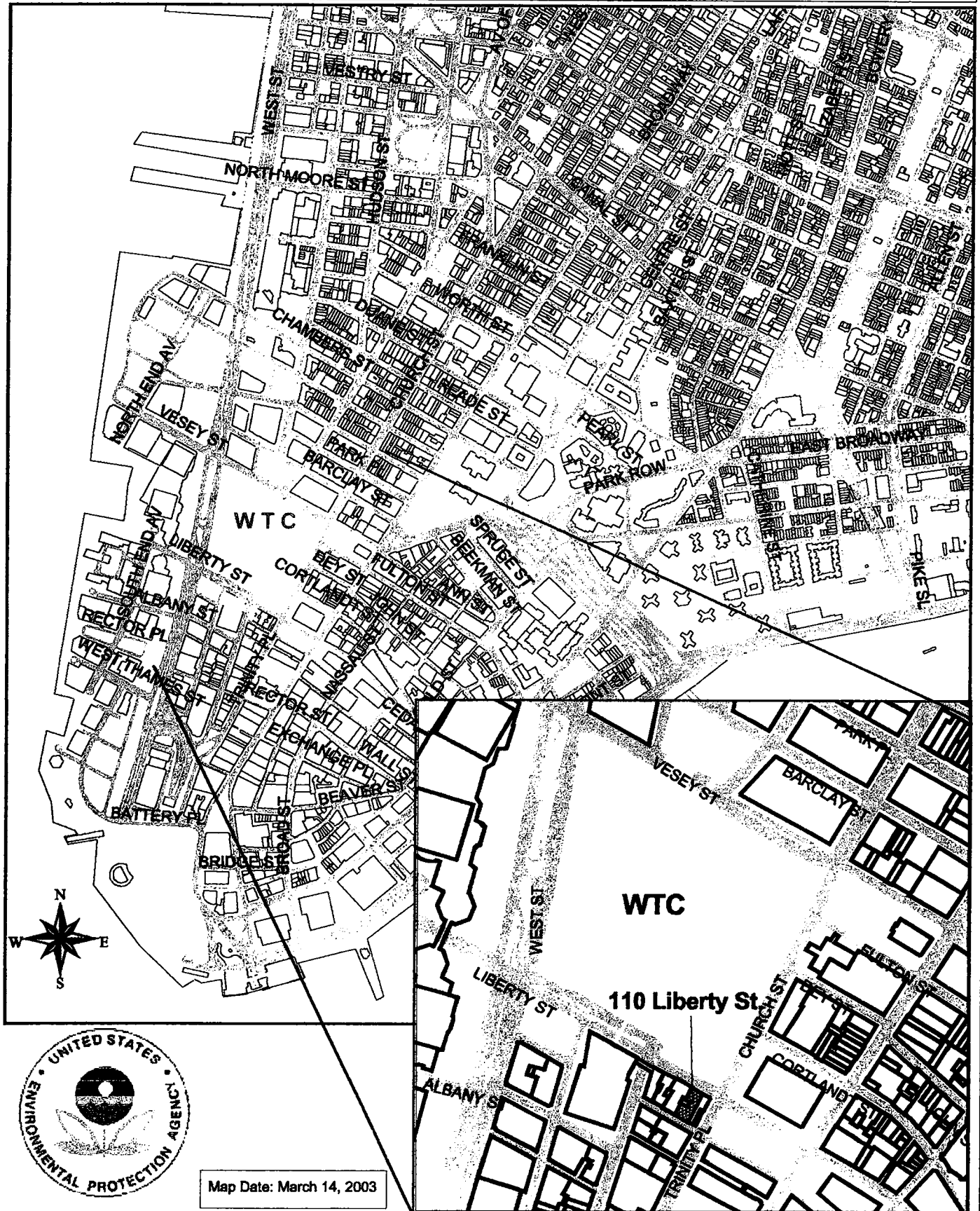
See Attachment F.

C

Attachment C

Site Map

Base Map of Lower Manhattan



D

Attachment D

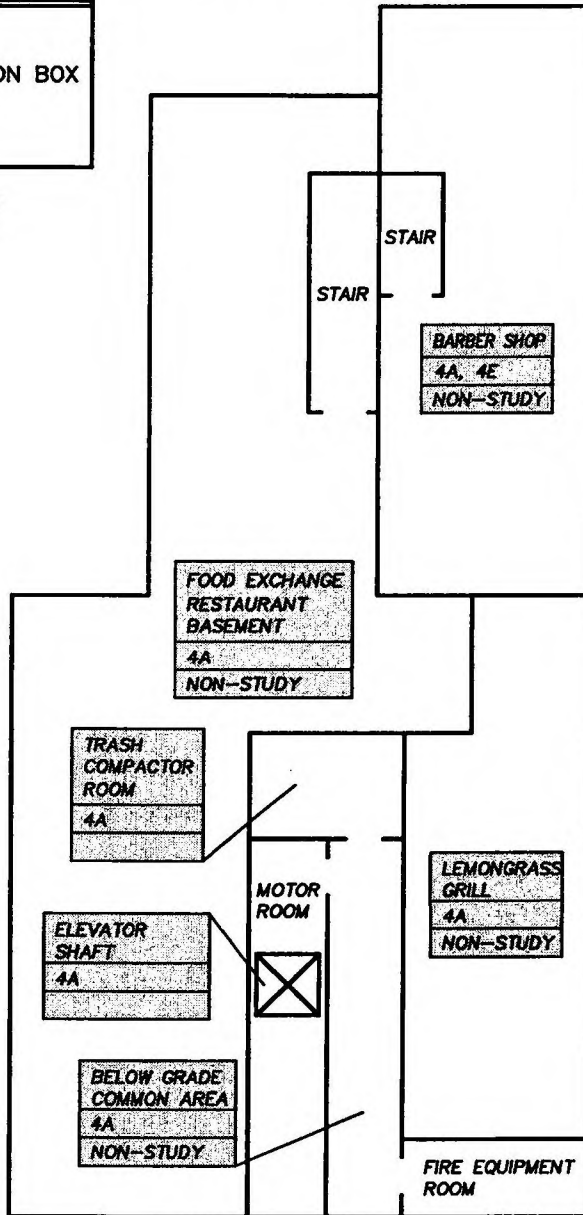
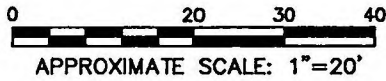
Floor Plans

BASEMENT

LIBERTY STREET

LEGEND:

AREA NAME	AREA DESCRIPTION BOX
CLEANING METHOD(S)	
NOTATION	



CEDAR STREET

DRAWING STATUS ☐ DRAFT ☒ FINAL

PROJECT NO.: 501060	RESPONSE MANAGER: SCOTT WILHELM	PROGRAM MANAGER: BRADLEY J. CUNNINGHAM	PROGRAM/CONTRACTS MANAGER: KIM D. BENNETT
SCALE: 1" = 20'	CADD ID: 501060_0	PLOT DATE: 2/10/03	CHK BY: K.D.B. CHK DATE: 2/10/03
REVISION NO.: 0	REV DATE: NA	DRN BY: AML	DRN DATE: 12/9/02 APPVD BY: K.D.B. APPVD DATE: 2/10/03



WRS Infrastructure & Environment, Inc.

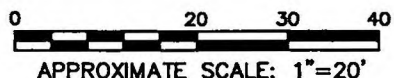
925 CANAL STREET, SUITE 7301, BRISTOL, PENNSYLVANIA 19007
PH: (267) 540-0048 FAX: (267) 540-0049

**WTC RESIDENTIAL
CONFIRMATION CLEANING STUDY**
110 LIBERTY STREET, NEW YORK, NEW YORK
US DEPARTMENT OF ENVIRONMENTAL PROTECTION
CONTRACT NO. 68-S2-99-07
DELIVERY ORDER NO. 060

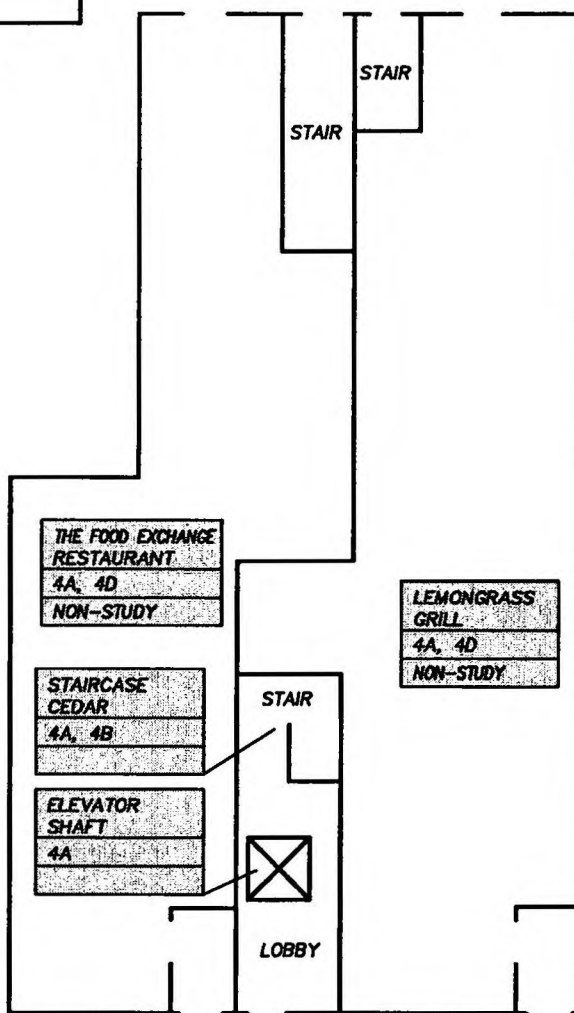
FIRST FLOOR

LEGEND:

AREA NAME	AREA DESCRIPTION BOX
CLEANING METHOD(S)	
NOTATION	



LIBERTY STREET



CEDAR STREET

DRAWING STATUS ☐ DRAFT ☒ FINAL

PROJECT NO. : 501060	RESPONSE MANAGER: SCOTT WILHELM	PROGRAM MANAGER: BRADLEY J. CUNNINGHAM	PROGRAM/CONTRACTS MANAGER: KIM D. BENNETT
SCALE: 1" = 20'	CADD ID: 501060_1	PLOT DATE: 2/10/03	CHK BY: K.D.B. CHK DATE: 2/10/03
REVISION NO.: 0	REV DATE: NA	DRN BY: AML	DRN DATE: 12/9/02 APPVD BY: K.D.B. APPVD DATE: 2/10/03



WRS Infrastructure & Environment, Inc.

925 CANAL STREET, SUITE 7301, BRISTOL, PENNSYLVANIA 19007
PH: (267) 540-0048 FAX: (267) 540-0049

**WTC RESIDENTIAL
CONFIRMATION CLEANING STUDY**
110 LIBERTY STREET, NEW YORK, NEW YORK
US DEPARTMENT OF ENVIRONMENTAL PROTECTION
CONTRACT NO. 68-S2-99-07
DELIVERY ORDER NO. 060

SECOND FLOOR

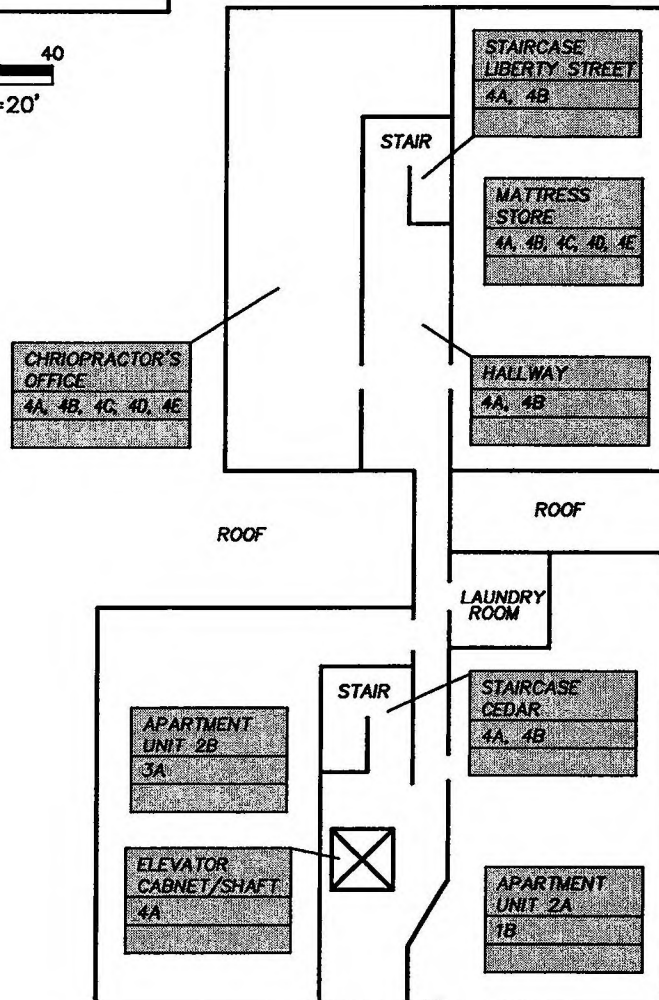
LEGEND:

AREA NAME	AREA DESCRIPTION BOX
CLEANING METHOD(S)	
NOTATION	

0 20 30 40
APPROXIMATE SCALE: 1"=20'



LIBERTY STREET



CEDAR STREET

DRAWING STATUS ☐ DRAFT ☒ FINAL

PROJECT NO. : 501060	RESPONSE MANAGER: SCOTT WILHELM	PROGRAM MANAGER: BRADLEY J. CUNNINGHAM	PROGRAM/CONTRACTS MANAGER: KIM D. BENNETT
SCALE: 1" = 20'	CADD ID: 501060_2	PLOT DATE: 2/10/03	CHK BY: K.D.B.
REVISION NO.: 0	REV DATE: NA	DRN BY: AML	DRN DATE: 12/9/02
		APPVD BY: XX	APPVD DATE: 2/10/03



WRS Infrastructure & Environment, Inc.

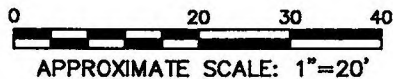
825 CANAL STREET, SUITE 7301, BRISTOL, PENNSYLVANIA 19007
PH: (267) 540-0048 FAX: (267) 540-0049

**WTC RESIDENTIAL
CONFIRMATION CLEANING STUDY**
110 LIBERTY STREET, NEW YORK, NEW YORK
US DEPARTMENT OF ENVIRONMENTAL PROTECTION
CONTRACT NO. 68-S2-99-07
DELIVERY ORDER NO. 060

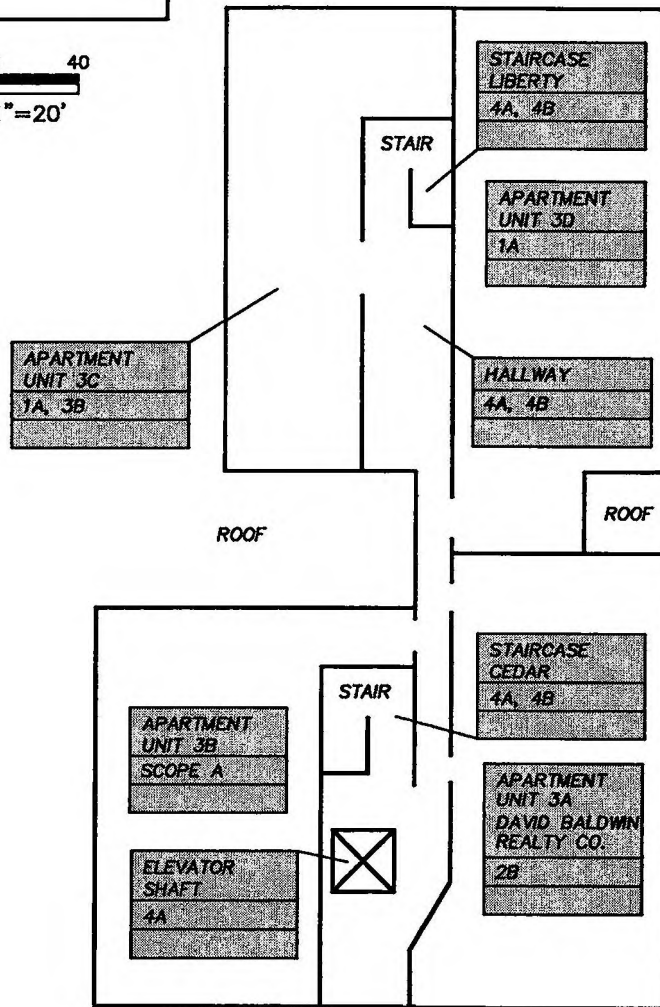
THIRD FLOOR

LEGEND:

AREA NAME	AREA DESCRIPTION BOX
CLEANING METHOD(S)	
NOTATION	



LIBERTY STREET



CEDAR STREET

DRAWING STATUS ☐ DRAFT ☒ FINAL

PROJECT NO. : 50506060 RESPONSE MANAGER: SCOTT WILHELM PROGRAM MANAGER: BRADLEY J. CUNNINGHAM PROGRAM/CONTRACTS MANAGER: KIM D. BENNETT
SCALE: 1" = 20' CADD ID: 501060_3 PLOT DATE: 2/10/03 CHK BY: K.D.B. CHK DATE: 2/10/03
REVISION NO.: 0 REV DATE: NA DRN BY: AML DRN DATE: 12/9/02 APPVD BY: K.D.B. APPVD DATE: 2/10/03



**WRS Infrastructure &
Environment, Inc.**

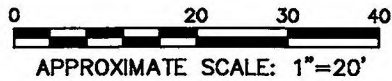
925 CANAL STREET, SUITE 7301, BRISTOL, PENNSYLVANIA 19007
PH: (267) 540-0048 FAX: (267) 540-0049

**WTC RESIDENTIAL
CONFIRMATION CLEANING STUDY**
110 LIBERTY STREET, NEW YORK, NEW YORK
US DEPARTMENT OF ENVIRONMENTAL PROTECTION
CONTRACT NO. 68-S2-99-07
DELIVERY ORDER NO. 060

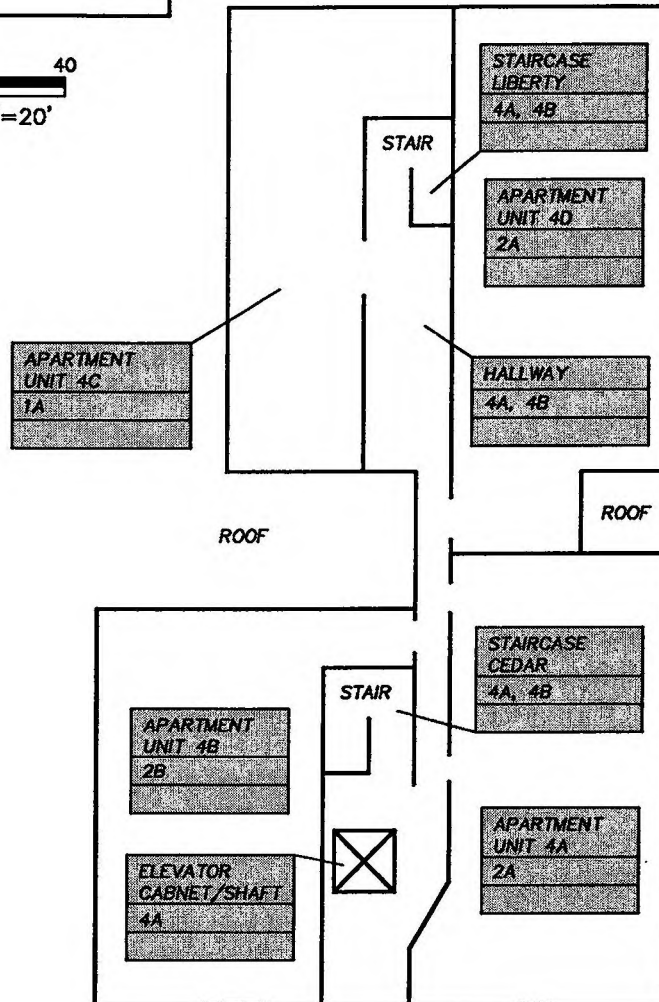
FOURTH FLOOR

LEGEND:

AREA NAME	AREA DESCRIPTION BOX
CLEANING METHOD(S)	
NOTATION	



LIBERTY STREET



CEDAR STREET

DRAWING STATUS ☐ DRAFT ☒ FINAL

PROJECT NO. : 501060	RESPONSE MANAGER: SCOTT WILHELM	PROGRAM MANAGER: BRADLEY J. CUNNINGHAM	PROGRAM/CONTRACTS MANAGER: KIM D. BENNETT
SCALE: 1" = 20'	CADD ID: 501060_4	PLOT DATE: 2/10/03	CHK BY: K.D.B. CHK DATE: 2/10/03
REVISION NO.: 0	REV DATE: NA	DRN BY: AML	DRN DATE: 12/9/02 APPVD BY: K.D.B. APPVD DATE: 2/10/03



WRS Infrastructure & Environment, Inc.

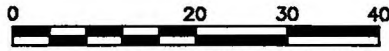
925 CANAL STREET, SUITE 7301, BRISTOL, PENNSYLVANIA 19007
Ph: (267) 540-0048 FAX: (267) 540-0049

**WTC RESIDENTIAL
CONFIRMATION CLEANING STUDY**
110 LIBERTY STREET, NEW YORK, NEW YORK
US DEPARTMENT OF ENVIRONMENTAL PROTECTION
CONTRACT NO. 68-S2-99-07
DELIVERY ORDER NO. 060

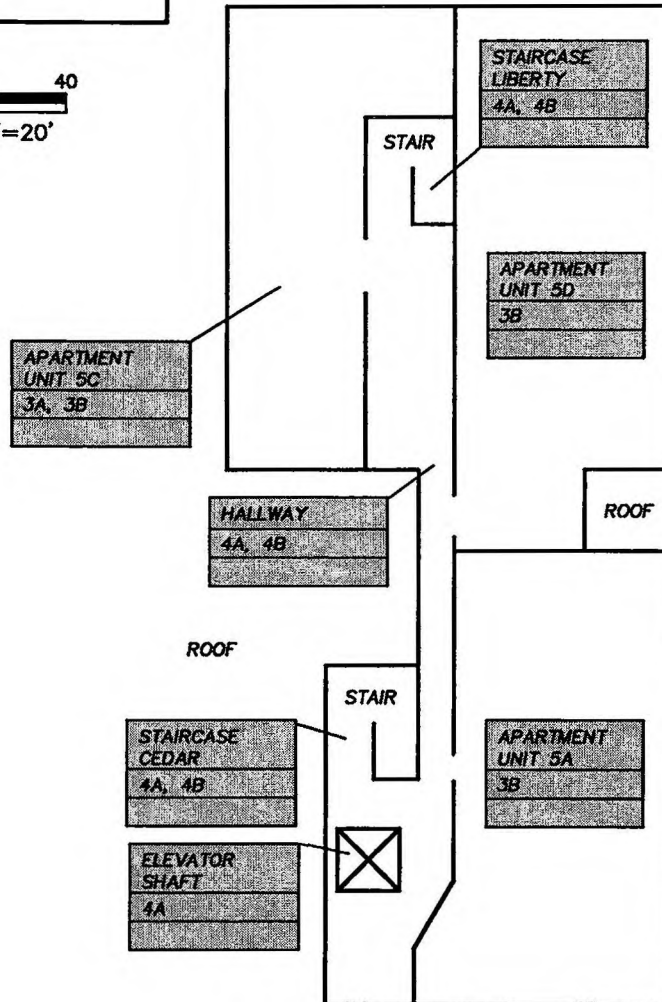
FIFTH FLOOR

LEGEND:

AREA NAME	AREA DESCRIPTION BOX
CLEANING METHOD(S)	
NOTATION	



LIBERTY STREET



CEDAR STREET

DRAWING STATUS ☐ DRAFT ☐ FINAL ☒

PROJECT NO. : 501060	RESPONSE MANAGER: SCOTT WILHELM	PROGRAM MANAGER: BRADLEY J. CUNNINGHAM	PROGRAM/CONTRACTS MANAGER: KIM D. BENNETT
SCALE: 1" = 20'	CADD ID: 501060_5	PLOT DATE: 2/10/03	CHK BY: K.D.B. CHK DATE: 2/10/03
REVISION NO.: 0	REV DATE: NA	DRN BY: AML	DRN DATE: 12/9/02 APPVD BY: K.D.B. APPVD DATE: 2/10/03



WRS Infrastructure & Environment, Inc.

925 CANAL STREET, SUITE 7301, BRISTOL, PENNSYLVANIA 19007
PH: (267) 540-0048 FAX: (267) 540-0049

**WTC RESIDENTIAL
CONFIRMATION CLEANING STUDY**
110 LIBERTY STREET, NEW YORK, NEW YORK
US DEPARTMENT OF ENVIRONMENTAL PROTECTION
CONTRACT NO. 68-S2-99-07
DELIVERY ORDER NO. 060

E

Attachment E

Health and Safety Plan, Changes and Issues



WRS INFRASTRUCTURE & ENVIRONMENT, INC.

SITE-SPECIFIC HEALTH AND SAFETY PLAN

**USEPA REGION II
Emergency Response and Rapid Response Service**

**WTC Pilot Cleaning Evaluation
New York, NY**

Submitted to:

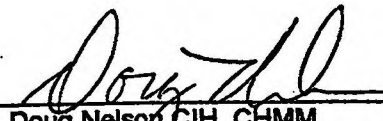
USEPA REGION II

Prepared by:

**WRS INFRASTRUCTURE & ENVIRONMENT, INC.
925 Canal Street, Suite 3701
Bristol, PA 19007**

WRS Project Number:

Prepared by:



Doug Nelson CIH, CHMM
WRS Corporate Health and Safety Manager

Date:

6/19/02

Reviewed by:

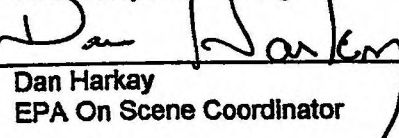


Scott Wilhelm
WRS Response Manager

Date:

8/8/02

Reviewed by:



Dan Harkay
EPA On Scene Coordinator

Date:

8/19/02



WRS INFRASTRUCTURE & ENVIRONMENT, INC.

SITE-SPECIFIC HEALTH AND SAFETY PLAN

**USEPA REGION II
Emergency Response and Rapid Response Service**

**WTC Pilot Cleaning Evaluation
110 Liberty Street
New York, NY**

Submitted to:

USEPA REGION II

Prepared by:

**WRS INFRASTRUCTURE & ENVIRONMENT, INC.
925 Canal Street, Suite 3701
Bristol, PA 19007**

WRS Project Number: 501060

Document No. 501060-001

1.0	INTRODUCTION	6
1.1	PURPOSE, SCOPE AND APPLICABILITY OF THE SITE SPECIFIC HEALTH AND SAFETY PLAN	6
1.2	REVISIONS TO THE PLAN	6
2.0	KEY PERSONNEL AND RESPONSIBILITIES	7
2.1	KEY PERSONNEL	7
2.2	RESPONSIBILITIES	7
2.2.1	RESPONSE MANAGER	7
2.2.2	SITE SAFETY AND HEALTH OFFICER (SSHO).....	7
2.2.3	WRS HEALTH AND SAFETY MANAGER (HSM).....	8
2.2.4	FOREMAN, OPERATORS, AND TECHNICIANS	8
3.0	SITE AND PROJECT DESCRIPTION	9
3.1	SITE DESCRIPTION	9
3.2	PROJECT DESCRIPTION.....	9
4.0	HAZARD ANALYSIS.....	10
4.1	GENERAL HAZARD ANALYSIS	10
4.1.1	PHYSICAL HAZARDS	11
4.1.2	CHEMICAL HAZARDS	12
5.0	PERSONNEL TRAINING REUIREMENTS	13
5.1	GENERAL.....	13
5.2	PRE-ASSIGNMENT AND ANNUAL REFRESHER TRAINING	13
5.3	PROJECT SUPERVISORS TRAINING.....	13
5.4	HEALTH AND SAFETY PLAN REVIEW	13
5.5	DAILY SAFETY MEETINGS	13
5.6	ASBESTOS TRAINING.....	14
5.7	LEAD TRAINING.....	14
6.0	PERSONAL PROTECTIVE EQUIPMENT	14
6.1	SPECIFIC LEVELS OF PROTECTION PLANNED FOR THE PROJECT	14

6.2	ENSEMBLE COMPONENTS.....	15
6.3	APPLICATION	15
6.4	INSPECTION.....	16
6.5	RESPIRATOR CARTRIDGE CHANGE-OUT SCHEDULE.....	16
7.0	MEDICAL SURVILLANCE REQUIREMENTS.....	16
7.1	GENERAL.....	16
7.2	SITE SPECIFIC MEDICAL MONITORING.....	16
7.3	SUBSTANCE ABUSE PREVENTION	16
7.4	ASBESTOS.....	17
7.5	LEAD.....	17
8.0	AIR SURVEILLANCE.....	17
8.1	MONITORING	17
8.2	ACTION LIMITS.....	17
8.3	AIR SAMPLING.....	17
9.0	SITE CONTROL MEASURES.....	19
9.1	CONTROL ZONES.....	19
9.2	SITE COMMUNICATIONS PLAN	19
9.3	SANITATION FACILITIES.....	19
10.0	DECONTAMINATION PLAN.....	21
10.1	LEVELS OF DECONTAMINATION PROTECTION REQUIRED FOR ASSISTING PERSONNEL.....	21
10.2	EQUIPMENT DECONTAMINATION.....	21
10.3	PERSONNEL DECONTAMINATION	21
10.3.1	PROCEDURE	21
10.3.2	EQUIPMENT.....	21
10.4	DISPOSITION OF DECONTAMINATION WASTES	21
11.0	EMERGENCY RESPONSE PLAN.....	22
11.1	PRE-EMERGENCY PLANNING	22
11.2	PERSONNEL ROLES AND LINES OF AUTHORITY.....	22
11.3	EMERGENCY RECOGNITION/PREVENTION.....	22
11.4	EMERGENCY EQUIPMENT/FACILITIES	23
11.5	FIRE OR EXPLOSION	23
11.6	SPILL OR LEAKS	23

APPENDICES

APPENDIX A HEALTH AND SAFETY FORMS

APPENDIX B HEAT STRESS

APPENDIX C WRS LOCKOUT/ TAGOUT SOP

APPENDIX D WRS FALL PROTECTION SOP

1.0 INTRODUCTION

1.1 Purpose, Scope and Applicability of the Site Specific Health and Safety Plan

Purpose of this site specific Health and Safety Plan (HASP) is to identify anticipated hazards and the control measures to be implemented at the **WTC Pilot Cleaning Evaluation** in New York City, hereafter known as the Site. The procedures presented in this HASP are based on the best available information at the time of the plan's preparation, and are intended only for the activities described in this plan.

The Plan applies to all WRS Infrastructure & Environment, Inc. (WRS) employees, and subcontractor employees. All personnel prior to entering the exclusion zone or contamination reduction zone (decontamination zone) must review and sign this plan. All personnel on site shall be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards of the project tasks/operations. This HASP summarizes those hazards in **Section 4.0** and defines hazard control measures planned for the site.

All visitors entering the contamination reduction zone and exclusion zone at the site will be required to read and verify compliance with the provisions of this HASP. In addition, visitors will be expected to comply with relevant OSHA requirements. Visitors will be expected to provide their own personal protective equipment unless the USEPA specifies otherwise. In the event that a visitor does not adhere to the provisions of this HASP, he/she will be requested to leave the work area.

The requirements and protocols cited in this plan were developed in consideration of current safety standards as defined by EPA/OSHA/NIOSH, health effects and standards for known contaminants, and procedures designed to account for the potential for exposure to unknown substances. Specifically, the following reference sources were consulted in developing this plan:

- OSHA General Industry and Construction Standards.
- EPA Standard Operating Safety Guides.
- NIOSH/OSHA/USCG/EPA Occupational Health and Safety Guidelines.
- NIOSH Pocket Guide to Chemical Hazards.
- EPA Draft Work Plan
- EPA Provided Sample Analytical Data

1.2 Revisions to the Plan

Revisions to this plan may be made in response to changes or unexpected conditions not described in this Plan. All revisions to this plan shall be documented on a *Field Procedures Change Authorization form* (Appendix A), approved by the WRS H&S Manager.

2.0 KEY PERSONNEL AND RESPONSIBILITIES

2.1 Key Personnel

The following personnel have principal responsibility for the implementation , maintenance and oversight of health and safety measures during site activities.

Job Function	Name	Phone	Alternate Phone
WRS Response Mgr.	Scott Wilhelm	PII	
WRS Program Mgr.	Brad Cunningham PE		
WRS H&S Mgr.	Doug Nelson CIH, CHMM		

2.2 Responsibilities

2.2.1 Response Manager

The **Response Manager** is responsible for health and safety "performance" in the field. The Site Response Manager can temporarily halt work at any time if, in his/her opinion, it is necessary to protect the health and well being of site workers or the general public. Specific responsibilities of the Response Manager include:

- Directing site activities in accordance with the HASP.
- Being aware of and complying with all applicable federal, state, and local occupational health and safety regulatory requirements.
- Ensuring that resources called for in the HASP and Work Plan/Operations Plan are on site and operational.
- Verifying that all permits, supporting documentation and clearances for a given task (e.g., utility surveys, health and safety plan, confined space entry permits) are in place.
- Informing the appropriate site management and safety personnel of the activities to be performed each day.
- Providing technical advice during routine operations and emergencies.
- Handling field emergency response situations that may arise.
- Correcting unsafe acts and conditions.
- Participating in pre-job and daily safety meetings.

2.2.2 Site Safety and Health Officer (SSHO)

The **Site Safety and Health Officer (SSHO)** has responsibility for ensuring that provisions of each HASP are implemented in the field by all WRS employees and subcontractor employees. The SSHO must be trained to implement the requirements in the site specific HASP, including the correct use of monitoring instruments, health and safety criteria for the site, documentation of monitoring results, and actions to take if site conditions change.

The designated SSHO shall continuously evaluate the adequacy of prescribed health and safety procedures and levels of protection against the actual conditions encountered in the field. If an obvious discrepancy exists between the realized hazard(s) and the level of personal protective equipment (either too much or too little), the SSHO shall immediately bring the situation to the attention of the WRS Health and Safety Manager (HSM). With the concurrence of the HSM and the Response Manager, the SSHO shall take appropriate corrective action. The SSHO has final on-site authority for all matters specifically related to worker health and safety, and emergency situations that require immediate action, including the authority to temporarily cease operations. Additional responsibilities of the SSHO include:

- Monitoring site activities for unsafe acts and conditions and initiating their correction.
- Monitoring project and site activities for conformance to the site specific HASP.
- Overseeing confined space entries and ensuring that all confined space entries are done in accordance with the requirements found in the WRSIE standard operating procedures (SOP's) for confined space entry.
- Performing on-site air monitoring and personal sampling as specified in the site specific HASP.
- Calibration of instruments.
- Maintenance of health and safety equipment and supplies.
- Ensuring that all work-related injuries and illnesses are properly treated and investigated.
- Conducting safety briefings and daily safety meetings.
- Maintaining documentation in support of the HASP.
- Participating in a pre-job safety briefing with project personnel to discuss anticipated hazards and their control measures.

2.2.3 WRS Health and Safety Manager (HSM)

The **WRS Health and Safety Manager (HSM)** shall be responsible for implementing an effective hazardous waste operations health and safety program. The HSM shall have the requisite authority to implement the procedures set forth in the WRS Health and Safety Manual for Hazardous Waste Site Activities, including the authority to temporarily halt work on a project if necessary, to protect employees' safety or health. The HSM may delegate certain duties to the SSHO or to other WRS personnel, but shall be ultimately responsible for the following:

- Overseeing the employee medical surveillance program and interacting with examining physicians as required
- Investigating site histories, performing site characterizations, and assessing site/task specific hazards.
- Developing or assessing task specific monitoring procedures, action levels, levels of personal protective equipment (PPE), and health and safety requirements for the site and the HASP.
- Performing periodic site inspections/audits.
- Following to resolution all deficiencies noted during site inspections. and,
- Resolve "level of care" conflicts that may arise during conduct of the project.

2.2.4 Foreman, Operators, and Technicians

All site personnel share responsibilities for health and safety. Specific duties include:

- Conducting work in accordance with the HASP.
- Participating in daily safety meetings/planning.
- Prompt reporting of all incidents and potential health and safety-related problems.

3.0 SITE AND PROJECT DESCRIPTION

3.1 Site Description

The Site is located at 110 Liberty Street. It is five stories with 12 residential and six commercial spaces. It has been unoccupied since 9/11/01. The building was severely impacted in the WTC collapse. Dust and debris were deposited in the building, windows were blown out, as well as skylights. Residential spaces, the basement and the roof of the building were professionally cleaned shortly after the collapse. Two of the commercial spaces have “inches” of dust and all residential spaces have experienced varying degrees of dust re-deposition.

Rental spaces range in size from 1,000 to 1,300 square feet. They are open in design and consist of a kitchen, bathroom and sleeping area. Each space is heated by an individual hot water baseboard system. Window or roof mounted air conditioners are present in the residential space, central air systems are present in commercial spaces Unit 1 and 2. Rental spaces are accessible through from Liberty and Cedar Streets through common hallways. Floors are accessible via an elevator and stairs. Each floor has a trash compactor room and utility room. A laundry room is located on the 2nd floor. The basement contains the building trash compactor, elevator well, electric motor rooms, preparation and storage areas or the Chinese restaurant and a hair salon.

3.2 Project Description

The project’s objective includes evaluating the effectiveness of various cleaning procedures that may have been used in the residential spaces. The study will include 12 residential spaces and 3 commercial spaces. The two restaurants and hair salon are not a part of the study, but will be cleaned at the completion of the study. Eight cleaning techniques will be evaluated:

1. Vacuuming with non-HEPA vacuums
2. Vacuuming with non-HEPA vacuums with Negative Air Machines (NAM)
3. Vacuuming with non-commercial HEPA vacuums
4. Vacuuming with non-commercial HEPA vacuums with NAM
5. Vacuuming with commercial HEPA vacuums
6. Vacuuming with commercial HEPA vacuums with NAM
7. Vacuuming heavy dust laden areas with commercial HEPA vacuums and 2 NAMs
8. Vacuuming heavy dust laden areas with commercial HEPA vacuums and 2 NAMs with vertical surface wet wiping and carpet shampooing.

Each cleaning technique will be evaluated on two rental units. Activities will include the following:

- Mobilization to site

- Establishing Support Area and Facilities
- Assist with photo documentation and resident visits
- Isolate study areas from common areas (plastic sheeting and adhesive tape)
- Clean common areas (HEPA vacuum and wet wipe horizontal surfaces)
Hallways,
Building entry ways,
Laundry rooms,
Stairs and wells,
Elevator well, roof mechanical room, interior and lobby,
Trash compactor and utility rooms (5), and
Basement
- Clean previously cleaned areas using the techniques to be evaluated
- Clean areas not previously cleaned using the techniques to be evaluated
- Clean non-study areas
- Dispose of wastes
- Decontaminate cleaning equipment
- Demobilization

4.0 HAZARD ANALYSIS

The evaluation of hazards is based upon the knowledge of project background information presented in Section 3, and anticipated risks posed by the specific tasks/operations to be performed. Section 4 presents a general description of project hazards. Section 4.2 describes the specific hazards associated with each task/activity, and identifies the hazard control measures to be implemented during completion of these tasks.

4.1 General Hazard Analysis

Potential/ Anticipated Hazards

CHEMICAL	YES	SLIPS, TRIPS, & FALLS SAME LEVEL	YES
ASBESTOS	YES	SLIPS, TRIPS, & FALLS DIFFERENT LEVEL	YES
FIRE/ EXPLOSION	NO	HEAVY EQUIPMENT/ VEHICULAR TRAFFIC	YES
HEAT STRESS	YES	OVERHEAD HAZARDS	YES
MACHINERY/ MECHANICAL EQUIPMENT	YES	ELECTRICAL/ UTILITY HAZARDS	YES
NOISE	YES	CONFINED SPACE	NO

4.1.1 Physical Hazards

Noise – vacuums produce noise exposures in excess of the permissible exposure limit (90dBA). Operators of these pieces of equipment must wear hearing protection (plugs). Others working in the same room/ area must wear hearing protection as well.

Ambient temperatures - capable of producing either heat are expected to impact the projec. The WRS SOP for Heat Stress Management is included as an Appendix B.

Motor vehicles – obey local traffic laws, use qualified drivers in insured vehicles. Seatbelt use is mandatory.

Flame, Heat or Spark Producing Operations - The use of flame, heat or spark producing equipment (e.g., cutting or welding torches and abrasive saws) is prohibited.

High or Elevated Work - All work near an unprotected side or edge (no handrail) which would allow a fall to a lower level of six feet or more will be performed using fall protection (e.g., body harness and lifeline). Fall protection equipment will provide continuous protection. Workers in aerial lift baskets will utilize full body harnesses with lanyards attached to the man basket. See the WRS Standard Operating Procedure for Fall Protection (Appendix D)

Electrical Safety - Ground fault protection devices (GFCI) will be provided for all electric power tools and extension cords. Vacuums directly (no extension cord) plugged into the building's outlets are exempt from this requirement when the outlet has been tested and verified to provide adequate grounding. Voltage detectors may be used to facilitate electrical safety. The WRS Lockout/ Tagout SOP (Appendix C) will be applied specifically to cleaning the elevator, and generally to activities specified in the SOP

Eye Protection - Eye protection is mandatory in all areas of the project site at all times. Eye protection will conform to ANSI Standard Z87.

Head Protection – Hardhats will be worn when overhead hazards exist and when the hazard of an employee bumping his head on an overhead object exists.

Floor Holes – cover floor holes in the building.

4.1.2 Chemical Hazards

SUBSTANCE	EXPOSURE LIMIT (PEL)	IDLH LEVEL	HEALTH EFFECTS	ROUTE OF ENTRY	FIRST AID By Route of Exposure
Polycyclic Aromatic Hydrocarbons (PAHs)	0.2 mg/m ³	80 mg/m ³	Dermatitis, bronchitis, potential occupational carcinogen	Inhalation, Contact	Eye: irrigate immediately, Skin: soap wash promptly
Lead	0.050 mg/m ³	100 mg/m ³	Weak, insomnia, gingival lead line, abdominal pain, irritated eyes	Inhalation Ingestion	Eye: irrigate immediately, Skin: soap wash promptly
Crystalline silica	Respirable 10 mg/m ³ / % SiO ₂ +2	50 mg/m ³	Cough, pain with breathing, wheezing, decreased pulmonary function, silicosis, cancer of lung	Inhalation	Eye: irrigate immed. Breath: fresh air
Asbestos	0.1 fiber/ cc	NA	Asbestosis, pain with breathing, restricted pulmonary function, finger clubbing, lung cancer	Inhalation Ingestion Contact	Eye: irrigate immed. Breath: fresh air

SUBSTANCE	EXPOSURE LIMIT (PEL)	IDLH LEVEL	HEALTH EFFECTS	ROUTE OF ENTRY	FIRST AID By Route of Exposure
Dioxin (1,1,2,2-Tetrachloro-debenzo-p-dioxin)	None	None	Eye irritation, allergic dermatitis, chloracne, digestive disturbances, possible reproductive effects, in animals produces liver/ kidney damage, cancer	Inhalation Ingestion Contact	Eye: irrigate immed. Skin wash with soap/ water Breath: fresh air Swallow: med attention
Man Made Vitreous Fibers (aka fiberglass and glass wool)	15 mg/m ³ (total) 5 mg/m ³ (respirable)	None	Irritation of eyes skin nose, throat, pain with breathing	Inhalation Contact	Eye: irrigate immed. Breath: fresh air
Gypsum (calcium (II) sulfate dihydrate)	15 mg/m ³ (total) 5 mg/m ³ (respirable)	None	Irritation of eyes, skin, mucous membranes, upper respiratory system, coughing, sneezing, runny nose	Inhalation Contact	Eye: irrigate immed. Breath fresh air

Concentrations of these materials in bulk samples collected to date include:

- Asbestos <1% (reported as chrysotile)
- Lead up to 300 ppm
- MMVF up to 40%
- Dioxin up to 0.088 ppb
- PAHs up to 340 ppm
- Crystalline silica (quartz) up to 10%
- Gypsum up to 14%

5.0 PERSONNEL TRAINING REQUIREMENTS

5.1 General

All project personnel are trained in accordance with OSHA's 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response Standard. At a minimum, all personnel are required to be trained to recognize the hazards on-project, the provisions of this HASP, and the personnel responsible for safety on the project.

5.2 Pre-Assignment and Annual Refresher Training

Non required other than and orientation to the site including a walkthrough. All employees should have their current 8-hr annual refresher training and be medically qualified to wear a respirator.

5.3 Project Supervisors Training

Consistent with OSHA 29 CFR 1910.120 paragraph (e)(4), individuals designated as Project Supervisors receive an additional 8 hours of training in addition to the 40 hr certification.

5.4 Health and Safety Plan Review

Prior to working on the project, each person will review the HASP and will have the opportunity to ask questions of the Project Health and Safety Officer about the plan's contents. After reviewing the HASP, WRS employees and subcontractor employees will sign the HASP Review Sign-Off (Safety Briefing form) located in *Appendix A*.

5.5 Daily Safety Meetings

Project safety meetings will be conducted daily. The meeting will cover:

- The work to be completed.
- Hazards associated with the work. and,
- Hazard control measures to be implemented.

WRS subcontractor employees and their supervisor(s) are required to attend.

5.6 Asbestos Training

The clean up of the dust in this building is an unclassified task because the material does not contain enough asbestos (<1%) to be considered Asbestos Containing Material (ACM). Therefore the training requirements at 29 CFR 1926.1101(k)(9)(viii) apply. There is no minimum or maximum time allotted for completion of this training only a list of subjects to be covered. Employees performing dust removal activities will have training that meets or exceeds these requirements.

5.7 Lead Training

Lead is present in the dusts to be removed. Lead training is required at 29 CFR 1926.62 (l) when employee exposures exceed the Action Limit of 30 ug/m³. Because the dust removal methods are designed to minimize the aerosolization of the dust, and the low concentrations (< 300 ppm), it is not anticipated that Action Limit will be reached and lead training will therefore not be necessary. An exposure assessment will be used to verify this assumption.

6.0 PERSONAL PROTECTIVE EQUIPMENT

This section describes the specific levels of protection required for each task to be conducted at the project. The general requirements of the EPA designated Levels of Protection (A-D) are described in the WRS Health and Safety Program Manual. The level of protection to be worn by field personnel will be monitored by the IHSO.

6.1 Specific Levels of Protection Planned for the Project

PPE assignments are task specific. Table 6.1 on the following page lists task specific PPE levels. These levels are disqualified for use if air surveillance indicates that the upper action limit for the level of protection being used is exceeded.

TABLE 6.1: LEVELS OF PROTECTION		
Location	Job Function/Task	PPE
Exclusion Zone	• Surveying and prep of previously cleaned areas	C1/2
	• Surveying and prep of areas not previously cleaned	CPAPR
	• Vacuuming with Non-HEPA filtered equipment	CPAPR
	• Vacuuming with HEPA filtered equipment in previously cleaned areas	C1/2
	• Wet wiping following non-HEPA vacuuming	C1/2
	• Wet wiping following HEPA vacuuming	D+
	• Cleaning equipment using air and vacuum	CPAPR
	• Removing/ Changing vacuum bags/ filters	CPAPR
Support Zone	Project Management Activities Materials Storage	D

6.2 Ensemble Components

Level D

This is the basic work uniform and shall consist of the following items:

- Safety glasses
- Steel-toed boots
- Hearing protection (as applicable)
- Leather gloves

Level D+

- Safety glasses
- Disposable coverall (Tyvek or Kleengaurd)
- Disposable head covering
- Disposable undergarments
- Disposable gloves
- Disposable boot covers or reusable/ cleanable boots (e.g., PVC, latex)
- Steel toe boots
- Hearing protection
- Skin Barrier Cream for preventing fiberglass dermatitis (North Brand Model 222 available from Lab Safety)

Level C

- Air Purifying Respirator (1/2 mask or full face PAPR)
- P100 Cartridges
- Disposable coverall (Tyvek or Kleengaurd)
- Disposable head covering
- Disposable undergarments
- Disposable gloves
- Disposable boot covers or reusable/ cleanable boots (e.g., PVC, latex)
- Steel toe boots
- Hearing protection
- Skin Barrier Cream for preventing fiberglass dermatitis (North Brand Model 222 available from Lab Safety)

6.3 Application

Table 6.1 details the anticipated levels of protection for different tasks. However, project developments may prompt changes in the levels of PPE. Proper notification of the IHSO, HSA, and WRS Project manager is required to ensure continued safe operations.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE KNOWLEDGE AND APPROVAL OF THE NORTHEAST SAFETY AND HEALTH ADMINISTRATOR, WRS PROJECT HEALTH AND SAFETY OFFICER, AND THE WRS PROJECT MANAGER.

6.4 Inspection

Before protective equipment is worn within the project area, its user will properly inspect it.

6.5 Respirator Cartridge Change-out Schedule

PAPR cartridges will be changed out when flow rate indicator (a.k.a. rotameter) measures unacceptably low flows. APR cartridges will be changed out when breathing becomes difficult or daily whichever comes first.

7.0 MEDICAL SURVILLANCE REQUIREMENTS

7.1 General

WRS utilizes a Medical Monitoring Program designed to determine each employee's health status and fitness (including the ability to utilize respiratory protection) for working at hazardous waste sites. All WRS personnel involved in hazardous waste project activities are required to undergo baseline, annual, and project specific examinations. WRS utilizes the services of physicians experienced in occupational medicine and the effects of toxic industrial substances. Medical surveillance records for WRS employees are retained for the length of employment plus 30 years.

7.2 Site Specific Medical Monitoring

No site specific medical monitoring is anticipated beyond that required under the Heat Stress Management SOP.

7.3 Substance Abuse Prevention

It is the policy of WRS to provide quality products and services to its customers and to maintain a safe and healthy workplace by assuring a work environment free of alcohol and other drugs. The unlawful manufacture, distribution, dispensation, possession, use or presence in one's system of a controlled substance is prohibited in the workplace. Any employee who is in violation of this policy will be subject to disciplinary action up to and including discharge. Help is available to employees who have substance abuse problems through the Employee Assistance Program.

Federal law also requires that an employee of WRS notify WRS in writing of a conviction under a criminal drug statute for a violation occurring during the performance of work under a covered federal procurement. This project is covered. Such notifications must be made through the WRS Health and Safety Manager.

7.4 Asbestos

The medical surveillance program outlined under 7.1 of this Plan includes the medical surveillance components required by the Asbestos Standard at 29 CFR 1926.1101(m).

7.5 Lead

Blood lead and ZPP monitoring are required by 29 CFR 1926.62(j) when airborne exposures exceed the Action Level of 30 ug/m³. Because the dust removal methods are designed to minimize the aerosolization of the dust, and the low concentrations (< 300 ppm), it is not anticipated that Action Limit will be reached and blood lead/ ZPP monitoring will therefore not be necessary. An exposure assessment will be used to verify this assumption.

8.0 AIR SURVEILLANCE

This section specifies the surveillance activities that will take place during the project. Surveillance activities will achieve the following objectives:

- Characterize breathing zone (BZ) concentrations of site contaminants for comparison with published exposure limits;
- Determining the appropriateness of respiratory protective equipment; and,
- Monitoring the performance of emission control activities.

8.1 Monitoring

The usefulness of real time monitoring of respirable dust in this work environment is unknown to WRS. Collecting this data alongside air sampling activities may “calibrate” future real-time respirable dust monitoring and the establishment of Action Limits. WRS will perform real-time respirable dust monitoring to instruct the crew in relative dust levels. There will be no respirable dust Action Limits until or unless air-sampling data is available for comparison with real-time data.

8.2 Action Limits

None initially.

8.3 Air Sampling

Personal air sampling for lead, asbestos, and silica will be performed. Samples will be collected from the breathing zones of employees using the following NIOSH Methods. Analysis of samples will be made using NIOSH analytical method as well to facilitate comparisons with exposure limits.

Method	Flow Rate	Sample Train Media
7300 Lead	2 liters per minute minimum sample volume to achieve detection limits 50 liters	37 mm cellulose ester membrane (0.8 micron) Closed Face
7400 Fibers (Asbestos and Man Made Vitreous Fibers MMVF)	2 liters per minute** minimum sample volume to achieve detection limits – 400 liters	25 mm cellulose ester membrane (pore size 0.45 – 1.2 microns) with conductive cowl. Open face
7500 Respirable Silica/ Calcite/ Gypsum*	1.7 liters per minute** minimum sample volume to achieve detection limits – 400 liters	37 mm PVC membrane (pore size 5 micron) with 10 mm nylon cyclone

* This methods requires that a bulk respirable or settled dust sample be submitted with personal breathing zone sample to identify interferences with detection method.

**These methods are sensitive to filter over loading. Length of sampling period should not exceed 4 hours. Use multiple sample periods to represent entire shift exposure.

Samples will be collected on individuals performing tasks representative of exposure conditions. Specifically the following tasks will be characterized:

- Common area cleaning;
- Non-HEPA vacuuming; and,
- Cleaning of areas not previously cleaned.

Sample pumps will be pre- and post sample period calibrated using a sample train in-line between the pump and calibration unit to simulate pressure drop posed by the sample train. Calibrations will be made with a primary calibration device (e.g., film flow calibrator or near frictionless piston).

Sample results will be communicated by the SHSO to employees represented by the sample data within five days of receipt on the WRS Air Sampling Data Acknowledgement Form. This data is forwarded to the WRS H&S Manager for inclusion in the employee's medical file.

9.0 SITE CONTROL MEASURES

9.1 Control Zones

Control boundaries will be established at the site. The exclusion zone, contamination reduction zone (decontamination zone) and support zone will be designated. A decontamination corridor will separate the Support areas of the project site from exclusion zones. The corridor should be split down the middle with a control line. One side of the corridor is for clean entry into exclusion zones and the other side is for decontamination of personnel and equipment. It may be necessary to protect the support zone from fugitive dust by placing it under positive pressure with the exhaust of a Negative air machine.

The Response Manager has been designated to coordinate access control on the work site. No unauthorized person shall be allowed beyond the contamination control line. During all activities in the exclusion zone, the implementation of a buddy system is mandatory.

Standing orders for the exclusion zone and contamination reduction zone are presented on the following page.

9.2 Site Communications Plan

Hand signals, radios, and mobile telephones are the modes of communication to be used at the site. The Response Manager will review hand signals with all site personnel prior to the start of the project and periodically at daily safety meetings. Standard hand signals include:

ACTION	MEANING
Hands around throat	- out of air/can't breathe
Thumbs up	- OK/yes
Thumbs down	- negative, no
Hands on top of head	- need assistance
Grip partner's wrist/waist	- leave area immediately

No one will be permitted to break visual contact while in the exclusion zone or contamination reduction zone. The buddy system will be strictly adhered to. When working in the exclusion zone, personnel will not be allowed to work alone. The buddy system will be in place to provide aid in case of an emergency.

A telephone will be available in the support zone. Emergency assistance telephone numbers will be posted by this telephone. The Project Manager is responsible for the management of communications during normal and emergency operations.

9.3 Sanitation Facilities

Sanitation facilities will be located within the support zone. They will include hand and face washing facilities and toilets.

<i>Standing orders for the exclusion zone and contamination reduction zone are as follows:</i>	
•	No smoking, eating, or drinking in these zones. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of any material is prohibited in any area designated as a contamination reduction zone or exclusion zone.
•	No horse play.
•	No matches or lighters in these zones.
•	Check-in on entrance to the contamination reduction zone. Check-out on exit from this zone. Entrance and exit locations shall be designated and emergency escape routes delineated. Warning signals for site evacuation have been established.
•	Implement the communications system. Communications using radios, hand signals, signs, or other means shall be maintained between work crew members at all times. Emergency communication shall be prearranged in case of radio failure, necessity for evacuation off site, or other reasons.
•	Maintain visual contact between exclusion zone entrants.
•	Wear the appropriate level of protection as defined in the site specific Health and Safety Plan.
•	Work will only be performed during daylight hours unless adequate lighting is available.
•	Contact with known or suspected contaminated surfaces should be avoided. Whenever possible, there will be no walking through puddles or discolored surfaces; kneeling on ground; or leaning, sitting or placing equipment on drums, containers, or the ground.
•	Prescribed drugs should not be taken by personnel where the potential for absorption, inhalation, or ingestion of toxic substances exists, unless specifically approved by a qualified physician.
•	All respirator wearers must be certified as being capable of wearing respiratory protection (physician's approval, fit tested) while performing their assigned tasks. All respirator wearers must have been fit tested, within the past 12 months, with the make and size respirator to be worn. No facial hair is allowed that would interfere with respirator fit.
•	Work areas for all operational activities shall be clearly established and clearly delineated in the site specific Health and Safety Plan.
•	Work areas and decontamination procedures shall be established based on expected site conditions and clearly delineated in the site specific Health and Safety Plan.

Personnel and equipment in the exclusion zone(s) will be minimized, consistent with effective site operations.

10.0 DECONTAMINATION PLAN

Decontamination of equipment and personnel will be performed to limit the potential migration of contaminants outside the exclusion zone. All equipment and personnel will be decontaminated prior to leaving the exclusion zone.

10.1 Levels Of Decontamination Protection Required For Assisting Personnel

The level of protection required for personnel assisting with decontamination is one level below that of the person being decontaminated. The Industrial Hygiene and Safety Officer is responsible for monitoring decontamination procedures and determining their effectiveness.

10.2 Equipment Decontamination

All vacuums and Negative Air Machines will have filters and pre-filters removed and disposed of before demobilization. They will also be wet wiped. The Response Manager and SHSO are responsible for ensuring the cleanliness of equipment prior to leaving the site. Any other equipment not disposed of after the job will be wet wiped.

10.3 Personnel Decontamination

10.3.1 Procedure

All site personnel should minimize contact with contaminants in order to reduce the need for extensive decontamination. Personnel decontamination will be conducted in the decontamination zone. Gross decontamination for PPE Levels C and D+ will include:

1. Vacuum coverall/ boots with HEPA vacuum
2. Remove coveralls and dispose
3. Remove boot covers and dispose (alternate: rinse boots/ remove and hang for drying)
4. Remove gloves and dispose
5. Remove respirator
6. Wash/rinse respirator (inside and out) and hang for drying
7. Rinse hard hat (inside and out)

Personal hygiene following decontamination will take place in the support zone.

10.3.2 Equipment

Personal decontamination equipment will consist of trashcans with liners (for disposable PPE), three-gallon containers (respirator wash, sanitize and rinse), water supply, and detergent.

10.4 Disposition of Decontamination Wastes

All equipment used for decontamination shall be decontaminated or disposed of properly. Aqueous liquids will be disposed according to the Site Work Plan. All disposable PPE will be containerized and properly disposed.

11.0 EMERGENCY RESPONSE PLAN

This Emergency Response Plan has been prepared to define the responsibilities, resources and actions necessary to respond to uncontrolled releases of contaminated materials and injury to personnel.

11.1 Pre-Emergency Planning

This Emergency Response Plan will be reviewed and revised on a regular basis (if necessary) by the IHSO. This will ensure that the plan is adequate and consistent with prevailing project conditions.

Local emergency medical, fire, and police resources will be identified.

11.2 Personnel Roles and Lines of Authority

The Project manager has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measures to ensure the safety of project personnel and the public.

The individual subcontractor organizations are responsible for assisting the Project manager in his/her mission within the parameters of their scope of work.

11.3 Emergency Recognition/Prevention

Section 4.0 identifies the chemical and physical hazards on project. Additional hazards that may result from project activities are listed in Table 11.1. This table also lists prevention and control techniques/mechanisms. Personnel will be familiar with techniques of hazard recognition from pre-assignment training and project specific briefings. The IHSO is responsible for ensuring that prevention devices or equipment are available to personnel.

TABLE 11.1: EMERGENCY RECOGNITION/CONTROL MEASURES		
Potential Hazard	Prevention/Control	Location of Response Equipment
Fire	- Fire Extinguisher (15 lb. dry chemical) - Ignition source control - Hot Work Prohibited	One per floor
Eyewash Facility	15 Minute Drench	At Building Entrance
Delayed Building Exit	- Mark routes of exit - Do not block stairs/ exits	All stairways/ exits

11.4 Emergency Equipment/Facilities

- First aid kit
- Fire extinguishers
- Telephone

The following safety equipment and materials will be maintained on project.

Safety Equipment

Number	Item
1	Industrial First Aid Kit
1	Fire Extinguisher per floor
1	Eyewash Station

In the event of an injury requiring more than minor first aid, or any employee reporting any sign or symptom of exposure to hazardous substances, immediately take the victim to a local emergency medical provider. In the event of life-threatening or traumatic injury, implement appropriate first aid and immediately call for emergency medical assistance. If the patient's condition is serious first aid should be administered while awaiting an ambulance or paramedics.

When an individual(s) is being transported to a clinic or hospital for treatment, the Project manager, or IHSO should ensure that information on the chemical(s) the individual(s) have been exposed to at the project is taken. This information, which is included in Section 4.0, could also be given to the hospital during project set-up activities. Any vehicle used to transport contaminated personnel will be treated and cleaned as necessary.

11.5 Fire or Explosion

In the event of a fire or explosion, the local Fire Department should be summoned immediately. Upon their arrival, the Project manager or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on project.

The IHSO shall act as the designated project emergency coordinator and shall have final authority for initial response to on-project emergency situations. Upon arrival of the appropriate emergency response personnel, the IHSO shall defer all authority but shall remain on the scene to provide assistance, if necessary. At the earliest opportunity, the IHSO shall contact the Project manager.

11.6 Spill or Leaks

In the event of a spill or a leak, project personnel will:

- Inform the Project manager immediately
- If a leak occurs containment procedures will begin if possible. Simultaneously, the source of the spill will be stopped if it is still releasing material. Air monitoring should be conducted downwind. The WRS Representative will be responsible for any reporting procedures that are required as a result of the spill.

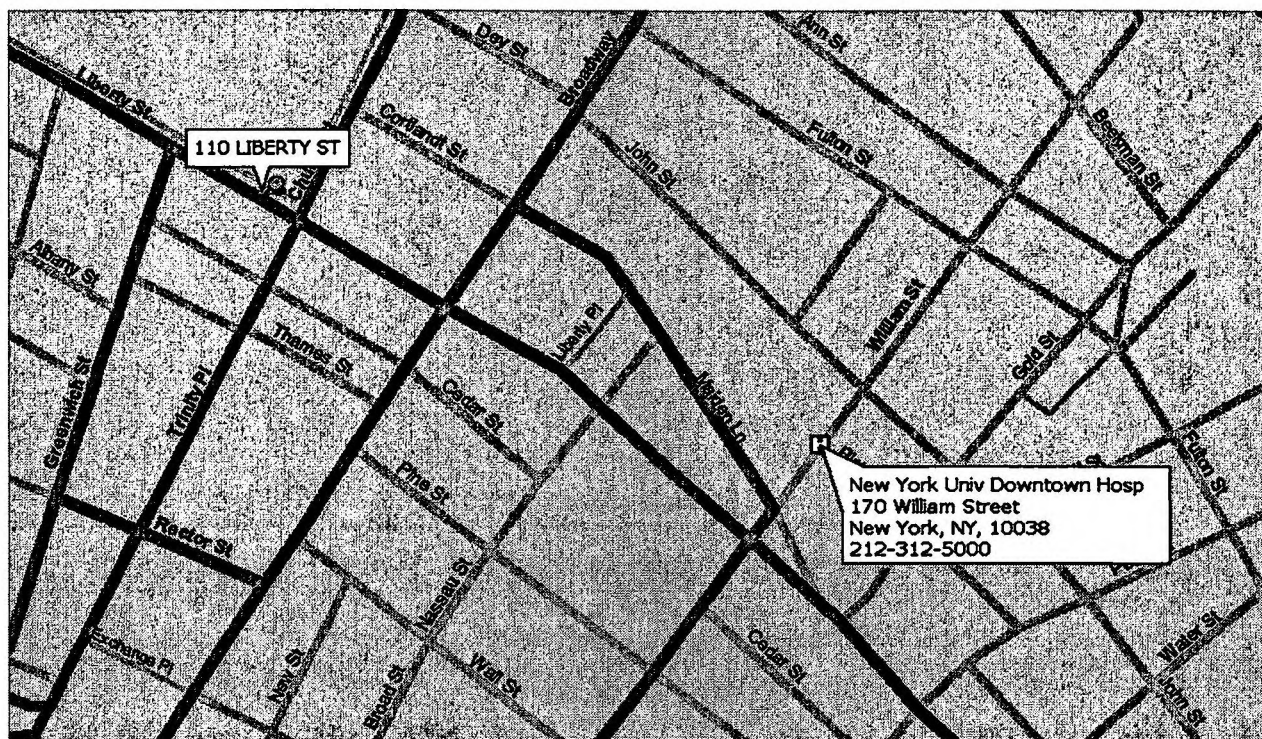


Figure 11-1
Route to Hospital

EMERGENCY TELEPHONE NUMBERS AND HOSPITAL ROUTE

EMERGENCY ASSISTANCE TELEPHONE LIST	
EMERGENCY ASSISTANCE ORGANIZATION	TELEPHONE NUMBER
New York University Downtown Hospital 170 William Street New York, NY 10038	<u>212-312-5000</u>
AMBULANCE/RESCUE SQUAD	911
FIRE	911
LOCAL POLICE	911
WRS BRISTOL OFFICE	267-540-0048
WRS H&S Manager	770-469-6522
CHEMTREC (24 HOURS)	(800) 424-9300
U. S. COAST GUARD NATIONAL RESPONSE CENTER (NRC)	(800) 424-8802
EPA OSC Communications	732-689-0019

APPENDIX A
HEALTH AND SAFETY FORMS

1. Accident/Incident Report
2. Daily Safety Meeting Form
3. Training Attendance Record
4. Qualitative Respirator Fit Test and Inspection Form
5. Daily Safety Report
6. SSHP Change Authorization
7. SSHP Sign-Off
8. Air Monitoring Log
9. Quantitative Respirator Fit Test Form

WRS INFRASTRUCTURE & ENVIRONMENT, INC.**INJURY/ILLNESS/INCIDENT INVESTIGATION AND REPORT (OSHA 301 Form Equivalent)**

Supervisor Complete Both Pages/Forward to Branch and WRS H&S Manager within 48 hrs./Supervisor's Manager Review for Completeness

Personal & Background Information

1. Case Number		2. Soc. Sec. No.		3. Name (Last name, first initial)			5. Date of Birth	
6. Gender ☐ M ☐ F		7. Date of Hire		8. Job or Site Name			9. Job Number	
11. Time of Accident		12. Time Employee Began Work		13. Date of Accident		14. Date Reported		15. Number of Others Involved in Accident
16. Occupation at Accident Time			17. Regular Occupation			18. Number of Others Injured in Accident		
19. Nature of Injuries (Bruise, Strain, etc.)					20. Injured Body Part (left index finger)			
21. Names of Others Involved in Accident					22. Names of Others Injured in Accident			
23. Chemicals Involved in Accident					24. Exact Location of Accident (Sketch on Back)			25. On WRS Premises? ☐ Yes ☐ No
26. Activity Injured was doing at time of accident or illness (operating backhoe, unloading drums, etc.) -Try to identify job in three words - Use no more than 30 spaces								
27. What Occurred (Use single line descriptive sentences to tell the story of what occurred)								
28. Check Type of Accident (Check one)								
☐ a. Struck by		☐ c. Contacted by		☐ e. Trapped in		☐ g. Caught between		☐ i. Different level fall
☐ b. Struck against		☐ d. Contact with		☐ f. Caught on		☐ h. Same level fall		☐ j. Strain/overexertion
☐ k. Exposure		☐ l. Other						
29. Accident Agent (Limit to 21 spaces)(i.e., equipment, machine, hand tool)					30. Contact Agent (Limit to 22 spaces)(i.e., machine part or material contacting)			
31. UNSAFE ACTIONS - What did employee do or fail to do that caused or contributed to accident? (Check no more than 2, give details on reverse)					32. UNSAFE CONDITIONS - What condition of tools, equipment or job site caused or contributed to accident? (Check no more than 2, give details on reverse)			
☐ a. Operating without authority		☐ i. Failure to make inoperative		☐ a. Inadequate guard/safety device		☐ h. Close clearance/congestion		
☐ b. Failure to make secure		☐ j. Riding hazardous equipment		☐ b. Hazardous personal attire		☐ i. Hazardous arrange/storage		
☐ c. Operating unsafe speed		☐ k. Took unsafe position		☐ c. Inadequate warning system		☐ j. Defective tools/equipment		
☐ d. Failure to warn/signal		☐ l. Horseplay, distractive		☐ d. Fire or Explosion hazard		☐ k. Atmospheric condition		
☐ e. Nullified safety device		☐ m. No protective equip. worn		☐ e. Unsecured against movement		☐ l. Illumination/noise		
☐ f. Used defective equipment		☐ n. Unsafe job procedure		☐ f. Poor housekeeping		☐ m. Other unsafe condition		
☐ g. Used equipment unsafely		☐ o. No unsafe action		☐ g. Protruding object		☐ n. No unsafe condition		
☐ h. Used wrong tool		☐ p. Other						
33. What caused or Influenced unsafe actions you identified above? (Answer only if item 32 applies. Check no more than 2)					34. What caused or Influenced unsafe condition you identified above? (Answer only if item 33 applies. Check no more than 2)			
☐ a. Unaware of job hazards		☐ h. Influence of emotions		☐ a. Caused by employee		☐ h. Preventive maintenance failure		
☐ b. Inattention to hazard		☐ i. Influence of fatigue		☐ b. Defective from normal use		☐ i. Defective tools/equipment		
☐ c. Unaware of safe method		☐ j. Influence of intoxicant/drugs		☐ c. Defective via abuse/misuse		☐ j. Exposure to corrosion		
☐ d. Low level job skill		☐ k. Defective vision		☐ d. Safety inspection failure		☐ k. Extreme temperature		
☐ e. Tried to gain or save time		☐ l. Influence of illness		☐ e. Housekeeping/cleaning failure		☐ l. Caused by other employees		
☐ f. Tried to avoid extra effort		☐ m. Other personal factors		☐ f. Faulty design/construction		☐ m. Other source cause		
☐ g. Tried to avoid discomfort		☐ n. Unknown personal factors		☐ g. Inadequate illumination		☐ n. Unknown source cause		
35. What action has been taken (Mark X box) or is planned (Mark P box) to prevent recurrence: (Mark no more than 5)								
X P			X P			X P		
☐ a. Reinstruction of employee			☐ h. Action to improve enforcement			☐ o. Improve design/construction		
☐ b. Reprimand/warning of employees involved			☐ i. Order JSA done on job			☐ p. Eliminate congestion		
☐ c. Penalty discipline of employee involved			☐ j. Order JSA revision			☐ q. Use safer Materials/supplies		
☐ d. Preventive instruction of others who do job			☐ k. Install safety guard against			☐ r. Improve illumination/ventilation		
☐ e. Job reassignment of employee			☐ l. Require protective equipment			☐ s. Mandatory pre-job instructions		
☐ f. Improved inspection procedure			☐ m. repair/replace equipment			☐ t. Correction other than above		
☐ g. Improved cleanup procedure			☐ n. Improve storage/arrangement			☐ u. No action required		
36. Immediate Supervisor (Last name first, first initial)					37. Employee's Signature			
38. Investigated by (Names and positions) Date					39. Reviewed and approved by (Name and position) Date			

Part 1. Accident Description and Direct Cause Analysis

WRS INFRASTRUCTURE & ENVIRONMENT, INC.**INJURY/ILLNESS/INCIDENT INVESTIGATION AND REPORT (OSHA 301 Form Equivalent)**

Supervisor Complete Both Pages/Forward to Branch and WRS H&S Manager within 48 hrs./Supervisor's Manager Review for Completeness

1. What Occurred

Describe in sequence (1) relevant background information if any, (2) employee's location and position relative to immediate surroundings, (3) how employee was doing job, (4) what occurred that precipitated the accident, (5) the type of accident and contact agent.

2. Contributing "Unsafe" Action What did the injured (or other person) do or fail to do that contributed directly to accident? Be specific.
(Ex., Failed to use protective equipment, Failed to lock out machine)
Don't report "Carelessness."

3. Contributing "Unsafe" Condition What defective or otherwise unsafe conditions of tools, equipment, machines, structures or work equipment contributed directly to accident?
(Ex., Oil on floor, Broken or missing machine guard, Poor housekeeping)

Part 2. Corrective Action Must Be Taken**4. Required Corrections**

What corrective actions will be taken to prevent recurrence of accident? See Reverse Side, Item 35, for basic correction ideas.
(Ex., Job Safety Analysis (JSA), Training, Employee counseling, Machine Guarding)

Part 3. Witnesses:**Part 4. Accident Location Sketch**

N
↑

Part 5. Extent and Outcome of Injury/Illness**Lost Time Case**

- Date Lost Time Began: ____/____/____
- Date Lost Time Ended: ____/____/____

Restricted Duty Case

Date Restriction Began: ____/____/____
Date Restriction Ended: ____/____/____

Restrictions:**Medical Treatment**

- Name of Hospital or Clinic:

- Name of Physician:

Describe Treatment:

Was employee treated in an Emergency Room? Yes ☐ No ☐ Was employee hospitalized overnight as an in-patient? Yes ☐ No ☐

**WRS INFRASTRUCTURE & ENVIRONMENT, INC.
DAILY SAFETY MEETING**

Date: _____ Job Name: _____

1. Work to be completed: _____

2. Hazards Associated with this work: _____

3. Hazard control measures to be implemented: _____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment: _____

Chemical Hazards: _____

Physical Hazards: _____

Emergency Procedures: _____

ATTENDEES	
<u>NAME PRINTED</u>	<u>SIGNATURE</u>
_____	_____
_____	_____
_____	_____
_____	_____

**WRS INFRASTRUCTURE &
ENVIRONMENT, INC.**

TRAINING ATTENDANCE RECORD

-001 WRS Infrastructure and Environment, Inc.

Class Title: _____

Class Content: _____

Class Instructor(s): _____

Date: _____

ATTENDED BY

NAMES (PRINTED)	SIGNATURES
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Instructor(s) Signature: _____

Date(s): _____

cc: Corporate File
 Branch File

WRS INFRASTRUCTURE & ENVIRONMENT, INC.
RESPIRATOR FIT TESTING & INSPECTION

NAME _____ EMPLOYEE NO. _____ DATE _____
 TITLE _____ SERVICE CENTER _____

HOOD/ ENCLOSURE MAY NOT BE USED WITH IRRITANT SMOKE.

IRRITANT SMOKE FIT TESTING:

<u>No. of Squeezes</u>	<u>Activity</u>	<u>Reaction</u>
_____	Initial	___ Yes ___ No
_____	Head/Neck Motion	___ Yes ___ No
_____	Motion/Talking	___ Yes ___ No
_____	Motion/Deep Breathing	___ Yes ___ No
_____	Total Squeezes	
Seal Obtained _____	Type of Cartridge used	_____
	Type of respirator	_____
	Size of respirator	_____

RESPIRATOR INSPECTION:

Head Straps	<u>ok / not ok</u>	Inhalation valves/stems/bodies	<u>ok / not ok</u>
Face to Mask Sealing Surface	<u>ok / not ok</u>	Canister holder gasket/ threads	<u>ok / not ok</u>
Exhalation valves/cover/stems/bodies	<u>ok / not ok</u>	Lens	<u>ok / not ok</u>

Action Taken to Correct Deficiencies: _____

Fit Test/ Inspection performed by: _____ Date _____

Employee signature: _____ Date _____

**WRS Infrastructure & Environment, Inc.
H&S Plan Change Authorization**

Project Name: _____

Date: _____

Project Number: _____

Description of Change:

Reason for Change:

Person requesting Change:

Signature

Date

Approved By

(WRS Health and Safety Administrator)

Signature

Date

Attach sheets if necessary

SAFETY BRIEFING

Project Name: _____ **Date:** _____

The following personnel were present at the pre-job safety briefing and having read the Health and Safety Plan, are familiar with its provisions, and will abide by the procedures set forth in this plan:

[illegible]

Printed name of Site Supervisor or Site Health and Safety Officer

Signature

Date

By signing below, I am indicating that I have read and agree to comply with the contents of the Site Specific Health and Safety Plan prepared for the _____ Project.

[illegible]

**WRS Infrastructure & Environment, Inc.
Air Monitoring Log**

Project Site:	Project No.	Date:

Level of Protection:	Description of Site (e.g. weather, temp., soil conditions):

Instrument:	Instrument Response:	Location:	Time:	Comments:

Calibration Data (e.g. type & gas concentration, instrument adjustments if any):

Additional Notes:

Signature: _____
(Health and Safety Officer)

Date: _____

WRS Infrastructure & Environment, Inc.

**WRS Infrastructure & Environment, Inc.
Quantitative Fit Testing Certificate**

Employee

Name: _____

Date: _____

Dept.: _____

Employee

No.: _____

Quantitative Fit Testing Device: DNI Nevada Fit Tester 3000 (Controlled Negative Pressure)

Test Parameters

Work Rate: Heavy 300 kcal/ hr.Cartridge Type: Hi (Combination)Mask Type: Full Face or Half FaceChallenge Pressure: _____ " H₂O

Manufacturer: _____

Breathing Rate: _____ LPM

Model: _____

Gender: _____

Size: _____

Minimum Passing Fit Factor: 500

18 Step Protocol Exercises & Tests

Step 1: Breathing 60 seconds	Step 10: Test Face Forward FF: _____ Test Q: _____
Step 2: Test Face Forward FF: _____ Test Q: _____	Step 11: Grimace 20 seconds
Step 3: Move Head Side to Side 60 seconds	Step 12: Test Face Forward FF: _____ Test Q: _____
Step 4: Test Face Left FF: _____ Test Q: _____	Step 13: Bend at Waist 30 seconds
Step 5: Test Face Right FF: _____ Test Q: _____	Step 14: Test Face Forward FF: _____ Test Q: _____
Step 6: Move Head Up & Down 60 seconds	Step 15: Jog in place 30 seconds
Step 7: Test Head Up FF: _____ Test Q: _____	Step 16: Test: Face Forward FF: _____ Test Q: _____
Step 8: Test Head Down FF: _____ Test Q: _____	Step 17: Re-don Respirator 60 seconds
Step 9: Reading 30 seconds	Step 18: Test Face Forward FF: _____ Test Q: _____

Average of Fit Test Exercises

Average % Leak: _____ Test Quality: _____ Equivalent Fitfactor: _____

Employee Signature: _____ Date: _____

Tester's Signature: _____ Date: _____

WRS Infrastructure & Environment, Inc

**APPENDIX B
HEAT STRESS**

WRS Infrastructure & Environment, Inc

WRS Heat Stress Management Standard Operating Procedure

CONTENTS

1.0 **PURPOSE**

2.0 **SCOPE**

3.0 **DEFINITIONS**

4.0 **RESPONSIBILITIES**

5.0 **PROCEDURE**

6.0 **REFERENCES**

7.0 **ATTACHMENTS**

8.0 **RECORD KEEPING**

9.0 **EQUIPMENT**

WRS Infrastructure & Environment, Inc

WRS Heat Stress Management Standard Operating Procedure

1.0 PURPOSE

The Heat Stress Management SOP is intended to describe measures which will reduce the probability of workers experiencing a heat related disorder.

2.0 SCOPE

The Heat Stress Management SOP is applicable to all WRS project sites. Its implementation is mandatory when workers wearing impermeable personal protective equipment are exposed to ambient air temperatures above 70°F.

3.0 DEFINITIONS

Stress can contribute significantly to accidents or harm workers in other ways.

The term "stress" denotes the physical (gravity, mechanical force, heat, cold, pathogens, injury) and psychological (fear, anxiety, crises, joy) forces that are experienced by individuals.

The body's response to stress occurs in three stages:

- a. **Alarm Reaction** - The body recognizes the stress and the pituitary-adreno-cortical system responds by increasing the heart rate and blood sugar level, decreasing digestive activity and dilating the pupils.
- b. **Adaptive Stage** - The body repairs the effect of stimulation and stress symptoms disappear.
- c. **Exhaustion Stage** - The body can no longer adapt to stress and the individual may develop emotional disturbances and cardiovascular and renal diseases.

The most common types of stress that affect remediation personnel are heat stress and cold stress. Heat and cold stress can be the most serious hazards an employee encounters at hazardous waste sites.

Heat Stress usually is a result of protective clothing decreasing natural body ventilation, although it may occur at any time work is being performed at elevated temperatures.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, regular monitoring and other preventative measures are vital.

Site workers must learn to recognize and treat various forms of heat stress.

4.0 RESPONSIBILITIES

The Project Manager/ Supervisor is responsible for directing work in accordance with this procedure when implementation conditions are met. The PM is also responsible for providing resources necessary for implementation of the procedure.

The Site Health and Safety Officer is responsible for monitoring and facilitating employee compliance with the procedure. The SHSO is responsible for instructing employees in the recognition and control of heat related illnesses.

5.0 PROCEDURE

WRS Infrastructure & Environment, Inc

WRS Heat Stress Management Standard Operating Procedure**5.1 Symptom Recognition and Treatment**

A large portion of heat stress control lies in the ability of an individual to recognize heat stress symptoms in themselves and co-workers. Early recognition and treatment of heat stress symptoms can prevent the development of more serious, debilitating and even life threatening conditions.

5.1.1 Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the heat regulating mechanisms of the body. The individual's temperature control system that causes sweating stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly. Heat stroke requires medical attention.

- a. Symptoms - Red, hot dry skin, although person may have been sweating earlier. Nausea, dizziness, confusion, extremely high body temperature, rapid respiratory and pulse rate, convulsions, unconsciousness, or coma.
- b. Treatment - Cool the victim quickly. If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the victim in cool, but not cold, water; sponge the body with cool water; or pour water on the body to reduce the temperature to a safe level (102°F). Observe the victim and obtain medical help. Do not give coffee, tea, or alcoholic beverages. Do give fluids by mouth if victim is in and out of consciousness

5.1.2 Heat Exhaustion

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. This condition is much less dangerous than heat stroke, but it nonetheless must be treated.

- a. Symptoms - Pale, clammy moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, breathing is shallow. The person may have a headache, may vomit, and may be dizzy.
- b. Treatment - Remove the person to a cool, air-conditioned place, loosen clothing, place in a head-low position, and provide bed rest. Consult a physician, especially in severe cases. The normal thirst mechanism is not sensitive enough to ensure body fluid replacement. Have the patient drink one to two cups of water immediately and every 20 minutes thereafter until symptoms subside. Total water consumption should be about one to two gallons per day.

5.1.3 Heat Cramps

Heat cramps are caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke.

- a. Symptoms - Acute painful spasms of voluntary muscles: e.g., abdomen and extremities.
- b. Treatment - Remove the victim to a cool area and loosen clothing. Have the patient drink one to two cups of water immediately and every 20 minutes thereafter until the symptoms subside. Total water consumption should be one to two gallons per day. Consult your physician.

5.1.4 Heat Rash

Heat rash is caused by continuous exposure to heat and humid air and is aggravated by chafing cloths. The condition decreases the ability to tolerate heat.

WRS Infrastructure & Environment, Inc

WRS Heat Stress Management Standard Operating Procedure

- a. Symptoms - Mild red rash, especially in areas of body in contact with protective gear.
- b. Treatment - Decrease the amount of time in protective gear and provide powder to help absorb moisture and decrease chafing.

5.2 Heat Stress Prevention Measures

What follows is a list of heat stress prevention measures which reduce the risk of an employee experiencing a heat related disorder. They are in no particular order. Successful heat stress prevention will require the implementation of all the control measures listed to varying degrees. No single control measure will prove to be either effective nor efficient for a given project site.

5.2.1 Fluid Replacement

Have workers drink 16 ounces of water before beginning work, such as in the morning or after lunch. Provide disposable, four ounce cups and water that is maintained at 50 to 60°F. Urge workers to drink one to two gallons per day. To assist employees track their own fluid replacement, provide individual water coolers/ containers, fill the containers each day, and check consumption at the end of the day. The use of paper cups and a single cooler for the entire job site are difficult for both supervisors and employees to track. Provide cool, preferably air-conditioned, area for rest breaks. Discourage the use of alcohol in nonworking hours and discourage the intake of coffee during working hours. Monitor for signs of heat stress.

Use of electrolyte containing fluids (e.g., Gatorade) is more important for unacclimatized workers than acclimatized workers.

5.2.2 Acclimate Crew Members

Acclimatization is the process by which the body adapts to heat stress. Changes include increased sweating efficiency (earlier onset of sweating, increased sweat production, lower electrolyte loss) and stabilized blood circulation (less likelihood of blackout, dizziness, spots, etc.) It occurs with brief (~100 minutes) daily exposures to heat in 5 -7 days. Benefits of acclimatization are typically lost with no heat exposure for a week or more.

5.2.3 Reduce Heat Load (both environmental and metabolic)

Provide cooling devices to aid body cooling (i.e., Cool Vests). These devices, however, add weight, and their use should be balanced against worker efficiency.

Evaporative cooling is aided by clothing which wicks away perspiration from the skin. Long cotton underwear acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing. However, long cotton underwear is of no use and can aggravate heat stress symptoms once it becomes soaked with perspiration.

Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing.

In hot weather, conduct field activities in the early morning or evening.

WRS Infrastructure & Environment, Inc

WRS Heat Stress Management Standard Operating Procedure

Reduce metabolic heat load by designing tasks such that employee exertion is kept to a minimum

Reduce environmental heat loads by reducing radiant heat exposure (sunshine). Working in shaded areas and taking breaks in shaded areas will reduce heat loads due to radiant heat.

5.2.4 Employee Rotation

In hot weather, rotate shifts of workers wearing impervious clothing. On project sites with large crews, stagger heat stress breaks so that tasks are not completely shut down. On sites with small crew sizes this may not be possible due to the "buddy system" rule.

5.2.5 Dry Clothing and Personal Hygiene

Good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

5.2.6 Avoid Diuretics and Stimulants

Avoid consuming alcoholic beverages which cause loss of body fluid water by urination. Avoid consumption of stimulants such as some cold medicines and caffeine which increase heart rates.

5.2.7 Heat Stress Monitoring and Work/ Rest Cycle Management

For strenuous field activities that are part of on-going work activities in hot weather, the following procedures shall be used to monitor the body's physiological response to heat and to manage the work/ rest cycle. These procedures are to be instituted when ambient temperatures exceed 70°F and employees are wearing impervious (i.e., does not allow perspiration to evaporate) clothing (e.g., Tyvek, Saranex, PE Coated Tyvek, etc., coveralls).

- a. **Measure Heart Rate (HR)** - The heart rate should be measured by the radial pulse at the wrist for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.
- b. **Measure Body Temperature** - Body temperature should be measured orally or aurally by a clinical thermometer as early as possible in the resting period. The temperature (OT) at the beginning of the rest period should not exceed 99.6°F, if it does, the next work period should be shortened by 33% while the length of the rest period stays the same. If the OT exceeds 99.6°F at the beginning of the next period, the following work cycle should be further shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F. Consuming fluids immediately prior to temperature measurement will give false, low readings. No one will continue to be exposed to hot conditions with an oral/ aural temperature in excess of 100.6°F.

WRS Infrastructure & Environment, Inc

WRS Heat Stress Management Standard Operating Procedure

- c. **Rest Areas** - Rest areas should be air conditioned if possible. The heart rates of workers who recover in air conditioned areas will be reduced faster and to lower rates than those that recover in non-air conditioned areas.
- d. **Manage Work/Rest Schedule** - The following work/rest schedule shall be used as a guideline:

<u>Adjusted Temperature (°F)</u>	<u>Active Work Time Using Impermeable Protective Gear</u>
75 or less	50
80	40
85	30
90	20
95	10
100	0

To calculate the adjusted temperature:

$$T(\text{adjusted}) = T(\text{actual}) + (13 \times \text{fraction sunshine})$$

Measure the air temperature with a standard thermometer. Estimate the fraction of sunshine by judging what percent the sun is out: 100% sunshine = no cloud cover = 1.0, 50% sunshine = 50% cloud cover = 0.5, and 0% sunshine = full cloud cover = 0.0.

Reduce or increase the work cycle according to the guidelines under heart rate and body temperature.

6.0 **REFERENCES**

- Occupational Safety and Health and Guidance Manual for Hazardous Waste Site Activities
- Patty's Industrial Hygiene and Toxicology, Fourth Edition
- OSHA Web Site <http://www.osha-slc.gov/SLTC/heatstress/index.html>

7.0 **ATTACHMENTS**

None

8.0 **RECORD KEEPING**

Records which facilitate the tracking of employee fluid consumption and work/ rest cycles will be generated.

9.0 **EQUIPMENT**

- Oral thermometers and hygienic slip covers or aural thermometers with hygienic slip covers
- Thermometer to measure air temperature
- Cool water and/ or electrolyte containing fluids (e.g., Gatorade)
- Ice cooled vests
- Materials to create shaded work areas

WRS Infrastructure & Environment, Inc

APPENDIX C
LOCKOUT/ TAGOUT
WRS STANDARD OPERATING PROCEDURE

WRS Infrastructure & Environment, Inc

CONTENTS

- 1.0 PURPOSE
- 2.0 SCOPE
- 3.0 DEFINITIONS
- 4.0 RESPONSIBILITIES
- 5.0 PROCEDURE
- 6.0 REFERENCES
- 7.0 ATTACHMENTS
- 8.0 RECORD KEEPING
- 9.0 EQUIPMENT

1.0 PURPOSE

WRS recognizes the hazards of unexpected:

- energization
- machine startup and/or
- release of stored energy

during service or maintenance activities on equipment/machines. The following Standard Operating Procedure: Control of Hazardous Energy - Lockout/Tagout, has been developed to provide for the isolation of all energy sources that could endanger employees.

This procedure establishes minimum requirements for the lockout and/or tagout of energy isolating devices and systems. Lockout and/or tagout shall be used to ensure that all equipment, machinery, systems and facilities are inoperable and isolated from all potentially hazardous energy. The Lockout/Tagout procedure shall be implemented before employees perform service or maintenance activities where the unexpected energization, start-up or release of stored energy could cause personal injury and/or damage to equipment, machinery, facilities or the environment.

2.0 SCOPE

- A. Provisions outlined in this SOP include individual responsibilities, instructions for the implementation and removal of energy control procedures and employee training requirements.
- B. Employees Covered - This procedure applies to all WRS employees and sub-contractors to the same.
- C. Activities Covered

Service and maintenance activities on machines, equipment, systems and facilities during which the unexpected energization, start-up or release of stored energy could cause injury to employees must be conducted under the protection of a Lockout/Tagout SOP.

Operation/Production activities during which an employee must remove or bypass a guard or other safety device, or place his/her body into an area of machinery/equipment where work is actually performed upon the material being processed (point of operation) must also be conducted in accordance with a Lockout/Tagout SOP.

- D. This SOP is generic in nature and applies to the portion of scenarios described above which meet the following criteria:
 - 1. The machine, equipment or facility component has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees;
 - 2. The machine, equipment or facility component has a single energy source which can be readily identified and isolated;
 - 3. The isolation and locking out of that energy source will completely de-energize and deactivate the machine, equipment or facility component;
 - 4. The machine, equipment or facility component is isolated from that energy source and locked out during servicing, maintenance or site operations;

5. A single lockout device will achieve a lock-out condition;
 6. The lockout device is under the exclusive control of the authorized employee performing the servicing, maintenance or site operation;
 7. The servicing, maintenance or site operation does not create additional hazards for other employees; and
 8. Utilization of this procedure has resulted in no accidents involving the unexpected activation or re-energization of an electrical source during servicing, maintenance or site operations.
- E. Activities which do not conform to these criteria must be conducted under equipment/machinery specific lockout/tagout procedures.

3.0. DEFINITIONS

AFFECTED EMPLOYEES - WRS employee and/or a subcontractor employee whose job includes activities such as operating machines or equipment on which servicing or maintenance is being performed under lockout or tagout action or whose job requires the employee to work in an area in which servicing or maintenance or site operations are being performed.

AUTHORIZED EMPLOYEE - An employee who locks or implements a tagout system procedure on electrical sources to perform the servicing or maintenance of the equipment, or site operations. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance, service on machinery/equipment or site operations which must be locked or a tagout system implemented. The authorized employee shall be properly trained and approved to apply and remove locks and tags.

BLANK - To introduce an obstruction or to replace an opening with a solid surface to prevent flow (e.g. pipeblank).

CAPABLE OF BEING LOCKED OUT - An energy isolating device will be considered to be capable of being locked out if it has a hasp or other attachment where a lock can be affixed, or has a locking mechanism built in.

DOUBLE ISOLATION - To isolate by closing two valves or inserting a blank within an area of two valves.

ENERGY ISOLATING DEVICE - A physical device which prevents the transmission or release of energy. Examples include, but are not limited to, restrain blocks, electrical circuit breakers, disconnect switches, slide gates, or line valves. Where possible, they shall provide visible indication of the position of the device. Push-buttons, selector switches, check valves, and other portions of the control circuit shall not be considered energy isolating devices.

ENERGY SOURCE - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

LOCKOUT - The placement of a lockout device on an energy isolation device, in accordance with an established procedure.

LOCKOUT DEVICE - A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe "off" position for the purpose of protecting personnel.

TAGOUT - The placement of a tagout device on an energy isolation device in accordance with an established procedure. (See Attachment B for a suggested lockout/tagout tag.)

TAGOUT DEVICE - A prominent warning device, such as a tag and a means of attachment which can be securely fastened to an energy isolating device in accordance with the established procedure.

- Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal.
- Tagout devices' attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable, with a minimum unlocking strength of no less than fifty pounds.
- Tagout devices shall have the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.

ZERO ENERGY STATE - Removal of all potential energy within the designated area of a lockout or tagout.

4.0 RESPONSIBILITY

Appropriate (authorized and affected) employees shall be instructed in the safety significance of the lockout/tagout procedure. Each new or transferred affected employee and other employees whose work operations are or may be in the area shall be instructed in the purpose and use of the lockout/tagout procedure.

- A. Affected Employees - shall conduct themselves in a manner which does not jeopardize the effectiveness of the Lockout/Tagout procedure. Assist Authorized Employees in the successful application, use and removal of the Lockout/Tagout SOP.
- B. Authorized Employees - shall be familiar with that particular equipment and processes that are being locked/tagged out, and with the means and methods to isolate the energy source. Shall conduct service, maintenance and operation activities covered by this SOP in strict accordance with its provisions.
- C. Industrial Hygiene and Safety Officer (IH&SO) - shall provide consultation to Operations Management on determining the applicability of this SOP to a particular activity. Develop equipment/machinery specific Lockout/Tagout SOPs not covered under this SOP. Assist Operations Management in determining the effectiveness of this SOP for a particular activity, conduct and/or coordinate the training of Authorized and Affected Employees. Audit and report on the effectiveness of the Lockout/Tagout SOP and training activities.
- D. Operations Management - shall identify, with IH&SO's assistance, activities covered under this SOP and shall inform Affected and Authorized employees of same. Shall identify to the IH&SO and provide access to employees in need of training. Shall assign work activities to Authorized and Affected Employees in accordance with this SOP. Shall identify to the IH&SO machinery/equipment in need of SOPs beyond the scope of this SOP and assist in their preparation. Shall inform outside servicing personnel or contractors of this procedure whenever they are engaged in activities covered by the scope of this procedure.

5.0 PROCEDURE

5.1 TRAINING

Each WRS site/location shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the safe application, usage and removal of energy controls are acquired by the employees. Proper documentation with content and person's signature is required.

WRS Infrastructure & Environment, Inc.

- A. The training shall include the following:
1. Each authorized employee shall receive training in the recognition of applicable hazardous energy sources.
 2. Each affected employee shall be instructed on the purpose and use of the energy control procedure.
 3. All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed concerning the procedure.
- B. Additional training requirements when using Tagout Systems shall include the following:
1. Tags are warning devices and do not provide physical restraint as would be provided by a lock.
 2. A tag shall not be removed without written approval of the authorized person responsible.
 3. Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are in the area.
 4. Tags and their means of attachment must be made of materials which will withstand the environmental conditions.
- C. Additional retraining shall be conducted:
1. Whenever there is a change in an employee's job assignment.
 2. Based on changing job assignments, methods of control and/or whenever a periodic inspection reveals a deviation from the energy control procedure.
- D. Training on the use of the Energy Control Procedures shall be certified by WRS. The certification shall contain each employee's name, signature and date of training.

All WRS employees shall receive training sufficient to undertake the activities of an Authorized employee under this generic SOP.

5.2 APPLICATION OF THE ENERGY CONTROL PROCEDURE

The following steps shall be followed in the application of the lockout or tagout system.

- A. Preparation for Shutdown - Authorized and affected employees shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.
- B. Machine or Equipment Shutdown - Machines or equipment shall be turned off or shut down using point of operation control switches.
- C. Machine or Equipment Isolation - The energy isolating device for the machine or equipment shall be physically located and operated to ensure that the machine or equipment is isolated from the energy source.

- D. Lockout or Tagout Device - The lockout or tagout device shall be affixed to each energy isolating device by authorized employees. The device shall be affixed in a manner that will hold the energy isolating device in a safe or off position.
- E. Full Employee Protection - When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program.

Means to be considered as part of the demonstration of full employee protection shall include the implementation of additional safety measures such as:

- Removal of an isolating circuit element
- Blocking of a controlling switch
- Opening of an extra disconnecting device
- Removal of a valve handle.

- F. Stored Energy - All potentially hazardous stored or residual energy shall be relieved, disconnected and rendered safe.
- G. Isolation of Energy Verification - Prior to starting work on machines or equipment, the authorized employee shall verify (per Section entitled "Removal of Lockout or Tagout Devices") that isolation and de-energization of the machine, equipment or electrical source has been accomplished.

5.3 REMOVAL OF LOCKOUT OR TAGOUT DEVICES

Before lockout or tagout devices are removed and energy is restored, the following procedures shall be followed:

- A. Employees
- The work area shall be checked to ensure that all employees have been safely positioned or removed from the area.
 - All affected employees shall be notified that the lockout or tagout devices have been removed before any machine, equipment or electrical source is energized.
- B. The Machine or Equipment
- The work area shall be inspected to ensure that all non-essential items have been removed and the machine or equipment is ready for operation.
- C. Removing the Lockout or Tagout Device
- Each lockout or tagout device shall be removed by the authorized employee who applied the device.

5.4 REMOVAL OF LOCKOUT OR TAGOUT DEVICE BY ANOTHER EMPLOYEE

When the authorized employee who applied the lockout or tagout device is not available to remove it, the following procedure must be in place with specific training for such removal.

WRS Infrastructure & Environment, Inc.

- Verify by visual inspection or equivalent that the authorized employee who applied the device is not at the facility.
- Make a reasonable effort to contact and notify the authorized employee that the lockout or tagout device has been removed.
- Notify that employee's supervisor.
- Before resuming work, ensure that the authorized employee knows that the device has been removed.

5.5 GROUP LOCKOUT OR TAGOUT

When servicing and/or maintenance is performed by a crew, craft or other group, they shall utilize a procedure which affords the employees a level of protection that is equivalent to that provided by the implementation of a personal lockout device.

Group lockout or tagout procedures shall include the following specific requirements:

- An employee will be assigned primary responsibility as an authorized employee for a set number of employees working under the protection of a group lockout or tagout device.
- This employee will maintain a roster of group members and their job assignments.
- When more than one crew, craft, or department is involve, assignment of overall job-associated lockout or tagout control responsibility shall be designated to an authorized employee to coordinate affected work forces and ensure continuity of protection.
- Each authorized employee shall affix a personal lockout or tagout device to the group lockbox or device, group lockout box, or comparable mechanism on the machine or equipment being serviced or maintained.

5.6 OUTSIDE PERSONNEL (CONTRACTORS)

- All outside servicing personnel (contractors) and WRS personnel shall inform each other of their respective lockout or tagout procedures.
- All WRS locations and or facilities shall ensure that the employees understand and comply with the restriction and prohibitions of the outside contractor's energy control procedures.

Table I
LOCKOUT OR TAGOUT SEQUENCE

NOTIFY EMPLOYEES	ACTION
Site Supervisor	A. Notifies all personnel affected by the lockout or tagout application and the reason therefore.
SHUTDOWN PROCESS OR EQUIPMENT	
Authorized Employee	A. Turns off or returns operating controls to the neutral mode using appropriate equipment/process shutdown procedures. B. Operates switches and/or valves or any other energy isolating device(s) so that the equipment is isolated from its energy source(s).
PLACE LOCKOUT AND/OR TAGOUT	
Authorized employee	A. Applies safety locks and tags in all cases as required to isolate all energy devices. The lockout or tagout must be visible and accessible to anyone attempting to operate the isolated device.
VERIFY THE ABSENCE OR CONTROL OF ENERGY	
Authorized employee	A. Checks or tests all systems after the lockout and tagging procedures have been completed to insure that total energy isolation has occurred. CAUTION: Return operating control to neutral or off position, after verification of energy isolation.
REMOVE LOCKOUT/TAGOUT DEVICES	
Authorized Employee	A. Checks the area around the machine or equipment to ensure that no one is exposed. B. Removes all tools from machines or equipment. Ensures all guards have been reinstalled and employees are in the clear. C. Ensures that all pipes that were opened for repair or draining purposes are closed and connected properly. D. Ensures that all controls are in off position or neutral position. E. Removes safety locks and/or tags. F. Operates the energy isolating devices to restore energy to the machine or equipment
ADMINISTER LOCKOUT/TAGOUT DEVICES	
Site Supervisor	A. Maintains a lockout or tagout log at the lock cabinet. B. Schedules and performs surveillances so that proper lock and tag procedure is being followed. C. Schedules and performs audits of the proper lock and tag procedure.

5.7 PROCEDURE INVOLVING MORE THAN ONE PERSON

Each individual working on equipment or processes shall be required to place his/her own personal lockout device or tagout device on the energy isolating device.

When an energy isolating device cannot accept multiple locks or tags, a multiple lockout or tagout device (hasp) may be used. If a lockout is used, a single lock may be used with the key being placed in a lockout box or cabinet which allows the use of multiple locks to secure it. Each employee will use his/her own lock to secure the box or cabinet.

6.0 REFERENCES

- 29 CFR 1910.147

- OSHA Web Page <http://www.osha-slc.gov/SLTC/controlhazardousenergy/index.html>

7.0 ATTACHMENTS

- Training Outline
- Sample Tag

8.0 RECORD KEEPING

- Employee training evets
- Inspections of ongoing LOTO's

9.0 EQUIPMENT

- Lockout device (e.g., hasp)
- Lock

ATTACHMENT A
Training Outline

CONTROL OF HAZARDOUS ENERGY LOCKOUT/TAGOUT Training Outline

I. Hazard Recognition

A. Recognize the Scenario

1. Unexpected Energization

2. Unexpected Machine Startup

3. Release of Stored Energy

4. Our Equipment vs. Our Clients Equipment

5. Suspect Activities

B. Recognize the Energy

1. Electric

2. Hydraulic

3. Pneumatic

4. Mechanical

5. Thermal

6. Chemical

7. Combinations

II. Hazard Control Standard Operating Procedure

A. Activities Covered

B. Definitions

1. Affected Employees

2. Authorized Employees

3. Blank

4. Capable of Being Locked Out

5. Double Isolation

6. Energy Isolating Device

7. Lockout

8. Lockout Device

9. Tagout

10. Tagout Device

11. Zero Energy State

C. Lockout/Tagout Sequence

1. Notify Employees

2. Shutdown Process or Equipment

3. Place Lockout/Tagout Device

4. Verify Absence or Control of Energy

5. Remove Lockout/Tagout Devices

D. Activities Not Covered by SOP

E. Removing Another Employee's Lock/Tag

F. Group Lockout/Tagout

G. Outside Personnel (Subcontractors, Clients)

ATTACHMENT B

Tag

NAME	DATE	HOUR
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

APPENDIX D
WRS FALL PROTECTION
STANDARD OPERATING PROCEDURE

CONTENTS

1.0 PURPOSE

2.0 SCOPE

3.0 DEFINITIONS

4.0 RESPONSIBILITIES

5.0 PROCEDURE

- 5.1 Training
- 5.2 Gaurdail Systems
- 5.3 Safety Net Systems
- 5.4 Personal Fall Arrest Systems
- 5.5 Positioning Device Systems
- 5.6 Warning Line Systems
- 5.7 Controlled Access Zones
- 5.8 Safety Monitoring Systems
- 5.9 Covers
- 5.10 Protection from Falling Objects
- 5.11 Fall Protection Plans

6.0 REFERENCES

7.0 ATTACHMENTS

8.0 RECORD KEEPING

9.0 EQUIPMENT

1.0 PURPOSE

This procedure establishes minimum requirements to prevent injuries to employees from different level falls. It also defines minimum requirements for complying with OSHA's Fall Protection Standard (29 CFR 1926 Subpart M).

2.0 SCOPE

This procedure applies to all WRS employees and WRS subcontractor employees exposed to the following workplace conditions:

Unprotected Sides and Edges - employees on walking/working surfaces (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level.

Leading Edge Work - employees constructing a leading edge 6 feet (1.8 m) or more above lower levels.

Work In Hoist Areas - employees in a hoist area shall be protected from falling 6 feet (1.8 m) or more to lower levels.

Holes - employees on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet (1.8 m) above lower levels. Employees on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) Employees on a walking/working surface shall be protected from objects falling through holes (including skylights).

Formwork and Reinforcing Steel - employees on the face of formwork or reinforcing steel shall be protected from falling 6 feet (1.8 m) or more to lower levels.

Ramps Runways and Other Walkways - employees on ramps, runways, and other walkways shall be protected from falling 6 feet (1.8 m) or more to lower levels.

Excavations - employees at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier.

Wells, Pits and Shafts - employees at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8 m) or more in depth shall be protected from falling.

Work Above Dangerous Equipment - employees working less than 6 feet (1.8 m) above dangerous equipment shall be protected from falling into or onto the dangerous equipment Employees working 6 feet (1.8 m) or more above dangerous equipment shall be protected from fall hazards.

Roof Work - employees engaged in roofing activities on low-slope roofs, with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling. Employees on a steep roof with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling.

Precast Concrete Erection - employees engaged in the erection of precast concrete members (including, but not limited to the erection of wall panels, columns, beams, and floor and roof "tees") and related operations such as grouting of precast concrete members, who are 6 feet (1.8 m) or more above lower levels shall be protected from falling.

Wall Openings - employees working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet (1.8 m) or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches (1.0 m) above the walking/working surface, shall be protected from falling.

Walking/ Working Surfaces Not Otherwise Addressed - employees on a walking/working surface 6 feet (1.8 m) or more above lower levels shall be protected from falling

3.0 DEFINITIONS

Anchorage - means a secure point of attachment for lifelines, lanyards or deceleration devices.

Body belt (safety belt) - means a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

Body harness - means straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

Buckle - means any device for holding the body belt or body harness closed around the employee's body.

Connector - means a device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or dee-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).

Controlled access zone (CAZ) - means an area in which certain work (e.g., overhand bricklaying) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

Dangerous equipment - means equipment (such as pickling or galvanizing tanks, degreasing units, machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment.

Deceleration device - means any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration distance - means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate.

Fall Protection

It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

Equivalent - means alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.

Failure - means load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

Free fall - means the act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free fall distance - means the vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Guardrail system - means a barrier erected to prevent employees from falling to lower levels.

Hole - means a gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, roof, or other walking/working surface.

Infeasible - means that it is impossible to perform the construction work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.

Lanyard - means a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

Leading edge - means the edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

Lifeline - means a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Low-slope roof - a roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

Lower levels - means those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

Mechanical equipment - means all motor or human propelled wheeled equipment used for roofing work, except wheelbarrows and mopcars.

Opening - means a gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.

Overhand bricklaying and related work - means the process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending and electrical installation incorporated into the brick wall during the overhand bricklaying process.

Personal fall arrest system - means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

Positioning device system - means a body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Rope grab - means a deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

Roof - means the exterior surface on the top of a building. This does not include floors or formwork which, because a building has not been completed, temporarily become the top surface of a building.

"Roofing work" means the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

Safety-monitoring system - means a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

Self-retracting lifeline/lanyard - means a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Snaphook - means a connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snaphooks must be the self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection.

Steep roof - means a roof having a slope greater than 4 in 12 (vertical to horizontal).

Toeboard - means a low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

Unprotected sides and edges - means any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches (1.0 m) high.

Walking/working surface - means any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

Warning line system - means a barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

Work area - means that portion of a walking/working surface where job duties are being performed.

4.0 RESPONSIBILITY

All WRS employees and subcontractor employees covered by this SOP are responsible for complying with its contents. Supervisors are responsible for implementing and enforcing the SOP and securing the resources necessary to implement it.

Fall Protection

5.0 PROCEDURE**5.1 TRAINING**

Employees with potential exposure to fall hazards shall receive training that will enable them to recognize the hazards of falling and implement procedures to be followed in order to minimize these hazards.

Retraining will be performed when an employee who has already been trained does not have the understanding and skill required by paragraph to recognize and control fall hazards. Circumstances where retraining is required include, but are not limited to, situations where changes in the workplace render previous training obsolete, or changes in the types of fall protection systems or equipment to be used render previous training obsolete, or inadequacies in an employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.

Training shall be performed by a competent person qualified in the following areas:

- The nature of fall hazards in the work area;
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
- The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used;
- The role of each employee in the safety monitoring system when this system is used;
- The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs;
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection; and
- The role of employees in fall protection plans;
- The applicable OSHA standards.

A written certification record of employee training will be maintained. The written certification record shall contain the name or other identity of the employee trained, the date(s) of the training, and the signature of the person who conducted the training.

5.2 GUARDRAIL SYSTEMS

The top edge height of top rails, or equivalent guardrail system members, shall be 42 inches (1.1 m) plus or minus 3 inches (8 cm) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of this paragraph. Note: When employees are using stilts, the top edge height of the top rail, or equivalent member, shall be increased an amount equal to the height of the stilts.

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 21 inches (53 cm) high. Midrails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level. Screens and mesh, when used, shall extend from the top rail to the walking/working level and along the entire opening between top rail supports.

Intermediate members (such as balusters), when used between posts, shall be not more than 19 inches (48 cm) apart. Other structural members (such as additional midrails and architectural panels) shall be installed such that there are no openings in the guardrail system that are more than 19 inches (.5 m) wide.

Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied within 2 inches (5.1 cm) of the top edge, in any outward or downward direction, at any point along the top edge.

Fall Protection

When the 200 pound (890 N) test load is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches (1.0 m) above the walking/working level. Guardrail system components selected and constructed in accordance with the following specifications are deemed to meet this requirement.

- (1) For wood railings: Wood components shall be minimum 1500 lb-ft/in(2) fiber (stress grade) construction grade lumber; the posts shall be at least 2-inch by 4-inch (5 cm x 10 cm) lumber spaced not more than 8 feet (2.4 m) apart on centers; the top rail shall be at least 2-inch by 4-inch (5 cm x 10 cm) lumber, the intermediate rail shall be at least 1-inch by 6-inch (2.5 cm x 15 cm) lumber. All lumber dimensions are nominal sizes as provided by the American Softwood Lumber Standards, dated January 1970.
- (2) For pipe railings: posts, top rails, and intermediate railings shall be at least one and one-half inches nominal diameter (schedule 40 pipe) with posts spaced not more than 8 feet (2.4 m) apart on centers.
- (3) For structural steel railings: posts, top rails, and intermediate rails shall be at least 2-inch by 2-inch (5 cm x 10 cm) by 3/8-inch (1.1 cm) angles, with posts spaced not more than 8 feet (2.4 m) apart on centers.

Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members shall be capable of withstanding, without failure, a force of at least 150 pounds (666 N) applied in any downward or outward direction at any point along the midrail or other member.

Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing. The ends of all top rails and midrails shall not overhang the terminal posts, except where such overhang does not constitute a projection hazard. Steel banding and plastic banding shall not be used as top rails or midrails. Top rails and midrails shall be at least one-quarter inch (0.6 cm) nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it shall be flagged at not more than 6-foot intervals with high-visibility material. Manila, plastic or synthetic rope being used for top rails or midrails shall be inspected as frequently as necessary to ensure that it continues to meet strength requirements.

When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section shall be placed across the access opening between guardrail sections when hoisting operations are not taking place.

When guardrail systems are used at holes, they shall be erected on all unprotected sides or edges of the hole. When guardrail systems are used around holes used for the passage of materials, the hole shall have not more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it shall be closed over with a cover, or a guardrail system shall be provided along all unprotected sides or edges. When guardrail systems are used around holes which are used as points of access (such as ladderways), they shall be provided with a gate, or be so offset that a person cannot walk directly into the hole.

Guardrail systems used on ramps and runways shall be erected along each unprotected side or edge.

5.3 SAFETY NET SYSTEMS

Safety nets shall be installed as close as practicable under the walking/working surface on which employees are working, but in no case more than 30 feet (9.1 m) below such level. When nets are used on bridges, the potential fall area from the walking/working surface to the net shall be unobstructed.

Safety nets shall extend outward from the outermost projection of the work surface as follows:

Vertical distance from working level to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet

Fall Protection

More than 5 feet up to 10 feet	10 feet
More than 10 feet	13 feet

Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified below. Safety nets and their installations shall be capable of absorbing an impact force equal to that produced by the drop test.

Safety nets and safety net installations shall be drop-tested at the jobsite after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place. The drop-test shall consist of a 400 pound (180 kg) bag of sand 30 + or - 2 inches (76 + or - 5 cm) in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than 42 inches (1.1 m) above that level.

When it is unreasonable to perform the drop-test a designated competent person shall certify that the net and net installation is in compliance with the above listed specifications by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the jobsite for inspection.

Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Defective components shall be removed from service. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system.

Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as possible from the net and at least before the next work shift.

The maximum size of each safety net mesh opening shall not exceed 36 square inches (230 cm) nor be longer than 6 inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6 inches (15 cm). All mesh crossings shall be secured to prevent enlargement of the mesh opening. Each safety net (or section of it) shall have a border rope for webbing with a minimum breaking strength of 5,000 pounds (22.2 kN). Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 6 inches (15 cm) apart.

5.4 PERSONAL FALL ARREST SYSTEMS

Connectors in a fall arrest system shall be drop forged, pressed or formed steel, or made of equivalent materials. They shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

Dee-rings and snaphooks shall have a minimum tensile strength of 5,000 pounds (22.2 kN). Dee-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

Snaphooks shall be the self closing, self locking type.

Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged:

- Directly to webbing, rope or wire rope;
- To each other;
- To a dee-ring to which another snaphook or other connector is attached;
- To a horizontal lifeline; or

- To any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

On suspended scaffolds or similar work platforms with horizontal lifelines that may become vertical lifelines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.

Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds (22.2 kN).

When vertical lifelines are used, each employee shall be attached to a separate lifeline. During the construction of elevator shafts, two employees may be attached to the same lifeline in the hoistway, provided both employees are working atop a false car that is equipped with guardrails; the strength of the lifeline is 10,000 pounds [5,000 pounds per employee attached] (44.4 kN); and all other criteria specified in this paragraph for lifelines have been met.

Lifelines shall be protected against being cut or abraded.

Self-retracting lifelines and lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less shall be capable of sustaining a minimum tensile load of 3,000 pounds (13.3 kN) applied to the device with the lifeline or lanyard in the fully extended position. Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet (0.61 m) or less, ripstitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN) applied to the device with the lifeline or lanyard in the fully extended position.

Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses shall be made from synthetic fibers.

Anchorage used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows:

- As part of a complete personal fall arrest system which maintains a safety factor of at least two; and
- Under the supervision of a qualified person.

Personal fall arrest systems, when stopping a fall, shall:

- Limit maximum arresting force on an employee to 900 pounds (4 kN) when used with a body belt;
- Limit maximum arresting force on an employee to 1,800 pounds (8 kN) when used with a body harness;
- Be rigged such that an employee can neither free fall more than 6 feet (1.8 m), nor contact any lower level;
- Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet (1.07 m); and,
- Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1.8 m), or the free fall distance permitted by the system, whichever is less.

The attachment point of the body belt shall be located in the center of the wearer's back. The attachment point of the body harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.

Fall Protection

The employer shall provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves.

Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.

Body belts (to be used only as a positioning device) shall be at least one and five-eighths (1 5/8) inches (4.1 cm) wide.

Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists except as specified in other subparts of this Part.

When a personal fall arrest system is used at hoist areas, it shall be rigged to allow the movement of the employee only as far as the edge of the walking/working surface.

5.5 POSITIONING DEVICE SYSTEMS

Positioning device systems and their use shall conform to the following provisions:

Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet (.9 m).

Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds (13.3 kN), whichever is greater.

Connectors used with positioning device systems shall be drop forged, pressed or formed steel, or made of equivalent materials. Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.

Connecting assemblies shall have a minimum tensile strength of 5,000 pounds (22.2 kN)

Dee-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member, or shall be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the snaphook keeper by the connected member. As of January 1, 1998, only locking type snaphooks shall be used.

Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged:

- Directly to webbing, rope or wire rope;
- To each other;
- To a dee-ring to which another snaphook or other connector is attached;
- To a horizontal lifeline; or
- To any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional Disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

Positioning device systems shall be inspected prior to each use for wear, damage, and other deterioration, and defective components shall be removed from service.

Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

5.6 WARNING LINE SYSTEMS

Warning line systems and their use shall comply with the following provisions:

- The warning line shall be erected around all sides of the roof work area.
- When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge.
- When mechanical equipment is being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1 m) from the roof edge which is perpendicular to the direction of mechanical equipment operation.
- Points of access, materials handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines.
- When the path to a point of access is not in use, a rope, wire, chain, or other barricade, equivalent in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area, or the path shall be offset such that a person cannot walk directly into the work area.
- Warning lines shall consist of ropes, wires, or chains, and supporting stanchions erected as follows:
 - The rope, wire, or chain shall be flagged at not more than 6-foot (1.8 m) intervals with high-visibility material;
 - The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches (.9 m) from the walking/working surface and its highest point is no more than 39 inches (1.0 m) from the walking/working surface;
 - After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 N) applied horizontally against the stanchion, 30 inches (0.8 m) above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof, or platform edge;
 - The rope, wire, or chain shall have a minimum tensile strength of 500 pounds (2.22 kN), and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions described above; and
 - The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.
- No employee shall be allowed in the area between a roof edge and a warning line unless the employee is performing roofing work in that area.
- Mechanical equipment on roofs shall be used or stored only in areas where employees are protected by a warning line system, guardrail system, or personal fall arrest system.

5.7 CONTROLLED ACCESS ZONES

Controlled access zones and their use shall conform to the following provisions.

When used to control access to areas where leading edge and other operations are taking place, the controlled access zone shall be defined by a control line or by any other means that restricts access. When control lines are used, they shall be erected not less than 6 feet (1.8 m) nor more than 25 feet (7.7 m) from the unprotected or leading edge, except when erecting precast concrete members.

When erecting precast concrete members, the control line shall be erected not less than 6 feet (1.8 m) nor more than 60 feet (18 m) or half the length of the member being erected, whichever is less, from the leading edge. The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge. The control line shall be connected on each side to a guardrail system or wall.

When used to control access to areas where overhand bricklaying and related work are taking place:

- The controlled access zone shall be defined by a control line erected not less than 10 feet (3.1 m) nor more than 15 feet (4.5 m) from the working edge.
- The control line shall extend for a distance sufficient for the controlled access zone to enclose all employees performing overhand bricklaying and related work at the working edge and shall be approximately parallel to the working edge.
- Additional control lines shall be erected at each end to enclose the controlled access zone.
- Only employees engaged in overhand bricklaying or related work shall be permitted in the controlled access zone.

Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:

- Each line shall be flagged or otherwise clearly marked at not more than 6-foot (1.8 m) intervals with high-visibility material.
- Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches (1 m) from the walking/working surface and its highest point is not more than 45 inches (1.3 m) [50 inches (1.3 m) when overhand bricklaying operations are being performed] from the walking/working surface.
- Each line shall have a minimum breaking strength of 200 pounds (.88 kN).

On floors and roofs where guardrail systems are not in place prior to the beginning of overhand bricklaying operations, controlled access zones shall be enlarged, as necessary, to enclose all points of access, material handling areas, and storage areas. On floors and roofs where guardrail systems are in place, but need to be removed to allow overhand bricklaying work or leading edge work to take place, only that portion of the guardrail necessary to accomplish that day's work shall be removed.

5.8 SAFETY MONITORING SYSTEMS

Safety monitoring systems and their use shall comply with the following provisions.

The employer shall designate a competent person to monitor the safety of other employees and the employer shall ensure that the safety monitor complies with the following requirements:

- The safety monitor shall be competent to recognize fall hazards;
- The safety monitor shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner;
- The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored;
- The safety monitor shall be close enough to communicate orally with the employee; and
- The safety monitor shall not have other responsibilities which could take the monitor's attention from the monitoring function.

Mechanical equipment shall not be used or stored in areas where safety monitoring systems are being used to monitor employees engaged in roofing operations on low-slope roofs.

No employee, other than an employee engaged in roofing work [on low-sloped roofs] or an employee covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safety monitoring system.

Each employee working in a controlled access zone shall be directed to comply promptly with fall hazard warnings from safety monitors.

5.9 COVERS

Covers for holes in floors, roofs, and other walking/working surfaces shall meet the following requirements:

Fall Protection

- Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.
- All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.
- All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.
- All covers shall be color coded or they shall be marked with the word "HOLE" or "COVER" to provide warning of the hazard. Note: This provision does not apply to cast iron manhole covers or steel grates used on streets or roadways.

5.10 PROTECTION FROM FALLING OBJECTS

Falling object protection shall comply with the following provisions:

- Toeboards, when used as falling object protection, shall be erected along the edge of the overhead walking/working surface for a distance sufficient to protect employees below.
- Toeboards shall be capable of withstanding, without failure, a force of at least 50 pounds (222 N) applied in any downward or outward direction at any point along the toeboard.
- Toeboards shall be a minimum of 3 1/2 inches (9 cm) in vertical height from their top edge to the level of the walking/working surface. They shall have not more than 1/4 inch (0.6 cm) clearance above the walking/working surface. They shall be solid or have openings not over 1 inch (2.5 cm) in greatest dimension.

Where tools, equipment, or materials are piled higher than the top edge of a toeboard, paneling or screening shall be erected from the walking/working surface or toeboard to the top of a guardrail system's top rail or midrail, for a distance sufficient to protect employees below.

Guardrail systems, when used as falling object protection, shall have all openings small enough to prevent passage of potential falling objects.

During the performance of overhand bricklaying and related work:

- No materials or equipment except masonry and mortar shall be stored within 4 feet (1.2 m) of the working edge.
- Excess mortar, broken or scattered masonry units, and all other materials and debris shall be kept clear from the work area by removal at regular intervals.

During the performance of roofing work:

- Materials and equipment shall not be stored within 6 feet (1.8 m) of a roof edge unless guardrails are erected at the edge.
- Materials which are piled, grouped, or stacked near a roof edge shall be stable and self-supporting.

Canopies, when used as falling object protection, shall be strong enough to prevent collapse and to prevent penetration by any objects which may fall onto the canopy.

5.11 FALL PROTECTION PLANS

This option is available only to employees engaged in leading edge work, precast concrete erection work, or residential construction work who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment. The fall protection plan must conform to the following provisions.

The fall protection plan shall be prepared by a qualified person and developed specifically for the site where the leading edge work, precast concrete work, or residential construction work is being performed and the plan must be

Fall Protection

maintained up to date. Any changes to the fall protection plan shall be approved by a qualified person. A copy of the fall protection plan with all approved changes shall be maintained at the job site. The implementation of the fall protection plan shall be under the supervision of a competent person.

The fall protection plan shall document the reasons why the use of conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety nets systems) are infeasible or why their use would create a greater hazard.

The fall protection plan shall include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection from the conventional fall protection systems. For example, the employer shall discuss the extent to which scaffolds, ladders, or vehicle mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling.

The fall protection plan shall identify each location where conventional fall protection methods cannot be used. These locations shall then be classified as controlled access zones and operated accordingly.

Where no other alternative measure has been implemented, a safety monitoring system shall be implemented.

The fall protection plan must include a statement which provides the name or other method of identification for each employee who is designated to work in controlled access zones. No other employees may enter controlled access zones.

In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss) an investigation of the circumstances of the fall or other incident shall be performed to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and shall implement those changes to prevent similar types of falls or incidents.

6.0 REFERENCES

- 29 CFR 1926 Subpart M --
- http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_M.html

7.0 ATTACHMENTS

None

8.0 RECORD KEEPING

- Employee training certifications
- Inspections of Safety Nets (when applicable)
- Fall protection plans (when applicable)

9.0 EQUIPMENT

- Personal fall arrest system components

**WRS Infrastructure
and Environment Inc.**

Memo

To: Ed Pisarcik
From: Doug Nelson
Date: 08/05/02
Re: Amendment to the WTC Project HASP

Based on analytical reports received from the laboratory (EMSL Analytical Inc.), Cristobalite was incorrectly reported as a component of respirable silica.

**WRS Infrastructure & Environment, Inc.
H&S Plan Change Authorization**

Project Name: WTC Pilot Cleaning Project Date: 8/6/02 Project Number: 501060

Description of Change: Change specific to Section 4.1.2 Chemical Hazards
Reason for Change: Further analysis of bulk dust samples Cristobalite is not present.

This amendment updates Section 4.1.2 Chemical Hazards of the HASP. Initially cristobalite was thought to be present. Based on analytical results of bulk samples taken from the site cristobalite is not present.

Ed Pisarcik

Person Requesting Change

Signature

Date

Doug Nelson

Approved By

(WRS Health and Safety Manager)

Signature

Date

Attach sheets if necessary.

**WRS Infrastructure
and Environment Inc.**

Memo

To: Ed Pisarcik

From: Doug Nelson

Date: 08/05/02

Re: Amendment to the WTC Project HASP

Based on analytical reports received from the laboratory (EMSL Analytical Inc.), Cristobalite was incorrectly reported as a component of respirable silica.

Changes to the Health and Safety Plan

1. Changes to the Health and Safety Plan

As a result of changing conditions and new information gained in the field through analytical activities, changes were made to the Health and Safety Plan. The changes related to lead sampling, levels of protection, and use of personal protective equipment. A memorandum concerning detection of cristobalite interference in laboratory results was also incorporated. (See Attachment E).

1.1 Lead Sampling

Air sampling to characterize for exposure of personnel to lead was discontinued on July 24, 2002, because lead in air concentrations consistently presented below the OSHA Action Limit of 30 ug/m3. (29CFR 1926.62).

1.2 Level of Protection

Levels of personal protective equipment (PPE) were changed to reflect exposure measurements. An addendum to the Health and Safety Plan was prepared to address this on September 17, 2002. The table below presents the PPE assignments by task, pursuant to original and the amended Health and Safety Plan.

1.3 Personal Protective Equipment (PPE) By Task

<i>Location</i>	<i>Task</i>	<i>Original PPE</i>	<i>Revised PPE</i>
Exclusion Zone	1. Surveying and prep of previously cleaned areas	Level C- ½ face	Level C- ½ face
	2. Surveying and prep of areas not previously cleaned	Level C PAPR	Level C PAPR
	3. Vacuuming with non-HEPA-filtered equipment	Level C PAPR	Level C PAPR
	4. Vacuuming with HEPA-filtered equipment in previously cleaned areas	Level C- ½ face	Level C- ½ face
	5. Wet wiping following non-HEPA vacuuming	Level C- ½ face	Level C- ½ face
	6. Wet wiping following HEPA vacuuming	Level D+	Level D+
	7. Cleaning equipment using air and vacuum	Level C PAPR	Level C PAPR
	8. Removing/ changing vacuum bags and filters	Level C PAPR	Level C PAPR
	9. Re-cleaning units w/HEPA vacuuming and supporting personal air sampling results	New Task	Level D+
	10. Re-cleaning units w/ non-HEPA vacuuming	New Task	Level C- ½ face
	11. Re-cleaning units w/HEPA vacuuming without supporting personal air sampling results	New Task	Level C- ½ face

1.4 Use of Goggles

Goggles were assigned for Levels D and D+ because of concerns that irritation of employee's eyes might result from airborne fiberglass. Once it was determined that eye irritation was not occurring, safety glasses were substituted.

Health and Safety Issues

1. Health and Safety Issues

1.1 Electrical Concerns

All areas of the building were inspected to ensure that no electrical concerns posed a threat to the safety of employees. In the Food Exchange, live, loose hanging electrical wires were found. Electricity at the panel box was shut off and the wires in question were taped.

1.2 Building Repairs

A damaged hand rail in the Liberty Street stairwell was reinstalled to ensure the safety of personnel. All other repairs made prior to commencement of the work related to building access.

1.3 Building Access

The only access concern related to broken windows in the Chiropractor's Office. In order to prevent unauthorized access, which could potentially pose risks to both public health and to equipment used in the study, plywood panels were installed over the broken windows.

1.4 Rodent Infestation

In the process of inspecting to identify safety concerns, evidence of rodent infestation was discovered (droppings). The building owner was advised of the problem and contacted an exterminator.

1.5 Personal Monitoring

Every morning, the Site Health and Safety Officer calibrated the personal pumps. The initial flow, pump start time, pump serial number, date, location of pump, and sample number were recorded. Personal pumps are typically worn by employees to collect air samples that are representative of what the employees are experiencing while working. Given the space constraints of the work areas and the number of parameters to be measured, the majority of exposure measurements were made using area samples.

Pumps for the three parameters were mounted on five-foot tripod stands, in lieu of being worn by the employees. The Site Health and Safety officer collected media blanks at a rate of 10% of samples. At the end of the day, the stand was disassembled and the final flow rate and finish time were recorded. The total volume was calculated and the samples were packaged and forwarded to EPA's contracted laboratory. The laboratory is accredited for analysis of lead and silica by the American Industrial Hygiene Association and by the NVLAP for asbestos. The air samples were analyzed by the laboratory for asbestos, using one or both of the following procedures: PCM /TEM.

Sampling for airborne lead ceased on July 24, 2002, after consistent results of non-detectable concentrations. Sampling for asbestos and silica continued throughout the project to the extent commensurate with the task and crew size.

1.6 Work Zones

Upon commencement of the study, the building condition was assessed for the purpose of establishing work zones. Determination of work zones was made with consideration of boundaries that would maximize work productivity while facilitating pre and post sampling efforts. The demarcation of zones was accomplished to ensure the health and welfare of personnel and third parties. The Site Health and Safety Officer supervised the demarcation of zones. Space at the site was extremely limited, forcing continuous re-designation of the support zone, contamination reduction zone and the personnel decontamination area throughout the project. At any given time, the exclusion zone consisted of the area or areas then being cleaned; the contamination reduction zone and the personnel decontamination zone changed accordingly. Typically, because the walls of the apartment units offered inherent boundaries, the room or area configuration served as the delineation.

The Support Zone

As noted previously, space constraints at the site presented difficulty, resulting in ongoing re-designation of work zones. The purpose of the support zone is to provide an area for support and communications to operations personnel. Initially, the support zone was designated as an area outside of the building, adjacent to the entrance vestibule on Cedar Street, while office functions were accomplished from a hotel several blocks away. The site Health and Safety Officer conducted daily safety meetings in the outdoor area to establish project procedures and controls, and to communicate changes. After being cleaned, the entrance vestibule was designated as part of the support zone. A third support zone was located on the second floor after it had been cleaned. This support zone occupied the north end of the enclosed hallway area between the Chiropractor's Office and the Mattress Store, and extended into apartment 2B, where an on-site office was established. (This unit was cleaned and sampled prior to use.) The outdoor area, the vestibule and the second floor area were all utilized as support zones until completion of the project.

The Exclusion Zone and The Contamination Reduction Zone

The exclusion zone was identified as the areas of the building then requiring cleaning. These areas were designated with a unit number or a common area reference. All personnel, tools, and small equipment passed into and out of the exclusion zone through the contamination reduction zone. The purpose of the contamination reduction zone is to provide a defined area for reduction of any contamination potentially sustained in the exclusion zone. The contamination reduction zone was relocated appropriately as the exclusion zone focal area changed.

The contamination reduction zone was initially established in the stairway landing area, near the elevator, adjacent to the vestibule on the first floor. Personnel suited with personal protective equipment in the vestibule. They unsuited in the area at the bottom of stairs, before re-entering the vestibule. As the job progressed, the contamination reduction zone was located adjacent to the areas being cleaned.

The Personnel Decontamination Area

The personnel decontamination area was located directly inside the contamination reduction

zone. In this area, personnel disrobed of personal protective wear that was subsequently bagged and disposed. The personnel decontamination area was supplemented with other safety precautions such as: a portable eye wash station, a first aid kit and fire extinguishers placed at various locations through out the building.

F

Attachment F

Scope A- Lower Manhattan Cleaning Procedures

World Trade Center Indoor Dust Cleaning Program

Scope of Work A

Application: These procedures apply to the cleaning of minimal dust accumulations (light coating). If a visual inspection indicates the presence of significant accumulations of dust and/or debris from the collapse of the WTC in residences or common spaces (including elevator shafts), Scope B procedures shall be applied (refer to Scope of Work B). Residents may be present during Scope A cleaning procedures.

1. Cleaning of Common Spaces

Common spaces including hallways, stairways and the interior of elevator cars shall be cleaned, if requested by the building owner. The Monitoring Contractor in consultation with EPA, or EPA's designee will evaluate and determine if other common areas including utility rooms, laundry rooms, compactor rooms, elevator shafts require cleaning. Work will begin from the entrance and continue through all common spaces in an orderly fashion. A detailed description of the minimum cleaning requirements for common space is as follows:

- a. Vacuuming will begin with the ceiling, continue down the walls and include floors. A vacuum equipped with a motorized agitator bar will be used to vacuum carpets.
- b. Impermeable walls and floors will be wet wiped, after consultation with and approval by owner. Wet wiping will not be conducted if it is determined that it would cause damage to the surface.
- c. Carpets will be cleaned with a water extraction cleaner after consultation with and approval by owner. After cleaning, red rosin construction paper will be applied to high traffic areas to protect carpets from soiling. Water extraction cleaning will not be conducted if it would cause damage to the carpet.
- d. Surfaces that are not cleaned by wet methods (wet wiping and water extraction cleaner) will be vacuumed two times.

2. Cleaning of HVAC Systems

HVAC systems that are determined by the Monitoring Contractor to be impacted by dust or debris from the collapse of the World Trade Center will be cleaned in accordance with the site-specific scope of work prepared by the Monitoring Contractor and approved by EPA. HVAC systems cleaning, if warranted, shall be completed prior to the initiation of the cleaning of common space or residences within an affected building. In the event that the HVAC system for an entire building requires cleaning, a separate, site specific contract will be awarded by DEP for this work. If only a portion of an HVAC system requires cleaning, then the cleaning contractor will conduct the cleaning utilizing specialized labor trained and experienced in duct cleaning.

HVAC cleaning shall be conducted in accordance with National Air Duct Cleaners

Association (NADCA) General Specification for the Cleaning of Commercial Heating, Ventilating and Air Conditioning Systems and the NADCA Assessment, Cleaning and Restoration Standard (ACR 2002). Verification of the effectiveness of HVAC system cleaning will be determined by the Monitoring Contractor. If dust or other contaminants are evident through visual inspection, those portions of the system where dust or other contaminants are present shall be re-cleaned and subjected to re-inspection for cleanliness. If the cleaning contractor is not a member of the NADCA, a subcontractor that is a member may perform this portion of the work.

3. Cleaning of Residential Spaces

Residences will be cleaned using HEPA vacuums, water extraction cleaners and wet wiping as described below. Surfaces to be cleaned include but are not limited to walls, floors, ceilings, ledges, trims, furnishings, appliances, equipment, etc. Encapsulating agents shall not be applied. Dry sweeping is prohibited. The cleaning contractor will not clean inside of drawers, cabinets, breakfronts and similar enclosed storage or display pieces, however, the exterior of these pieces will be cleaned. Cleaning of clothing and accessories (handbags, shoes etc.) shall be the responsibility of the occupant. A detailed description of the minimum cleaning requirements is as follows:

- a. Terraces, balconies, exterior window sills, window wells and window guards that are accessible from the interior of the dwelling, shall be cleaned.
- b. Interior windows, screens, window sills and window guards will be cleaned
- c. Vacuuming will begin with the ceiling, continue down the walls and include the floor. A vacuum equipped with a motorized agitator bar will be used to vacuum carpets.
- d. Impermeable walls and floors will be wet wiped, after consultation with and approval by owner/resident. Wet wiping will not be conducted if it is determined that it would cause damage to the surface.
- e. Carpets will be cleaned with a water extraction cleaner after consultation with and approval by owner/resident. After cleaning, red rosin construction paper will be applied to high traffic areas to protect carpets from soiling. Water extraction cleaning will not be conducted if it would cause damage to the carpet.
- f. Fabric covered furniture will be vacuumed and then cleaned with a water extractions cleaner after consultation with and if approved by owner/resident. Water extraction cleaning will not be conducted if it would cause damage to the furniture.
- g. All surfaces including but not limited to floors, walls, curtains, fabric window treatments, upholstery and other materials that are not cleaned by wet methods (wet wiping and water extraction cleaning) will be HEPA vacuumed two times. Fabric covered furniture that is not cleaned by wet methods will be vacuumed using an appropriate brush attachment.
- h. Intake/discharge registers of HVAC systems (if present) will be removed/cleaned. The first foot of duct work will also be vacuumed; then the register will be reinstalled and covered with a layer of 6 mil polyethylene sheeting.
- i. Window and room air conditioners will be vacuumed, wet wiped and removed

from their housing to allow access to internal portions of the air conditioner. The internal portions of the air conditioner and housing will then be vacuumed. Filters will be vacuumed and reinstalled. Air conditioners will be reassembled and reinstalled after cleaning.

- j. Paperwork and books will be HEPA-vacuumed.
 - k. Electrical outlets will be vacuumed.
 - l. Appliances such as refrigerators and stoves will be cleaned and moved. The floor footprint of the appliances will be cleaned and the appliance will be reinstalled in their original positions.
 - m. Refrigerator cooling tubes will be brushed and vacuumed.
 - n. The first foot of all exhaust duct work (including stove, dryer and bathroom vents) where accessible, will be vacuumed. Exhaust fans will be vacuumed and wiped
 - o. Unobstructed closet floors will be vacuumed.
 - p. Solid objects (electrical equipment, exercise equipment, etc.) will be wet wiped, moved to allow cleaning of the underlying surface and will be returned to their original location.
 - q. Dishwasher toe plates will be removed and the floor beneath the appliance will be cleaned.
 - r. Baseboard heaters will be cleaned. Protective covers on finned radiant heaters and baseboard heaters will be removed to expose heat elements. Fins are to be brushed and vacuumed to remove dust.
 - s. All cleaning equipment will be vacuumed and/or wet wiped after completion of the cleaning and before removal from the work area.
4. HEPA air filtration devices (AFDs) will run continuously during all cleaning activities, as appropriate given site conditions. AFDs shall be installed and operated to provide a minimum of one air change every 15 minutes. Make up air should be derived from a non-impacted source (i.e. open window or common spaces previously cleaned).
 5. A minimum of one asbestos supervisor shall be present in each building during work.
 6. A Cleaning Checklist (to be developed by EPA) will be completed by the cleaning contractor as tasks are completed to document the progress of the cleaning.
 7. The cleaning contractor shall notify the monitoring contractor immediately upon completion of the cleaning. The Monitoring Contractor will conduct a thorough visual inspection to verify the absence of visible dust accumulations. If dust is observed the cleaning contractor will re-clean as necessary at no additional cost.
 8. Air sampling shall be performed by the Monitoring Contractor after the area is free of dust accumulations as determined by the Monitoring Contractor. The residence will be re-cleaned and re-tested if the clean-up criteria of 0.0009 fibers/cc (PCME measured by TEM) is not achieved or if determined necessary by EPA. This clean-up criterion may be reevaluated and revised, if determined necessary based on field conditions and analytical

limitations.

9. Any damage or loss that occurs during cleaning is the responsibility of the cleaning contractor. The cleaning contractor is not responsible for damage or loss caused by the acts of third parties not involved in the cleaning activities.
10. Owner/residents may identify and tag certain furnishings (e.g. carpets and fabric covered furniture) for disposal rather than cleaning. Disposal of residents' personal property shall not occur without prior written authorization by the owner.
11. Disposal of all wastes generated during the cleaning shall be the responsibility of the contractor. All waste generated shall be treated as asbestos-containing material (ACM). Transportation and disposal of generated waste shall be in compliance with all applicable rules and regulations.
12. If mold or peeling, flaking or chalking paint is observed in the work area, the cleaning contractor shall immediately contact the Monitoring Contractor.
13. If in-place materials suspected to contain asbestos are observed the Cleaning Contractor shall immediately notify the Monitoring Contractor. The Monitoring Contractor will evaluate the condition of the material to identify damaged, deterioration, delamination, etc. The Cleaning Contractor shall wrap suspect ACM that is in good or excellent condition with 6-mil polyethylene sheeting and seal airtight with duct tape or equivalent method prior to cleaning or air monitoring.
14. In the event that damaged, deteriorated, delaminated, etc. suspected ACM is observed, the Cleaning Contractor will notify the Monitoring Contractor. Cleaning or air monitoring will not proceed in areas where such suspected ACM is observed until instructed otherwise.

G

Attachment G

Sampling and Analysis Plan

This document will be provided upon request.

H

Attachment H

Synopsis of Cleaning Methods by Building Area and Fact Sheets

Synopsis of Cleaning Methods by Building Area

Residential Apartments and Common Areas

Unit 2A. Test: 1B- Ridgid® shop vacuum, Hoover® upright, AFD, no HEPA. Soap and water wet wipe of all horizontal surfaces. This 1,335 sq. ft. loft with one bedroom faces Cedar Street. Hardwood floors, no carpet, no windows blown in, all personal items disposed except for a couch and chairs. Minimal dust accumulation in dwelling except for baseboard heating elements.

Unit 2B. Test: 3A- Industrial HEPA-filtered vacuum, no AFD. Soap and water wet wipe of all horizontal surfaces. This 946 sq. ft. loft with 2 separate bedrooms faces Cedar Street. Hardwood floors, no carpet, no windows blown in, all personal items except a couch, disposed of prior to cleanup. Minimal dust accumulation in dwelling except for baseboard heating elements.

Second Floor Hallway. Test: 4A- Industrial HEPA-filtered vacuum, AFD. Test: 4B- Soap and water wet wipe of all *horizontal and vertical* surfaces (this hallway, ceiling and floors only). Vinyl tiles on floor, sheet rock walls covered with wall paper glue, painted sheet rock ceiling. Minimal dust accumulation.

Unit 3A. Test: 2B- Craftsman® shop vacuum, Eureka® upright, HEPA and AFD. Soap and water wet wipe of all horizontal surfaces. This 1,368 sq. ft. loft (utilized as office space for Baldwin Reality) faces Cedar Street. Carpet is present on half the floor space; the remainder is hardwood floors. No windows blown in. The area is furnished with 10 - 12 wood desks, files and office equipment. Minimal dust accumulation in dwelling.

Unit 3B. Scope A- Lower Manhattan Cleaning Procedure: Industrial HEPA-filtered vacuums, AFD. Soap and water wet wipe of all *horizontal and vertical* surfaces. This 968 sq. ft. loft with three bedrooms faces Cedar Street. Tenants plan to reoccupy dwelling, therefore personal items except for mattresses, carpet and magazines remained for cleaning. No windows blown in, hardwood floors, area completely furnished, tenants clothes present. Minimal dust accumulation in dwelling except for baseboard heating units.

Unit 3C. Test: 1A- Craftsman® shop vacuum, Eureka® upright, no HEPA, no AFD. Soap and water wet wipe of all *horizontal and vertical* surfaces. Test: 3B- Industrial HEPA-filtered vacuum, AFD, and soap and water wet wipe of all *horizontal and vertical* surfaces. This 655 sq. ft. loft with two bedrooms faces ground zero. Hardwood floors, windows blown in, no carpet, nearly all personal items disposed of prior to clean up. Significant accumulation of dust in dwelling.

Unit 3D. Test: 1A- Ridgid® shop vacuum, Hoover® upright, no HEPA, no AFD. Soap and water wet wipe of all horizontal surfaces. This 968 sq. ft. loft with three bedrooms faces ground zero. Hardwood floors, windows blown in, no carpet, all personal items except for three pieces of hardwood furniture disposed of. Significant accumulation of dust in dwelling.

Third Floor Hallway. Test: 4A- Industrial HEPA-filtered vacuums, AFD. Test: 4B- Soap and water wet wipe of all *horizontal and vertical* surfaces (this hallway, ceiling only). Plywood floors, sheet rock walls covered with wall paper glue, painted sheet rock ceiling. Minimal dust accumulation.

Unit 4A. Test: 2A- Craftsman® shop vacuum, Hoover® upright, HEPA, no, AFD. Soap and water wet wipe of all horizontal surfaces. This 1,368 sq. ft. open loft, faces Cedar Street. Hardwood floors, no windows blown in, all personal items removed prior to cleanup. Minimal dust accumulation in dwelling except for baseboard heating units.

Unit 4B. Test: 2B- Ridgid® shop vacuum, Hoover® upright, HEPA, AFD. Soap and water wet wipe of all horizontal surfaces. This 968 sq. ft. loft with 4 bedrooms faces Cedar Street. Personal items cleaned then bagged. Hardwood floors, no blown in windows. Minimal dust accumulation in dwelling except for baseboard heating units.

Unit 4C. Test: 1A- Craftsman® shop vacuum, Eureka® upright, no HEPA, no AFD. Soap and water wet wipe of all horizontal surfaces. This 655 sq. ft. open loft faces ground zero. Personal items cleaned then bagged. No carpet, hardwood floors, windows blown in. Significant accumulation of dust in dwelling.

Unit 4D. Test: 2A- Ridgid® shop vacuum, Eureka® upright, HEPA, no AFD. Soap and water wet wipe of all horizontal surfaces. This 968 sq. ft. open loft faces ground zero. Personal items cleaned then bagged. Hardwood floors, windows blown in. Significant accumulation of dust in dwelling.

Fourth Floor Hallway. Test: 4A- Industrial HEPA-filtered vacuum, AFD. Test: 4B- Soap and water wet wipe of all *horizontal and vertical* surfaces (this hallway, ceiling only). Plywood floors, sheet rock walls covered with wallpaper glue, painted sheet rock ceiling. Minimal dust accumulation.

Unit 5A. Test: 3B- Industrial HEPA-filtered vacuum, AFD. Soap and water wet wipe of all horizontal surfaces. This 1,404 sq. ft. loft with one bedroom faces Cedar Street. Personal items cleaned then bagged. Hardwood floors, no carpet, one blown in window. Minimal dust accumulation in dwelling except for baseboard heating units.

Unit 5C. Test: 3A- Industrial HEPA-filtered vacuum, no AFD. Soap and water wet wipe of all horizontal surfaces. Test: 3B- Industrial HEPA-filtered vacuum, AFD. Soap and water wet wipe of all horizontal surfaces. This 968 sq. ft. loft with three bedrooms faces ground zero. Hardwood floors, no carpet, all personal items removed, windows blown in. Significant accumulation of dust in dwelling.

Unit 5D. Test: 3B- Industrial HEPA-filtered vacuum, AFD. Soap and water wet wipe of all horizontal surfaces. This 1,024 sq. ft. open loft faces ground zero. All personal items removed prior to cleaning. Windows blown in, hardwood floors, no carpet. Significant accumulation of dust in dwelling.

Fifth Floor Hallway. Test: 4A- Industrial HEPA-filtered vacuum, AFD. Test: 4B- Soap and water wet wipe of all *horizontal and vertical* surfaces (this hallway, ceiling only). Plywood floors, sheet rock walls covered with wallpaper glue, painted sheet rock ceiling. Minimal dust accumulation.

Liberty Street Staircase. Test: 4A- Industrial HEPA-filtered vacuum, AFD. Test: 4B- Soap and water wet wipe of all *horizontal and vertical* surfaces. Cast concrete steps/landings, sheet rock walls and ceiling. All surfaces covered with gloss paint. Minimal dust accumulation.

Cedar Street Staircase. Test: 4A- Industrial HEPA-filtered vacuum, AFD. Test: 4B- Soap and water wet wipe of all *horizontal and vertical* surfaces. Wood steps/landings, sheet rock walls and ceiling. Floor covered with vinyl tiles, walls and ceilings covered with gloss paint. Minimal dust accumulation.

Commercial Units

Chiropractor's Office. Test: 4A- Industrial HEPA-filtered vacuums, AFD. Test: 4B- Soap and water wet wipe of all *horizontal and vertical* surfaces. Test: 4C- Carpet cleaning using a commercial carpet wet vacuum with warm water. Test: 4D- A/C Duct Cleaning. Test: 4E- Cleaning of bathroom tile floor and desk top wet wipe using water only. This 716 sq. ft. office space with 4 examination rooms faces ground zero. All front windows were blown in. Excessive amounts of dust present on all horizontal and vertical surfaces. Floor areas covered with wall-to-wall carpeting; suspended ceiling covered with fibrous tiles. A two foot high void space was above ceiling. Ceiling tiles, flexible ventilation ducts and office equipment were removed and disposed of prior to cleaning. Void space contained HVAC system, and wood floor joist system for third floor apartment. This area contained WTC-related and non-WTC-related dust. The space was extremely difficult to clean due to the present of electrical wires, recessed lighting fixtures, sprinkler systems and the dry friable nature of the wood support system.

Mattress Store. Test: 4A- Industrial HEPA-filtered vacuums, AFD. Test: 4B- Soap and water wet wipe of all *horizontal and vertical* surfaces. Test: 4C- Carpet cleaning using a commercial carpet wet vacuum with a warm water shampoo solution. Test: 4D- A/C Duct Cleaning. Test: 4E- Cleaning of vinyl floor tile and window ledge wet wipe using water only. This 968 sq. ft. open space faces ground zero. All front windows blown in, excessive amounts of dust present on all horizontal surfaces. Floor areas covered with wall-to-wall carpeting and approximately 25 display mattresses and box springs. Ceiling tiles, mattresses, office equipment and flexible ventilation ducts removed and disposed of prior to cleanup. Void space above suspended ceiling exhibited same characteristics as in the Chiropractor's office.

Basement

Elevator Shaft/Compactor Room. Test: 4A- Industrial HEPA-filtered vacuum, AFD. Soil floor in elevator shaft, concrete floor in compactor room. Cinderblock walls, exposed floor joists.

Commercial Units (Non-Study)

Lemongrass Grill. Test: 4A-Industrial HEPA-filtered vacuum, AFD. Test 4D- A/C Duct Cleaning. This 3,500 sq. ft. unit has two floors. The first floor is at street level with entrances from both Liberty and Cedar Streets. The lower level (basement) was used for food preparation and storage. Gypsum ceilings and hard wood floors are present throughout the dining area. Wood floor joists from the first floor constitute the basement ceiling. The floor is concrete. The dining area is decorated with typical Thai accents consisting of bamboo and thatch. Grills, ovens, refrigerators, tables, chairs and a bar are on the first floor. The basement contains a walk-in refrigerator, freezers, preparation table, a dishwasher and dry good storage. The establishment's HVAC system is suspended from the ceiling of the first floor. All exterior windows facing the WTC were blown inward, depositing significant amounts of dust on all surfaces of the first floor. Minimal dust was present in the basement. Prior to cleaning, all tables, chairs, containerized food and accent decorations were disposed. Restaurant equipment including woks, utensils, pots, pans and flatware were vacuumed and washed.

The Food Exchange. Test: 4A- Industrial HEPA-filtered vacuum, AFD. Test 4D- A/C Duct Cleaning. This 5,000 sq. ft. unit has three floors. The first floor is at street level with entrances from both Liberty and Cedar Streets. This floor was used for food service and customer dining. The lower level (basement) was used for food preparation and storage. The third level (sub-basement) was used for storage of restaurant equipment. Ceramic tile covers the floor area in both the dining room and the basement. The floor of the sub-basement is packed soil. All exterior windows had been blown inward depositing significant amounts of dust on all surface areas of the first floor. Minimal dust was present in the basement. The first floor ceiling by the Liberty Street entrance is made of gypsum board. The ceiling on the Cedar Street entrance consists of suspended acoustical tile covered with a decorative tin facing. Above the suspended ceiling is a two foot void space that houses the HVAC system for the establishment. The basement ceiling is a suspended fibrous tile ceiling. The void space above both suspended ceilings and the gypsum ceiling contained both WTC-related and non-WTC-related dust. Asbestos pipe insulation was present in the void space of the basement. Grills, refrigerators, tables and chairs are present on the first floor. The basement contains walk-in refrigerators, preparation tables, stoves, dishwashing areas and dry good storage. Prior to cleaning, all open and bulk stored food; fibrous ceiling tiles in the basement; and wrap insulation that had surrounded the HVAC systems were disposed of. The HVAC system is located in the void space above the dining room ceiling.

The Barber Shop. Test: 4A- Industrial HEPA-filtered vacuum, AFD. Test 4E- Water wet wipe of all horizontal and vertical surfaces. This 1,268 sq. ft. open space facing the WTC Site is located below grade to Liberty Street. The front door of the business was blown inward depositing significant amounts of dust and debris down the staircase into the rental space. Floor areas were covered with ceramic tiles; the ceiling is a suspended system using fibrous tiles. Above the suspended ceiling is a void space which accommodates flexible A/C ducts, electrical conduit and lights. All structural support members above the ceiling were encapsulated with a non-asbestos insulating material. Equipment including chairs, wash sinks, counters and hair care displays were located in the shop. The head space above the entrance door houses an A/C condenser/compressor unit that was heavily impacted with WTC contaminated dust and debris. Ceiling tiles, flexible duct, chairs, display shelving and hair care merchandise were disposed of prior to cleaning. Ancillary rooms are adjacent to the shop space that extends under Liberty Street. These rooms have earthen floors and are believed to be associated with utility companies. They were not cleaned.

Exterior A/C Condenser/Compressor Units

A/C Condenser/Compressor Units. Test: 2A- Craftsman® shop vacuum, HEPA, no AFD. Three commercial condenser/compressor units and four residential condenser/compressor units were inspected to determine if they required cleaning of WTC-related dust. No significant dust was present on the exterior and interior surfaces of the four residential units. It is believed that the condenser/compressor units were cleaned prior to the study, by contractors retained by the owner, to remove dust and debris from the building roof. The three commercial condenser/compressor units had minimal to moderate WTC-related dust/debris.

Fact Sheets

Study**Unit 2A** – 2nd floor, Southeast corner, Cedar Street

Cleaning Method: Test 1B - Surface cleaning using non-HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Hoover® Upright, Ridgid® Shop Vacuum, AFD.

Filtration Status: No HEPA

Unit Size: 1,335 sq. ft.; 13,350 cu. ft.

AFD Status: Required

AFD Specification: 400/600 cfm

Unit Air Exchange Rate: 22.25 min @ 600 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 1,335 sq. ft. loft facing Cedar Street has two bedrooms. The unit has hardwood floors and no carpeting. All exterior windows were intact. Minimal dust was present in the dwelling, except for baseboard heating elements and window sash frames. All personal items were disposed of, with the exception of fabric-covered furniture and kitchenware, prior to cleaning.

Difficult Areas Encountered:

- Exterior windows and sashes
- Hydronic baseboard heating units
- Cracks and crevices

Study**Unit 2B** - 2nd floor, Southwest corner, Cedar Street

Cleaning Method: Test 3A - Surface cleaning using industrial HEPA filtered vacuums. Area air filtration not required. Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Nilfisk™ Vacuum (CFM 127)

Filtration Status: HEPA

Unit Size: 946 sq. ft.; 9,460 cu. ft.

AFD Status: Not Required

AFD Specifications: N/A

Unit Air Exchange Rate: 23.65 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 946 sq. ft. loft facing Cedar Street has two bedrooms. The unit contains hardwood floors and no carpeting. All exterior windows were intact. Minimal dust was present in the dwelling except for baseboard heating elements and window sash frames. All personal items, with the exception of fabric-covered furniture, were disposed of prior to cleaning.

Difficult Areas Encountered:

- Exterior windows and sashes
- Hydronic baseboard heating units
- Cracks and crevices

Study**Unit 3A** - 3rd floor, Southeast corner, Cedar Street

Cleaning Method: Test 2B - Surface cleaning using HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Eureka® Upright, Craftsman® Shop Vacuum and AFD.

Filtration Status: HEPA

Unit Size: 1,368 sq. ft.; 14,364 cu. ft.

AFD Status: Required

AFD Specification: 400/600 cfm

Unit Air Exchange Rate: 23.94 min @ 600 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 1,368 sq. ft. loft facing Cedar Street is utilized as office space for the Baldwin Realty Company. Carpeting covers half the floor space. The remainder is hardwood flooring. All exterior windows were intact. Minimal dust was present in the space, except for baseboard heating elements and window sash frames. The space is furnished with office equipment including desks, chairs, file cabinets, and tables.

Difficult Areas Encountered:

- Exterior windows and sashes
- Recessed lighting
- Fireplace interior
- Cracks and crevices
- Hydronic baseboard heating units

Unit 3B - 3rd floor, Southwest corner, Cedar Street

Cleaning Method: Scope A - Lower Manhattan Cleaning Procedure - Surface cleaning using industrial HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all *horizontal and vertical* surfaces.

Equipment Used: Nilfisk™ Vacuum (CFM 127), AFD

Filtration Status: HEPA

Unit Size: 968 sq. ft.; 10,164 cu. ft.

AFD Status: Required

AFD Specification: 400/600 cfm

Unit Air Exchange Rate: 25.41 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 968 sq. ft. loft facing Cedar Street has three bedrooms. All personal items including clothing, kitchenware, books, furniture, and electronic devices were cleaned since the tenants plan to reoccupy the unit. Mattresses and carpets were disposed of. All exterior windows were intact. Minimal dust was present in the space, except for baseboard heating elements and window sash frames.

Difficult Areas Encountered:

- Exterior windows and sashes
- Hydronic baseboard heating units
- Cleaning of small items including CD's, tapes, clothes, shoes, kitchenware, etc.
- Cracks and crevices

Study**Unit 3C** - 3rd floor, Northwest corner, Liberty Street

Cleaning Method: Test 1A - Surface cleaning using non-HEPA filtered vacuums. Area air filtration not required. Soap and water wet wipe of all *horizontal and vertical* surfaces.

Test 3B - Surface cleaning with industrial HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all *horizontal and vertical* surface.

Equipment Used: Eureka® Upright Vacuum, Craftsman® Shop Vacuum

Filtration Status: No HEPA

Unit Size: 655 sq. ft.; 6,877 cu. ft.

AFD Status: Not Required

AFD Specification: N/A

Unit Air Exchange Rate: 17.19 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 655 sq. ft. loft with two bedrooms faces the WTC site. The unit has hardwood floors and no carpeting. All exterior windows had been blown inward. Significant dust had accumulated in the dwelling. All personal items with, the exception of fabric-covered furniture, were disposed of prior to cleaning.

Difficult Areas Encountered:

- Hydronic baseboard heating units
- Boarded window openings
- Cracks and crevices

Unit 3D - 3rd floor, Northeast corner, Liberty Street

Cleaning Method: Test 1A - Surface cleaning using non-HEPA filtered vacuums. Area air filtration not required. Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Hoover® Upright Vacuum, Ridgid® Shop Vacuum

Filtration Status: No HEPA

Unit Size: 968 sq. ft.; 10,164 cu. ft.

AFD Status: Not Required

AFD Specification: N/A

Unit Air Exchange Rate: 25.41 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 968 sq. ft. loft with three bedrooms faces the WTC site. The unit has hardwood floors and no carpeting. All exterior windows had been blown inward. Significant dust had accumulated in the dwelling. All personal items, with the exception of fabric-covered furniture and three pieces of hardwood furniture, were disposed of prior to cleaning.

Difficult Areas Encountered:

- Hydronic baseboard heating units
- Boarded window openings
- Cracks and crevices

Study**Unit 4A** - 4th Floor, Southeast corner, Cedar Street

Cleaning Method: Test 2A - Surface cleaning using HEPA filtered vacuums. Area air filtration not required. Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Hoover® Upright Vacuum, Craftsman® Shop Vacuum

Filtration Status: HEPA

Unit Size: 1,368 sq. ft.; 12,996 cu. ft.

AFD Status: Not Required

AFD Specification: N/A

Unit Air Exchange Rate: 21.66 min @ 600 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 1,368 sq. ft. open loft faces Cedar Street. The unit has hardwood floors and no carpeting. All exterior windows were intact. Minimal dust was present in the dwelling, except for the baseboard heating elements and window sash frames. All personal and business possessions to be retained by the tenant were vacuumed and bagged.

Difficult Areas Encountered:

- Dwelling used as a business for dressmaking, which resulted in cleaning of excessive amounts of personal and business related items.
- Exterior windows and sashes
- Hydronic baseboard heating units
- Appliances dirty with encrusted grease

Unit 4B - 3rd Floor, Southeast corner, Cedar Street

Cleaning Method: Test 2B - Surface cleaning using HEPA filtered vacuums. Air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Ridgid® Shop Vacuum, Hoover® Upright Vacuum, AFD.

Filtration Status: HEPA

Unit Size: 968 sq. ft.; 10,164 cu. ft.

AFD Status: Required

AFD Specification: 400/600 cfm

Unit Air Exchange Rate: 22.99 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 968 sq. ft. loft facing Cedar Street has four bedrooms. The unit has hardwood floors and no carpeting. All exterior windows were intact. The bedrooms were temporary structures built of particle board which were dismantled prior to cleaning. Minimal dust was present in the dwelling, except for baseboard heating elements and window sash frames.

Difficult Areas Encountered:

- Exterior windows and sashes
- Hydronic baseboard heating units
- Cracks and crevices

Study**Unit 4C** - 4th Floor, Northwest corner, Liberty Street

Cleaning Method: Test 1A - Surface cleaning using non-HEPA filtered vacuums. Area air filtration not required. Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Eureka® Upright Vacuum, Craftsman® Shop Vacuum

Filtration Status: No HEPA

Unit Size: 655 sq. ft.; 6,222 cu. ft.

AFD Status: Not Required

AFD Specification: N/A

Unit Air Exchange Rate: 15.55 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 655 sq. ft. open loft faces the WTC site. The unit has hardwood flooring and no carpeting. All exterior windows had been blown inward. Significant dust had accumulated in the dwelling. All personal possessions to be retained by the tenant were vacuumed and bagged.

Difficult Areas Encountered:

- Exterior windows and sashes
- Hydronic baseboard heating units
- Boarded window openings
- Cracks and crevices

Unit 4D - 4th Floor, Northeast corner, Liberty Street

Cleaning Method: Test 2A - Surface cleaning using HEPA filtered vacuums. Air filtration not required. Soap and water wet wipe of all horizontal surfaces

Equipment Used: Craftsman® Shop Vacuum, Hoover® Upright Vacuum

Filtration Status: HEPA

Unit Size: 968 sq. ft.; 9,196 cu. ft.

AFD Status: Not Required

AFD Specifications: N/A

Unit Air Exchange Rate: 22.99 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 968 sq. ft. open loft faces the WTC site. The unit has hardwood floors and no carpeting. All exterior windows had been blown inward. Significant dust had accumulated in the dwelling. All personal possessions to be retained by the tenant were vacuumed and bagged.

Difficult Areas Encountered:

- Exterior windows and sashes
- Hydronic baseboard heating units
- Boarded window openings
- Cracks and crevices
- Tenant possessions required special attention

Study**Unit 5A** - 5th floor, Northeast corner, Cedar Street

Cleaning Method: Test 3B - Surface cleaned using industrial HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Nilfisk™ Vacuum (CFM 127) AFD

Filtration Status: HEPA

Unit Size: 1,404 sq. ft.; 15,444 cu. ft.

AFD Status: Required

AFD Specification: 400/600 cfm

Unit Air Exchange Rate: 25.74 min @ 600 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 1,404 sq. ft. loft faces Cedar Street and has one bedroom. The unit has hardwood floors and no carpeting. It had one damaged window. The dwelling was fully furnished and had many personal items all of which were vacuumed, bagged and retained for the tenant. Minimal dust was present in the dwelling except for baseboard heating elements and window sash frames.

Difficult Areas Encountered:

- Owner's possessions required significant effort
- Exterior windows and sashes
- Hydronic baseboard heating units
- Cracks and crevices

Unit 5C - 5th floor, Northwest corner, Liberty Street

Cleaning Method: Test 3A - Surface cleaning with industrial HEPA filtered vacuums. Area air filtration not required. Soap and water wet wipe of all horizontal surfaces.

Test 3B - Surface cleaning with industrial HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Nilfisk™ Vacuum (CFM 127)

Filtration Status: HEPA

Unit Size: 968 sq. ft.; 10,648 cu. ft.

AFD Status: Not Required

AFD Specification: N/A

Unit Air Exchange Rate: 26.62 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 968 sq. ft. loft facing the WTC site has three bedrooms. The unit has hardwood floors and no carpeting. All exterior windows had been blown inward. Significant dust and debris had accumulated in the dwelling. All personal items, with the exception of fabric covered furniture, were disposed of prior to cleaning.

Difficult Areas Encountered:

- Hydronic baseboard heating units
- Boarded up window openings
- Cracks and crevices
- The fourth cleaning was necessary as a result of sawdust and debris deposited in areas previously cleaned, by a carpentry crew installing new hardwood flooring. This cleaning was conducted using the Test 3B cleaning method.

Study**Unit 5D** - 5th floor, Northeast corner, Liberty Street

Cleaning Method: Test 3B - Surface cleaning using industrial HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Nilfisk™ Vacuum (CFM 127), AFD

Filtration Status: HEPA

Unit Size: 968 sq. ft.; 10,648 cu. ft.

AFD Status: Required

AFD Specification: 400/600 cfm

Unit Air Exchange Rate: 26.62 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 968 sq. ft. open loft faces the WTC Site. The unit has hardwood floors and no carpeting. All exterior windows had been blown inward depositing significant amounts of dust and debris throughout the dwelling. All personal items were disposed of prior to the cleanup. Significant dust was accumulated in the dwelling.

Difficult Areas Encountered:

- Hydronic baseboard heating units
- Boarded up window openings
- Cracks and crevices

Common Areas

Vestibule, Elevator, Stairwells, Hallways, Utility Rooms, Trash Chute Accesses and Laundry Room.

Cleaning Method: Test 4A, 4B - Surface cleaning using industrial filtered vacuums. Air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all *horizontal and vertical* surfaces.

Equipment Used: Nilfisk™ Vacuum (CFM 127), AFD.

Filtration Status: HEPA

Unit Size:	Four Levels Total:	2,556 sq. ft.; 30,492 cu. ft.
	Hallways (per level)	639 sq. ft.; 7,623 cu. ft.
	Vestibule	150 sq. ft.; 1,500 cu. ft.
	Elevator Compartment	48 sq. ft.; 384 cu. ft.
	Laundry Room	(Included as hallway)
	Utility Rooms	(Included as hallway)

AFD Status: Required

AFD Specifications: 400/600 cfm

Unit Air Exchange Rate: 19.5 min at 400 cfm (hallway)

Minimum Air Exchange Required: Every 30 minutes

Description: The vestibule is located on Cedar Street and provides access to the building's only elevator and one stairwell. A second stairwell is accessed from Liberty Street. Four hallways connect the two stairwells and elevator access point on each floor (2nd floor to 5th floor). Each hallway contains a utility room with a trash chute access. The laundry room is located off of the 2nd floor hallway. The common areas contain no porous building material. All walls and ceilings in the stairwells are painted. Carpeting is not present in any of the common areas. Minimal dust was observed in the common areas.

Difficult Areas Encountered:

- The common areas were used daily by all individuals working in the building. These areas were frequently damp mopped to control the migration of dust.
- Dust accumulations were heavy at the base of the walls where the baseboard trims were removed.
- Hallway walls were vacuumed, but not wet wiped as a result of wallpaper paste residue left when the wallpaper was removed prior to the pilot study.

Study**Chiropractor's Office**

2nd Floor, Northwest corner, Liberty Street

Cleaning Methods: Test

4A - Area air filtration utilizing an air filtration device (AFD). Surface cleaning utilizing an industrial vacuum equipped with HEPA filtration. NilfiskTM Vacuum (CFM 127), AFD.

4B - Surface cleaning of horizontal and vertical surfaces using a wet wipe with soap and water.

4C - Carpet cleaning using a commercial carpet wet vacuum with warm water Carpet ExpressTM (Model C-4)

4D - A/C Duct Cleaning. One air handling system located above the suspended ceiling supplies interior offices with air conditioning. The system has a central return grill located under the air handler. All flexible duct lines were removed and disposed of. Supply diffusers and return grills were removed for cleaning and reuse. A professional HVAC cleaning company was contracted to clean the HVAC system in accordance with the following work outline:

- The work area immediately under the A/C system was protected using plastic sheeting.
- Diffusers and return grills were cleaned with a degreasing agent.
- Openings in the distribution duct were sealed with a protective barrier to prevent debris blow back.
- Distribution ducts were cleaned using mechanical brushes under negative air and HEPA filtration, then washed with a degreasing agent.
- The blower unit was washed with a degreaser, and the residues were removed using a vacuum.
- All distribution ducts were fogged with a biocide, then encapsulated with an FDA approved sealer.

4E - Surface cleaning of horizontal and vertical surfaces consisting of wet wipe using water only (bathroom floor and desk top).

Equipment Used: Nilfisk[®] Vacuum (CFM 127); AFD; Carpet wet vacuum, (Model C-4)

Filtration Status: HEPA

Unit Size: 836 sq. ft.; 8,360 cu. ft.

AFD Status: Required under method A and D

AFD Specifications: 400/600 cfm

Unit Air Exchange Rate: 20.9 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Chiropractor's Office – Continued

Unit description: This 716 sq.ft. commercial office space with four examination rooms faces the WTC site. All front windows had been blown inward, depositing significant amounts of dust and debris throughout the unit. Floor areas were covered with wall-to-wall carpet and padding. A two-foot void space is located above the suspended fibrous tile ceiling. The void space contains an A/C system suspended from the wood floor joist construction of the 3rd floor unit. The space accommodates sewer drain pipes, electrical and telephone wires, A/C system duct work, and lighting and fire protection systems. The void space contained dust both related and not related to the WTC attack. Ceiling tiles, flexible duct and office equipment were removed and disposed of prior to cleaning.

Difficult Areas Encountered:

- The ceiling void space was cluttered with utilities.
- The wood structural members above the void space were porous and flaking.
- Minimal space was available in the void spaces, making it difficult to work efficiently.
- The hydronic baseboard heating units were difficult to clean.
- The wall-to-wall carpeting was difficult to clean thoroughly.
- Frequent clogging of vacuum filtration systems occurred due to the quantity of dust.

Study**Mattress Store**

2nd Floor, Northwest corner, Liberty Street

Cleaning Methods: Test

4A - Area air filtration utilizing an air filtration device (AFD). Surface cleaning using a vacuum equipped with HEPA filtration. Nilfisk® Vacuum (CFM 127), AFD

4B - Surface cleaning of horizontal and vertical surfaces using a wet wipe with soap and water.

4C - Carpet cleaning using a commercial carpet wet vacuum with a warm water shampoo solution. "Carpet Express" (Model C-4)

4D - A/C Duct Cleaning. One A/C system located above the suspended ceiling supplies the showroom with air conditioning. The system has two central return grills located under and adjacent to the air handler. All flexible duct lines were removed and disposed of. Supply diffusers and return grills were removed for cleaning and reinstalled. A professional HVAC cleaning company was contracted to clean the HVAC system in accordance with the following work outline.

- The workspace was protected using plastic and tape immediately under the duct system and in proximity of the working equipment.
- Diffusers and return grills were removed.
- Diffusers and return grills were treated with a degreasing agent.
- The distribution duct was sealed with a protective barrier to prevent blow back of debris.
- Diffusers and return grills were washed of degreasing agent and sanitized.
- The distribution duct and surrounding areas were HEPA vacuumed.
- The distribution duct openings degreased and sanitized.

4E - Surface cleaning of horizontal and vertical surfaces consisting of wet wipe using water only (vinyl floor tile and window ledge).

Equipment used: Nilfisk® Vacuum (CFM 127), AFD; Carpet wet vacuum, (Model C-4)

Filtration status: HEPA

Unit Size: 946 sq. ft.; 9,460 cu. ft.

AFD Status: Required under methods A and D

AFD specification: 400/600 cfm

Unit air exchange rate: 23.65 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: This 968 sq. ft. mattress showroom faces the WTC Site. An exterior window wall had been blown inward, depositing significant amounts of dust throughout the showroom. Approximately twenty-five mattresses were on display in the showroom. Floor areas were covered with wall-to-wall carpet and padding. A two-foot void space is located above the suspended fibrous tile ceiling. The void space contains an A/C air handling system that is suspended from the wood floor joist construction of the 3rd floor unit. The void space accommodates the sewer drain pipe, electrical and telephone wires, A/C system duct work, and lighting and fire protection systems. The void space contained dust both related to and not related to the WTC attack. Ceiling tiles, flexible ducts, furniture, and display items were disposed of prior to cleaning.

Mattress Store - Continued**Difficult Areas Encountered:**

- Ceiling void space was cluttered with utilities.
- The wood structural members above the void space were porous and flaking.
- Minimal space was available in the void space making it difficult to work.
- Hydronic baseboard heating units were difficult to clean using vacuum equipment only.
- Wall-to-wall carpeting was difficult to clean thoroughly.
- Frequent clogging of vacuum filtration systems occurred due to the quantity of dust.

Study and Non-Study

Basement Areas

Elevator Shaft and Motor Room, Trash Compactor Room, Fire Equipment Room.

Cleaning Method: Test 4A – Surface cleaning using industrial HEPA filtered vacuums. Air filtration using an air filtration device (AFD).

Equipment Used: Nilfisk™ Vacuum (CFM 127)

Filtration status: HEPA

Common Area Size: 642 sq. ft.; 5,136 cu. ft. (Total of all areas, elevator shaft not included.)

AFD Status: Required

AFD specification when required: 400/600 cfm

Unit air exchange rate: 12.8 min @ 400 cfm

Minimum Air Exchange Required: Every 30 minutes

Description: Basement areas include: A trash compactor room, an equipment room containing the building fire protection controls to the ceiling sprinkler system, a motor control room for the elevator, and access to the elevator shaft containing the elevator compartment, as well as a common room which provided access to all the above areas. These basement areas are accessed through an outside stairwell located in the Cedar Street sidewalk.

The floors are constructed of concrete. The walls are composed of painted concrete block or brick. The elevator shaft floor is compacted soil. The shaft walls are composed of mortar and brick. Floor joists and decking of the first floor constitute the ceiling of the basement areas. All basement areas appeared to have been hose washed. No significant dust was present. With the exception of the ceiling materials, no porous materials were present. Debris such as cardboard boxes, used hydraulic oil, rags, discarded elevator parts, and dead rodents were disposed of prior to cleanup. The elevator shaft was inspected from the fifth floor to the below grade location when access was provided by the elevator contractor. The vertical wall surfaces of the shaft were constructed of brick and mortar and presented no visible dust down to the second floor. The lower section in the elevator shaft contained sand accumulation from natural deterioration. The exposed brick under the elevator framework, to a height of approximately six feet from the bottom of the shaft, was encrusted with mud, indicating a high water line some time during the building history.

Difficult Areas Encountered:

None

Lemongrass Grill

1st Floor and basement, Cedar & Liberty Streets

Cleaning Method: Test 4A - Surface cleaning using industrial HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all horizontal surfaces. **Test 4D** – A/C Duct Cleaning

Equipment Used: Nilfisk™ Vacuum (CFM 127), AFD

Filtration Status: HEPA

Unit Size: 1st floor: 2,451 sq. ft.; 33,134 cu. ft.; basement: 1,080 sq. ft.; 9,720 cu. ft.

AFD Status: Required

AFD Specification: 1000/2000 cfm

Unit Air Exchange Rate: 1st floor: 16.56 min @ 2,000 cfm; basement: 9.72 min @ 1000 cfm

Minimum Air Exchange Required: Every 30 minutes

Unit Description: The restaurant encompasses approximately 3,500 square feet. It has entrances on both Cedar and Liberty Streets. The establishment is comprised of two floors. The first floor is at street level and was used for food service and customer dining. The lower level (basement) was used for food preparation and storage. Gypsum ceilings and hard wood floors are present throughout the dining area. Wood floor joists from the first floor constitute the basement ceiling. The floor is concrete. The dining area is decorated with typical Thai accents consisting of bamboo, and thatch. Grills, ovens, refrigerators, tables, chairs and a bar are on the first floor. The basement contains a walk-in refrigerator, freezers, preparation table, a dishwasher and dry good storage. The establishment's HVAC system is suspended from the ceiling of the first floor. All exterior windows facing the WTC were blown inward depositing significant amounts of dust on all surfaces of the first floor. Minimal dust was present in the basement. Prior to cleaning all tables, chairs, containerized food and accent decorations were disposed of. Restaurant equipment including woks, utensils, pots, pans, and flatware were vacuumed and washed. Bottles of liquor were washed and removed by the owner.

The establishment has one HVAC system. This system provides heating and cooling to the dining area via solid metal supply ducts. The system's return is located in the dining area. A second system provides outdoor makeup air to the cooking stations. Cleaning of this system was performed in accordance with the site-specific HVAC cleaning procedures prepared by Covino Environmental Associates Inc.

Non-Study

Difficult Areas Encountered:

- Approximately 200 lbs. of spoiled fish, meat and poultry were removed from freezers and refrigerators.
- There was encrusted grease on, and adjacent to, all cooking surfaces, stove exhaust systems and floor areas.
- Wood structural members in the basement preparation area were porous and flaking.
- Insect and rodent infestations created unpleasant work conditions.
- Frequent clogging of vacuum filtration systems occurred due to the quantity of dust and rodent droppings.

The Food Exchange

1st floor, basement and sub-basement Cedar & Liberty Street

Cleaning Method: Test 4A - Surface cleaning using industrial HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). Soap and water wet wipe of all horizontal surfaces.

Equipment Used: Nilfisk™ Vacuum (CFM 127), AFD

Filtration Status: HEPA

Unit Size: 1st floor- 2,324 sq. ft.; 31,606 cu. ft.; basement- 2,596 sq. ft.; 36,344 cu. ft.

AFD Status: Required

AFD Specification: 400/600 cfm

Unit air exchange rate: 1st floor 15.80 min @ 2000 cfm, basement 18.17 min @ 2000 cfm.

Minimum Air Exchange Required: Every 30 minutes

Unit Description: The restaurant encompasses approximately 5,000 square feet. It may be entered from either a Cedar Street or a Liberty Street entrance. The establishment is comprised of three floors. The first floor is at street level. This floor was used for food service and customer dining. The lower level (basement) was used for food preparation and storage. The third level (sub-basement) was used for storage of restaurant equipment. Ceramic tile covers the floor area in both the dining room and the basement. The floor of the sub-basement is packed soil. All exterior windows had been blown inward depositing significant amounts of dust on all surface areas of the first floor. Minimal dust was present in the basement. The first floor ceiling by the Liberty Street entrance is made of gypsum board. The ceiling on the Cedar Street entrance consists of suspended acoustical tile covered with a decorative tin facing. Above the suspended ceiling is a two-foot void space that houses the HVAC system for the establishment. The basement ceiling is a suspended fibrous tile ceiling. The void space above both suspended ceilings and the gypsum ceiling, contained both WTC related and non-WTC related dust. Asbestos pipe insulation was present in the void space of the basement. Grills, refrigerators, tables and chairs are present on the first floor. The basement contains walk-in refrigerators, preparation tables, stoves, dishwashing areas, and dry good storage. Prior to cleaning, all open and bulk stored food, fibrous ceiling tiles in the basement, and wrap insulation that had surrounded the HVAC systems, were disposed of. The HVAC system located in the void space above the dining room ceiling consists of two air handlers that provide heat or cooling to the first floor via separate solid metal supply ducts. The system return is from the dining area and void space located above the first floor. Cleaning of this system was performed by a subcontractor in accordance with a site-specific scope of work prepared by Covino Environmental Associates Inc.

The Food Exchange - Continued**Difficult Areas Encountered:**

- The ceiling void space was cluttered.
- The wood structural members above void space were porous and flaking.
- Asbestos pipe wrap insulation was present in void space.
- Removal of ceiling tiles created dusty conditions.
- Insect and rodent infestations created unpleasant work conditions.
- Frequent clogging of vacuum filtration systems occurred due to the quantity of dust and rodent droppings.

Barber Shop

This unit is located in the basement.

Cleaning Method: Test 4A - Surface cleaning using industrial HEPA filtered vacuums. Area air filtration utilizing an air filtration device (AFD). **Test 4E** - Water wet wipe of all *horizontal and vertical* surfaces.

Equipment Used: Nilfisk™ Vacuum (CFM 127), AFD.

Filtration Status: HEPA

Unit Size: 1,268 sq. ft.; 15,216 cu. ft.

AFD Status: Required

AFD Specification: 400/600 cfm

Unit Air Exchange Rate: 25.36 min @ 600 cfm

Minimum Air Exchange Rate: Every 30 minutes

Unit Description: This 1,268 sq. ft. open space facing the WTC Site is located below grade to Liberty Street. The front door of the business was blown inward depositing significant amounts of dust and debris down the staircase into the rental space. Floor areas are covered with ceramic tiles; the ceiling is a suspended system using fibrous tiles. Above the suspended ceiling is a void space which accommodates flexible A/C ducts, electrical conduit and lights. All structural support members above the ceiling are encapsulated with a non-asbestos insulating material. Equipment including chairs, wash sinks, counters and hair care displays are located in the shop. The headspace above the entrance door houses an A/C condenser/compressor unit that was heavily impacted with WTC contaminated dust and debris. Ceiling tiles, flexible duct, chairs, display shelving and hair care merchandise were disposed of prior to cleaning. Adjacent to the shop space are ancillary rooms that extend under Liberty Street. These rooms have earthen floors and are believed to be associated with utility companies. They were not cleaned.

Difficult Areas Encountered:

- Sprayed-on insulation/fire protection applied to structural members in the void space above the suspended ceiling prevented effective vacuuming of the area.
- Significant quantities of WTC dust and debris were deposited into the remote A/C condenser/compressor unit and associated housing.
- The space above the fixed ceiling at the entrance to the Barber Shop stairwell was heavily impacted, requiring special preparation for access and removal of bulk quantities of WTC dust/debris.

Study and Non-Study

Exterior A/C Condenser/Compressor Units

Three commercial size condenser/compressor units and one cooling tower are located on the atrium roof and four residential size condenser/compressor units are located on the 5th floor roof.

Cleaning Method: Test 2A - Surface cleaning utilizing a vacuum equipped with HEPA filtration.

Equipment Used: Craftsman® Shop Vacuum

Filtration Status: HEPA

Unit Size: N/A

AFD Status: Not Required

AFD Specifications: N/A

Unit Air Exchange Rate: N/A

Minimum Air Exchange Required: N/A

Description: Three condenser/compressor units and four residential condenser/compressor units were inspected to determine if they required cleaning of WTC-related dust. No significant dust was present on the exterior and interior surfaces of the four residential units. It is believed that the condenser/compressor units were cleaned prior to the pilot, by contractors retained by the owner, to remove dust and debris from the building roof. The three commercial condenser/compressor units had minimal to moderate WTC related dust/debris.

Units Inspected but not Cleaned:

The four condenser/compressor units for dwellings 3A, 5A, 5C, and 5D require no cleaning.

Units Cleaned:

- The Food Exchange restaurant cooling tower located on the building atrium roof
- THAI Restaurant condenser/compressor unit located on the atrium roof
- Commercial Unit 1, Chiropractors office, condenser/compressor unit
- Commercial Unit 2, Mattress showroom, condenser/compressor unit

Difficult Areas Encountered:

None

Attachment I

HVAC Cleaning Procedures

**CLEANING PROCEDURES
FOR TWO COMMERCIAL VENTILATION SYSTEMS
IMPACTED BY DUST AND CONTAMINANTS
FROM THE COLLAPSE OF THE WORLD TRADE CENTER (WTC)**

NEW YORK, NEW YORK

Prepared for:

**ENVIRONMENTAL PROTECTION AGENCY
USEPA Emergency and Rapid Response
Contract -No. 68-S2-99-07**

Prepared by:

**WRS INFRASTRUCTURE AND ENVIRONMENT, INC.
925 Canal Street Suite 3701
Bristol, PA 19007**

October 11, 2002

WRS Document No. 501060-007

General Procedures for Cleaning WTC-Related Contaminants from Ventilation Systems at 110 Liberty Street, New York, New York

1.0 SCOPE

The procedures contained in this document provide guidance for cleaning WTC-related dust in two commercial ventilation systems and in a combustion air make-up riser for the residential units within the building located at 110 Liberty Street, New York, New York, and for post-cleaning verification sampling. This document includes performance requirements and post-cleaning verification sampling for cleaning WTC-related dust and debris from ventilation systems consisting of fans, housings, ducts, air control devices, grilles and other components.

2.0 PURPOSE

The purpose of this document is to provide minimum requirements for cleaning ventilation system components that were impacted by airborne dust from the WTC collapse, and to provide procedures for post-cleaning verification sampling following clean-up.

WTC-related dust is generally considered to have common, consistent, and readily observable characteristics visually and tactilely differentiating it from common dust. WTC-related dust generally contains extremely fine particles similar in consistency to talcum powder, is light-colored, contains pulverized concrete and/or gypsum wallboard, and may contain asbestos fibers. Unless otherwise indicated by sampling and analytical testing, the following components shall be assumed to be present in WTC-related dust:

- Man-made Vitreous Fibers
- Crystalline Silica
- Lead
- Asbestos

For this project, all specified ventilation system components shall be assumed to contain WTC-related dust and shall be cleaned accordingly.

Where sampling and analysis indicate that dust and debris in ventilation systems contain only crystalline silica, man-made vitreous fibers, lead, or <1% asbestos contamination, this procedure specifies that duct systems shall be cleaned only while maintained under negative pressure using HEPA-filtered vacuum collection equipment specific to the duct cleaning industry. All cleaning of air handling equipment shall be performed within containment structures that are maintained under negative pressure using HEPA-filtered air filtration devices.

Where sampling and analysis indicate that dust and debris within a ventilation system contains 1% or greater asbestos as determined by standard sampling and analytical techniques, the ventilation system cleaning procedure shall be designed by a New York-licensed Project Designer. The cleaning will be performed in accordance with local, state and federal regulations as specified in the Project Design.

3.0 APPLICABLE DOCUMENTS

This section provides full bibliography for references made within this document, or considered in preparation of this document. Cleaning and post-cleaning verification sampling should be conducted in a manner that is fully compliant with the guidance provided in the following documents, to the extent applicable.

1. ACR 2002, *Assessment, Cleaning and Restoration of HVAC Systems*, National Air Duct Cleaning Association, Washington, D.C. (2002).

ACR 2002 specifies procedures for cleaning HVAC systems.

2. NADCA Standard 97-05, *Requirements for the Installation of Service Openings in HVAC Systems*, National Air Duct Cleaning Association, Washington, D.C. (1997).

NADCA 97-05 includes procedures for installing service openings in HVAC systems and construction and material specifications for replacement panels, plates or access doors to cover such openings.

3. *SMACNA HVAC Duct Construction Standards – Metal and Flexible*, Sheet Metal and Air Conditioning Contractors' National Association, Inc., 2nd Edition (1995).

The SMACNA standard includes construction and material specifications for access doors for covering service openings as required under 7.5 and 11.1.3 of this document.

4. *SMACNA Fibrous Glass Duct Construction Standards*, Sheet Metal and Air Conditioning Contractors' National Association, Inc., 6th Edition (1992).

The SMACNA standard includes construction and material specifications for access doors for covering service openings as required under item 6.5.1.2 of this document.

5. NFPA Standards 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, and 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*, National Fire Protection Association (1999 Edition).

The NFPA standards include construction and material specifications for replacement coverings on service openings as required under item 6.5.1.2 of this document.

6. *Cleaning Fibrous Glass Insulated Air Duct Systems*, North American Insulation Manufacturers Association (NAIMA), 1993

This document provides guidance for cleaning fibrous glass-insulated interior ventilation system surfaces.

7. ASHRAE 33-78, *Methods of Testing Forced Circulation Air Cooling and Air Heating Coils*, American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), 1978

This document contains procedures for testing air flow through ventilation system thermal coils.

8. ARI 410-91 *Forced-Circulation Air-Cooling and Air-Heating Coils*, Air Conditioning and

Refrigeration Institute (ARI), 1991

This document contains procedures for testing air flow through ventilation system thermal coils.

9. ASHRAE 62-2001, Ventilation for Acceptable Indoor Air Quality, American Society of Heating, Refrigeration, and Air Conditioning Clients (ASHRAE), 2001

This document provides performance and evaluation criteria for acceptable general ventilation system operation.

10. Military Standard 282, United States Department of Defense (DOD), 1956

This document contains leak testing procedures for in-place filters used in air filtration devices, HEPA vacuums and vacuum collection equipment.

11. AMCA 99-86, Standards Handbook, Air Movement and Control Association, 1986

This document contains specifications for air filtration devices.

12. ASHRAE Terminology of Heating, Ventilation, Air Conditioning, and Refrigeration, American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), 1991

This document defines terminology for use in referring to ventilation systems and components.

13. OSHA Regulations 29 CFR 1910, Occupational Health and Safety Standards

The OSHA regulations specify health and safety requirements for protecting employees during the inspection procedures.

14. Title 15, Chapter 1, Rules of City of New York Asbestos Regulations

This document contains New York City regulations regarding asbestos abatement.

15. NYSDOL – DOSH Regulations – Part 56. ASBESTOS

This document contains New York State regulations regarding asbestos abatement.

16. NYC Guidelines on Assessment and Remediation of Fungi in Indoor Environments

This document contains New York City guidelines regarding microbial remediation.

4.0 CHARACTERIZATION OF DUST/ENVIRONMENTAL HAZARDS

Prior to the start of work, an evaluation of the dust shall be performed by an independent environmental service contractor. The independent environmental service Contractor shall be experienced in performing all necessary sampling procedures for analytical evaluation of the WTC –related dust.

Prior to the start of work, the independent environmental service Contractor shall make a determination

as to whether the following contaminants are present:

- Man-made Vitreous Fibers
- Crystalline Silica
- Lead
- Asbestos

Bulk samples when applicable will be collected for quantitative analysis of the above-referenced analytes. Samples for analysis of man-made vitreous fibers, crystalline silica, lead and Asbestos may only be submitted to an EPA approved laboratory. Wipe samples and air samples may be taken when the quantity of dust to be analyzed is insufficient for bulk collection.

The onsite Environmental Cleaning Contractor shall note any mold growth, rodent droppings, or other biological hazards if observed.

5.0 SITE EXAMINATION

Prior to commencing work, all ventilation system/duct cleaning professionals shall visit the site to examine the conditions under which the work is to be performed in order to identify those conditions that might adversely affect the work. These conditions may include, but may not be limited to the following:

1. Difficulty accessing ventilation system components.
2. Ventilation systems components located in parts of the building that are not included in the scope of ventilation system cleaning, but that may cause the ventilation system components to become re-contaminated following cleaning.
3. Asbestos-containing materials on ventilation system components to be cleaned or damaged asbestos-containing materials in the vicinity of the ventilation system components to be cleaned.
4. Specific scaffolding and/or fall protection requirements.

6.0 VENTILATION SYSTEM/DUCT CLEANING FIRM REQUIREMENTS

- 6.1 The ventilation system/duct cleaning firm shall meet the following minimum health and safety requirements:

Appropriate Respiratory Protection Program as required by 29 CFR 1910.134.

Appropriate Hazard Communication Training as required by 29 CFR 1910.1200, to include health hazards associated with man-made vitreous fibers, crystalline silica, lead, asbestos, and microbiological hazards that may likely be encountered in ventilation systems, in addition to chemicals brought on site to perform the work.

Prior experience in cleaning HVAC systems.

Appropriate personal protective equipment and written program.

An experienced individual to act as a site health and safety supervisor to respond to unanticipated health hazards that may be encountered on the site and to ensure implementation of required health and safety practices.

- 6.2 In addition to the above minimum requirements, the duct cleaning professional shall meet the following contaminant-specific requirements:
- 6.2.1 Man-made Vitreous Fibers – appropriate Hazard Communication training and personal protective equipment
 - 6.2.2 Crystalline Silica – appropriate Hazard Communication training and personal protective equipment
 - 6.2.3 Lead – appropriate Hazard Communication training, ability to perform personal exposure monitoring for airborne lead, ability to comply with requirements of 29 CFR 1910.1025
 - 6.2.4 Asbestos (< 1%) – appropriate Hazard Communication training, ability to perform personal exposure monitoring for airborne asbestos, ability to comply with requirements of 29 CFR 1910.1001
- 6.3 All workers shall possess current EPA-accredited training as an Asbestos Worker (32-hour training) or as an Asbestos Supervisor (40-hour training).

7.0 GENERAL PERFORMANCE REQUIREMENTS

In general, all cleaning of air moving equipment and active plenums shall be performed under negative pressure using HEPA-filtered air filtration devices. All ducts that are cleaned shall be maintained under negative pressure using HEPA-filtered vacuum collection equipment specific to the duct cleaning industry. Air filtration devices and vacuum collection equipment shall be exhausted to the outdoors. After cleaning of the ventilation system, any areas that are affected by the work must be as clean or cleaner than their condition prior to the start of work, and must meet post-cleaning verification requirements contained in 8.2 of this document.

- 7.1 **Containment:** WTC-related dust and debris removed by cleaning/remediation process shall be collected and precautions taken to ensure that the debris is not otherwise dispersed outside the ventilation system during cleaning. After cleaning of the ventilation system, any areas that are affected by the work must be as clean or cleaner than their condition prior to the start of work.
- 7.1.1 When working outside the negative air pressure system the ventilation system/duct cleaning firm shall install plastic sheeting on the floor surface under and at a minimum of 3 feet outside the perimeter of the system. All exposed service tools and equipment shall be free of debris and contamination from the ventilation system. Tools and equipment include (but are not limited to): Vacuum collection equipment, vacuum hoses and attachments, air lines and hoses, brushes, extension rods, cables, ladders, power tools, hand tools, zoning devices, and inspection equipment.
 - 7.1.1.2 Contaminated tools and equipment shall be maintained in poly bags until cleaned in the designated decontamination area at the work site.

7.1.1.3 Hoses, cables, and extension rods shall be cleaned free of visible debris with suitable sanitary damp wipes at the point they are withdrawn from exposed ventilation system components or containment areas into general occupant areas.

7.1.2 Upon removing duct diffusers and grilles prior to cleaning, the ventilation system/duct cleaning firm shall provide adequate containment measures to prevent contaminant exposure from accumulated debris on these devices.

7.2 **Equipment:** All service equipment must operate on standard 110 VAC, 20A circuits.

7.2.1 **Vacuum Collection Equipment:** All vacuum collection equipment or air filtration devices shall utilize a minimum of HEPA filtration (99.97% at 0.3 micron) final collection efficiency at the device's exhaust. Multi-sectioned equipment must not be opened or detached in occupied areas once contaminated with debris. Vacuum collection equipment shall provide sufficient negative airflow velocity in the ventilation system zone being serviced to draw dislodged debris from the mechanical cleaning device to the vacuum's collection chamber (typically a minimum of 3000 feet per minute (fpm) in the portion of the HVAC system being cleaned.

7.2.2 **Pressurized Air Source Used for Cleaning Devices:** Must provide a minimum of 175 PSI at a volume of 15 cubic feet per minute. Device must provide pressurized air free of significant moisture, oil and toxic vapors, or be equipped with adequate filtration and dryers to remove such contamination. The ventilation system/duct cleaning firm shall provide ongoing documentation of the device's delivery of contaminant-free pressurized air.

7.3 **Component Cleaning:** Mechanical Cleaning procedures include the dislodging of WTC-related dust and debris on the interior surfaces of the ventilation system by manual, mechanical, pneumatic, or hydro-agitation. Loosened debris shall be collected and removed from the ventilation system using suitable vacuum collection equipment and/or HEPA vacuuming methods, as specified.

7.3.1 **Cleaning Non-Porous ventilation system components:** Cleaning methods shall be used that will render the ventilation system components visibly clean. No cleaning method shall be used which will damage components of the ventilation system or significantly alter the integrity of the system.

7.3.2 **Cleaning Porous Ventilation System Components:** Cleaning method shall be used that will render the ventilation system components visibly clean and minimize fiber release from the porous ventilation system component surface. No cleaning method should be used which will damage components of the ventilation system or significantly alter the integrity of the system. Porous ventilation system components which exhibit increased potential for fiber release (i.e. damaged internal surface bond or coating, and open internal seams and joints) shall be replaced or encapsulated with a product approved for that purpose upon completion of Mechanical Cleaning procedures.

7.4 **Encapsulation of Ventilation System Components:** Encapsulation of porous or degraded porous ventilation system components shall be employed only after cleaning and successful

completion of post-cleaning verification procedures by the Environmental Cleaning Contractor (see 8.2 of this document).

7.4.1 Encapsulant coatings shall be applied directly to the interior porous surfaces of ventilation system components by hand brushing, rolling, or troweling, or via spray system, with a maximum distance of 24" from the spray discharge tip to the surface being treated. Encapsulant coatings may not be fogged into the system. A continuous film thickness should be achieved in treated areas, as per manufacturer's instructions.

7.4.2 Ventilation system control devices, heating elements, sensing equipment, grilles, and fans must be adequately blocked off or masked so that they will remain free from over-spray from the Encapsulation process.

7.5 **Service openings:** All access ways cut in the ventilation system for inspection and/or cleaning must be repaired so that they shall not significantly alter the airflow or adversely impact the facility's indoor air quality. All openings made in the ventilation system must be sealed in accordance with industry standards and local codes, using materials acceptable under those standards and codes (see Appendix B).

7.6 **Disposal of Debris:** All waste and debris removed from the ventilation system shall be double-bagged in 6-mil polyethylene bags and disposed of in accordance with all applicable federal, state, and local requirements.

8.0 QUALITY ASSURANCE

8.1 **Health and Safety:** The ventilation system/duct cleaning firm shall comply with all applicable federal, state, and local requirements for protecting the safety of the ventilation system/duct cleaning firm's employees, building occupants, and the environment. No processes or materials shall be employed in such a manner that they will create adverse health effects to the building occupants, the ventilation system/duct cleaning firm's employees, or the general public.

8.1.1 The ventilation system/duct cleaning firm shall perform initial exposure monitoring of its employees for asbestos and lead in accordance with 29 CFR 1910. 1001 and 29 CFR 1910.1025, respectively.

8.1.2 Ventilation system/duct cleaning firm's employees shall use respiratory protection in compliance with OSHA 1910.134

8.1.3 Regardless of exposure assessment results, at minimum the ventilation system/duct cleaning firm's employees shall wear properly fitted, HEPA-filtered (P-100) negative half-mask respirators when performing any work related tasks on site which might expose them to elevated levels of airborne particulate.

8.2 **Post-cleaning Verification:** Prior to re-commissioning a cleaned section of the ventilation system (at the end of the work shift, etc.), the ventilation system/duct cleaning firm will obtain cleanliness clearance from the Environmental Cleaning Contractor. Ventilation system cleanliness will be determined after mechanical cleaning and before the application of any surface treatment or introduction of any treatment-related substance to the ventilation system. Verification shall be conducted before the ventilation system is restored to normal operation.

Ventilation system components may be evaluated by the Environmental Cleaning Contractor for visible cleanliness via direct visual inspection or with a visual inspection system (i.e., mirrors, boroscope, remote camera). The Environmental Cleaning Contractor may direct the ventilation system/duct cleaning firm to provide additional access openings into the ventilation system, as deemed necessary to thoroughly verify cleanliness.

8.2.1 All porous and non-porous ventilation system surfaces must be visibly clean and capable of passing a visual inspection.

8.2.2 Cleaning of non-porous ventilation system surfaces shall be verified by surface wipe sampling performed by the Environmental Cleaning Contractor using specified methods. Surface wipe sampling for man-made vitreous fibers, crystalline silica, lead and asbestos will be performed. Wipe sample results must meet the following criteria to established that cleaning has been adequate:

- Lead – less than 25 micrograms of lead per square foot using the specified method
- Asbestos – no asbestos detected using the specified method

8.2.3 Pre-occupancy air testing: After successful completion of 8.2.1 and 8.2.2, and removal all polyethylene sheeting, containments and any remaining visible debris, the ventilation system shall be started up and air sampling for man-made vitreous fibers, crystalline silica, lead and asbestos will be performed performed by the Environmental Cleaning Contractor using specified methods. Airborne concentrations of these contaminants shall be within recommended guidelines for acceptable indoor air quality. Occupants may re-enter the building only after successful completion of air monitoring.

8.3 **Materials and Workmanship:**

8.3.1 Work shall be executed by skilled persons who are thoroughly trained, experienced and completely familiar with the specified requirements and the methods needed for proper performance of the project, and shall be in conformance with the best practices of each trade involved.

8.3.2 Work shall present a neat and workmanlike appearance when completed.

8.3.3 Finish of materials and components shall be consistent with industry good practice.

8.4 **Cleaning:** Work and storage areas shall be maintained and kept clean on a daily basis. The ventilation system/duct cleaning firm shall final clean the immediate work area(s) with a HEPA-filtered vacuum cleaner to be free of any residual visible WTC-related dust. Materials removed and debris resulting from the ventilation system/duct cleaning firm's work shall become the property of the ventilation system/duct cleaning firm and shall be removed for appropriate disposal (see 7.6 of this document).

9.0 **WORK SEQUENCE AND SCHEDULING**

9.1 As a general procedure, cleaning work should follow the ventilation system airflow, beginning at the system's return air intakes. Cleaning should proceed from those points to the air handling unit (AHU), then out through the air discharge points. This work sequence will reduce the

likelihood of cleaned portions of the ventilation system being re-contaminated if the system is reactivated at the end of the work shift.

- 9.2 Additional precautions that may be used to protect cleaned surfaces of the ventilation system from being re-contaminated by uncleaned ventilation system surfaces. These may include: 1) the installation of temporary duct blanks or zoning devices to separate cleaned sections, and 2) installation of temporary air filters.

10.0 PRODUCTS

- 10.1 **Encapsulants:** Ventilation system encapsulation products shall be for specific use in ventilation systems and applied per manufacturer's instructions. Encapsulants shall be water-based, with low VOC (volatile organic compound) emissions, and meet NFPA smoke development and flame spread requirements for HVAC system products.

- 10.1.1 Ventilation system/duct cleaning firm shall maintain on-site MSDS copies for any encapsulant product used in the ventilation system.

- 10.1.2 Ventilation system/duct cleaning firm will apply product in strict compliance with manufacturer's recommended safety precautions for Ventilation system/duct cleaning firm's personnel and building occupants.

- 10.1.3 Ventilation system/duct cleaning firm shall comply with any applicable federal, state, or local regulations regarding the use of such products.

- 10.2 **Cleaning Chemicals:** Any chemicals used in cleaning ventilation system components (i.e. chemical cleaners, degreasers, etc.) shall be applied per manufacturer's instructions.

- 10.2.1 Ventilation system/duct cleaning firm shall maintain on-site MSDS copies for any cleaning chemical used in the ventilation system.

- 10.2.2 Ventilation system/duct cleaning firm shall comply with any applicable federal, state, or local regulations regarding the use of such products.

11.0 EXECUTION

11.1 Preparation - General

- 11.1.1 **Project Orientation/Preparation:** Ensure that a site examination has been performed in accordance with Section 5.0 of this document.

- 11.1.1.1 **Task Coordination:** A pre-task performance meeting shall be conducted for the project.

- 11.1.1.2 **Walk-through:** Visually inspect the ventilation system prior to the start of work and note any mechanical modifications. Note location of all electrical panels for fuse reset. Note condition of fans, visible buildups, and accessible ductwork.

11.1.2 Site Preparation: To minimize possible contamination and damage, the ventilation system/duct cleaning firm shall provide a negative pressure work area containment as necessary during ventilation system remediation.

11.1.2.1 Negative pressure must be maintained by way of an attached external HEPA-filtered air filtration device. The vacuum must provide at least eight (8) air-changes in the containment per hour.

11.1.2.2 The AHU servicing the area being cleaned must be shut down or zoned-off and remain so during the cleaning process.

11.1.2.3 Only properly trained, authorized individuals may enter the work area while cleaning is being performed.

11.1.3 System Access: Provide necessary access for cleaning and inspection of the ventilation system.

11.1.3.1 Remove and poly bag diffusers if transport to decontamination area will be through non-containment areas. Clean all grilles and diffusers. Thoroughly dry grilles and diffusers prior to re-installing after cleaning.

11.1.3.2 Install service openings as specified in Appendix B in return air handling systems as necessary to facilitate inspection and cleaning procedures. Access points should not exceed fifty (50) foot intervals to accommodate procedures and final inspection, unless otherwise deemed acceptable by the building management or Environmental Cleaning Contractor.

11.1.3.3 The structural integrity of the ductwork shall not be significantly altered by the installation of service openings (See APPENDIX B).

11.1.4 Duct Zoning: Ventilation system/duct cleaning firm will isolate sections of the ventilation system if needed to facilitate cleaning.

11.1.4.1 Prior to cleaning, ventilation system airflow control devices may be repositioned and zoning devices installed in diffusers and ductwork as necessary to facilitate negative airflow from vacuum collection equipment and to avoid contamination from entering the conditioned air spaces.

11.1.4.2 All zoning devices shall be removed and airflow control devices reset to their pre-cleaning positions upon completion of cleaning in the work area they serve.

11.1.4.3 Zoning devices must be disposed of or cleaned free of contaminant debris or other suitable measures employed to prevent cross-contamination prior to reuse in other ventilation system areas.

11.2 General Cleaning Procedures

- 11.2.1 Hand wet-wiping: Wiping may be performed in cases where dry cleaning methods such as HEPA vacuuming or mechanical brushing, cannot successfully remove contaminants of concern. Damp wiping should be performed with disposable towels or rags properly wetted with Simple Green or a similarly environmentally friendly degreasing agent. If disinfection is required, a Foster Products 40-80 HVAC and Wall Disinfectant or equivalent quarternary ammonium compound cleaning solution may be used.

It is not necessary to establish negative pressure in locations where wet wiping is the only cleaning performed. If possible, the components to be cleaned should be removed, placed in a 6-mil polyethylene bag, and cleaned outside of the occupant space. If removal of the components is not possible, use of a disposable drop cloth in the work area is recommended.

- 11.2.2 Manual HEPA vacuum with soft bristle brush attachment: Manually vacuum internal HVAC surfaces from top to bottom to remove all visible debris. Maintain the cleaning zone under negative pressure (minimum -0.02 inches water gauge) using a HEPA filtered air filtration device during manual vacuuming
- 11.2.3 Power driven mechanical or pneumatic brush system for duct runs: This type of equipment may only be used in ducts where negative pressure has been established using a HEPA filtered vacuum collection device (minimum of 3000 fpm air velocity in cleaning zone of the duct). Always work in the direction of the air flow. Apply the mechanical brushing equipment to dislodge debris from the interior surfaces of the duct. Following mechanical brushing, all surfaces of the cleaning zone shall be air washed with a pressurized air source to transport all dislodged debris to the vacuum collection device. *Note that air washing alone is not a sufficient cleaning method and will not be considered acceptable for proper duct cleaning.*
- 11.2.4 Chemical wet cleaning of evaporator or chilled water coils: Wet cleaning of the coils and drip pan shall be performed using commercially available coil cleaner, subject to approval of Environmental Professional. Saturate the coils with a pump sprayer and thoroughly rinse with clean water. Cleaning solution and rinse water will collect in the condensate drain pan; if significant lead or asbestos contamination has been identified in the dust on the coils and/or in the drain pan, the water must be collected and tested for proper disposal.

Maintain the cleaning zone under negative pressure using a HEPA filtered air filtration device. If odors are present and it is not possible to exhaust the HEPA filtered air filtration device outside the building, it may be necessary to use an activated carbon bed in air filtration device to eliminate odors.

- 11.2.5 Electric Heating and Reheat coils: Clean electric heating and reheat coils using only dry methods. No water or encapsulant may come into contact with electric heating or re-heat coils. Dry clean using one or more of the following methods:

- 11.2.6 Manual HEPA vacuum
- 11.2.7 Pressurized air cleaning (only if cleaning zone is maintained under negative pressure)
- 11.2.8 Manual brushing using manual HEPA vacuum to collect dust

Maintain the cleaning zone under negative pressure using a HEPA filtered air filtration device whenever possible.

11.3 Site-specific Cleaning Procedures

11.3.1 Lemon Grass Restaurant

This is a 2,351 sq ft space with variable ceiling height. One air handling unit is located above the ceiling toward the south end of the floor. This is a recirculating air unit with no outdoor air supply. Return air enters the unit through a grille located in the side of the unit. The air handling unit is accessible and is provided with access doors. The air handling unit distributes supply air through a main supply air duct and several branch ducts. Supply air diffuser openings are located on the underside of the supply duct (most of the diffusers have been removed). The supply diffuser openings extend in a line to the north of the air handling units and are spaced approximately 15' apart. There are approximately four 18" supply diffuser openings located to the north of the air handling unit. There is a separate ducted make-up air system that delivers outdoor air to the cooking stations. The make-up air system consists of a single duct with diffuser openings on the underside of the duct, and a blower assembly that is located in-line with the duct. Outdoor air is provided to the make-up air system through a ducted outdoor air intake located in an exterior wall of the building approximately 10' above ground level.

VENTILATION SYSTEM COMPONENTS TO BE CLEANED

The following system components will be cleaned in the Lemon Grass Restaurant:

- a. Air handling unit and components
- b. Reheat Coil
- c. Supply air ducts and terminal diffusers
- d. Makeup Air System
- e. Dissembled Duct Sections on Floor

CLEANING PROCEDURES

General: Any interior surfaces of the air handling unit or ventilation system that are porous shall be cleaned using manual HEPA vacuuming methods. After successful completion of visual inspection and verification sampling, a lockdown encapsulant shall be applied to the porous surfaces using a hand-operated sprayer or brush, using care not to coat electrical or mechanical components.

Note that if any disassembly of the air handling units is required to complete the work, the air handling unit shall be reassembled by a qualified HVAC professional after all parts are dry and are verified clean.

Note that all HEPA air filtration devices and HEPA-filtered vacuum collection devices shall be exhausted to the outdoors.

Air Handling Unit

1. Ensure that the air handling unit motor is locked out and is electrically isolated, and place the air handling unit and its components under containment prior to beginning work. A temporary Zip-wall containment of 6-mil, fire retardant polyethylene sheeting extending from the floor to the ceiling deck, and maintained under negative pressure using a HEPA-filtered air filtration device is sufficient. The footprint of the containment should be large enough to accommodate a ladder or scaffolding. Note that WRS Infrastructure and Environment, Inc. may construct the containment prior to the start of ventilation system cleaning. In addition, WRS Infrastructure and Environment, Inc. shall install a service opening to facilitate cleaning of interior components. The access panel shall be installed in the supply air duct between the blower and the reheat coil.
2. Clean the filter racks at the return air side of the unit by damp wiping.
3. Prior to cleaning, place polyethylene sheeting underneath the coils. Wet clean the upstream and downstream sides of cooling coils. Apply manufacturer-approved cleaning solution to the coils using low pressure methods (i.e., airless sprayer, hand operated pump).
4. Clean the blower assembly and blower housing in place. The blower assembly and blower housing shall be cleaned by a combination of hand vacuuming, damp wiping and air washing. As required in this document, air washing shall only be performed after a vacuum collection device has been installed.
5. HEPA vacuum remaining interior surfaces and components (e.g., condenser equipment and compartment, controls, outside air vent to condenser compartment) to remove all visible debris. No encapsulant materials may be used inside the condenser compartment.
6. Perform a final cleaning by wet-wiping and/or HEPA vacuuming methods of the interior work area containment surfaces, ladders, equipment etc. prior to final visual inspection and wipe sampling.

Reheat Coils

1. Clean the electric reheat coil (located inside the supply air duct) by dry vacuuming or air washing. No liquids may come into contact with the electric reheat coil.

Supply Air Ducts and Terminal Diffusers

1. Remove all terminal diffusers into 6-mil polyethylene bags and proceed to the enclosure constructed for cleaning of the air handling unit. Terminal diffusers shall be wet-cleaned. The diffusers should be sprayed with Simple Green or a similar environmentally safe degreaser and hand washed as needed to remove adhered materials.
2. Seal the diffuser openings using 6-mil polyethylene sheeting to be secured with duct tape.
3. Install a vacuum collection device at the terminal end of the duct section to be cleaned. If the entire duct is not cleaned as one unit, then isolate the section of the duct to be cleaned using a zoning device.
4. The supply air duct shall be cleaned using a pressurized air/mechanical brush system in combination with a vacuum collection device. The direction of cleaning shall be from the air handler toward the terminal end of the duct. (It is permissible to use a mechanical brush followed by application of pressurized air in lieu of combination style equipment.) The

vacuum collection equipment shall be configured to maintain a minimum of 3000 feet per minute air velocity in the cleaning zone.

Make-Up Air System

1. All non-porous surfaces of the outdoor air intake located on the exterior of the building shall be cleaned using manual wet-wiping and HEPA vacuuming methods as needed to remove adhered materials. Note that the air intake for the condenser compartment of the air handling unit is located adjacent to the outdoor air intake for the makeup air system and should be cleaned concurrently.
2. The section of the duct from the outdoor air intake through the blower unit shall be cleaned using HEPA vacuum methods. It may be necessary to install a service opening in order to perform this cleaning.
3. Clean blower assembly and blower housing in place by a combination of hand vacuuming, damp wiping and air washing. As required in this document, air washing shall only be performed after a vacuum collection device has been installed.
4. Seal the diffuser openings using 6-mil ethylene sheeting to be secured with duct tape.
5. The makeup air duct shall be cleaned using a pressurized air mechanical brush system in combination with a vacuum collection device. The direction of cleaning shall be from the blower assembly toward the terminal end of the duct. (It is permissible to use a mechanical brush followed by application of pressurized air in lieu of combination style equipment.) It may be necessary to install a service opening in order to perform the duct cleaning. The vacuum collection equipment shall be configured to maintain a minimum of 3000 feet per minute air velocity in the cleaning zone.

Dissembled Duct Sections on Floor

1. Transport dissembled duct sections to the enclosure constructed for cleaning of the air handling unit for wet cleaning. The dissembled duct sections should be sprayed with Simple Green or a similar environmentally safe degreaser and hand washed as needed to remove adhered materials.

11.3.2 Food Exchange Restaurant

This is a 2,324 sq ft space with 10' high suspended acoustical ceiling on the south side and a solid gypsum drywall suspended ceiling on the north side. An older tin ceiling is present on the deck of the south side and an additional layer of gypsum is attached to the deck on the north side. Prior to the start of work, the suspended acoustical ceiling on the south side will be removed by WRS Infrastructure and Environment, Inc.

Two nearly side-by-side air handling units are located above the ceiling. These are recirculating air units with no outdoor air supply. Return air enters the ceiling plenum through passive return grilles located in the false ceiling below each unit. The air handling units draw return air from the ceiling plenum through grilles in the sides of the units. The air handling units distribute supply air to supply air ducts that extend to the north and to the south of the units. The ducts are approximately 50' long (north-south dimension). Supply air is distributed to the occupant space through supply diffusers off of the supply duct; the diffusers are flush with the false ceiling. There are supply grilles off the supply air duct that extend in a line to the north and to the south

of the air handling units; these are spaced approximately 15' apart. There are 5 supply grilles each located to the north and south of the air handling units.. The air handling unit is not provided with access doors and is difficult to access.

VENTILATION SYSTEM COMPONENTS TO BE CLEANED

The following system components in the Food Exchange Restaurant will be cleaned:

- a. Air handling units and components
- b. Supply air ducts and terminal diffusers

CLEANING PROCEDURES

General: Any interior surfaces of the air handling unit or ventilation system that are porous shall be cleaned using manual HEPA vacuuming methods. After successful completion of visual inspection and verification sampling, a lockdown encapsulant shall be applied to the porous surfaces using a hand-operated sprayer or brush, using care not to coat electrical or mechanical components.

Note that if any disassembly of the air handling units is required to complete the work, the air handling unit shall be reassembled by a qualified HVAC professional after all parts are dry and are verified clean.

Note that all HEPA air filtration devices and HEPA-filtered vacuum collection devices shall be exhausted to the outdoors.

Air Handling Units

1. Ensure that the air handling unit motors are locked out and is electrically isolated, and place the air handling units and their components under containment prior to beginning work. A temporary Zip-wall containment of 6-mil, fire retardant polyethylene sheeting extending from the floor to the ceiling deck, and maintained under negative pressure using a HEPA-filtered air filtration device is sufficient. The footprint of the containment should be large enough to accommodate a ladder or scaffolding. Note that WRS Infrastructure and Environment, Inc. may construct the containment prior to the start of ventilation system cleaning.
2. Clean the filter racks at the return air sides of the units by damp wiping.
3. Prior to cleaning, place polyethylene sheeting underneath the coils. Wet clean the upstream and downstream sides of cooling coils. Apply manufacturer-approved cleaning solution to the coils using low pressure methods (i.e., airless sprayer, hand operated pump).
4. Clean the blower assembly and blower housing in place. The blower assembly and blower housing shall be cleaned by a combination of hand vacuuming, damp wiping and air washing. As required in this document, air washing shall only be performed after a vacuum collection device has been installed.
5. HEPA vacuum remaining interior surfaces and components to remove all visible debris. No encapsulant materials may be used inside the condenser compartment.

Reheat Coils

1. Note that if reheat coils are present, by dry vacuuming or air washing. No liquids may come into contact with the electric reheat coil.

Supply Air Ducts and Terminal Diffusers

1. Remove all terminal diffusers into 6-mil polyethylene bags and proceed to the enclosure constructed for cleaning of the air handling unit. Terminal diffusers shall be wet-cleaned. The diffusers should be sprayed with Simple Green or a similar environmentally safe degreaser and hand washed as needed to remove adhered materials.
2. Seal the diffuser openings using 6-mil polyethylene sheeting to be secured with duct tape.
3. Install a vacuum collection device at the terminal end of the duct section to be cleaned. If the entire duct is not cleaned as one unit, then isolate the section of the duct to be cleaned using a zoning device.
4. The supply air duct shall be cleaned using a pressurized air/mechanical brush system in combination with a vacuum collection device. The direction of cleaning shall be from the air handler toward the terminal end of the duct. (It is permissible to use a mechanical brush followed by application of pressurized air in lieu of combination style equipment.) The vacuum collection equipment shall be configured to maintain a minimum of 3000 feet per minute air velocity in the cleaning zone. (See Requirements Section for use of this equipment.)

11.3.3 Combustion Make-up Air Riser

The combustion make-up air riser extends from the ceiling of a second floor mechanical closet to the roof of the building.

VENTILATION SYSTEM COMPONENTS TO BE CLEANED

The following system components will be cleaned:

- a. Combustion riser
- b. Associated vents
- c. Roof cap

CLEANING PROCEDURES

Note that the HEPA-filtered vacuum collection devices shall be exhausted to the outdoors.

Combustion riser, associated vents and roof cap

1. Remove all vents into 6-mil polyethylene bags and proceed to work area appropriate for cleaning the vents. The vents shall be wet-cleaned. The vents should be sprayed with Simple Green or a similar environmentally safe degreaser and hand washed as needed to remove adhered materials.
2. Seal the vent openings using 6-mil polyethylene sheeting to be secured with duct tape.
3. Install a vacuum collection device at the bottom of the riser on the second floor.

4. The combustion riser shall be cleaned using a pressurized air/mechanical brush system in combination with a vacuum collection device. The direction of cleaning shall be from the roof down toward the second floor. (It is permissible to use a mechanical brush followed by application of pressurized air in lieu of combination style equipment.) The vacuum collection equipment shall be configured to maintain a minimum of 3000 feet per minute air velocity in the cleaning zone. (See Requirements Section for use of this equipment.)
5. Remove the roof cap if possible and place on a polyethylene sheet. Wet-clean by damp wiping in place or if removed, spray with Simple Green or a similar environmentally safe degreaser and hand wash as needed to remove adhered materials.

APPENDIX A DEFINITIONS

1. **Access Doors:** Covers for service openings consisting of pre-fabricated operable or removable entry panels, which are installed in a ventilation system to facilitate inspection and maintenance services.
2. **Air Conveyance System, Air Handling System, HVAC System, Ventilation System:** The ventilation system is any interior surface of a building's air distribution system for conditioned spaces and/or occupied zones (See definition of air handling system, ASHRAE 62-1989). This includes the entire air distribution system from the points that the air enters the system to the points that air is discharged from the system. The return air grilles, air ducts (except ceiling plenums) to the air handling unit (AHU), the interior surface of the AHU, mixing box, coil compartment, condensate drain pans, humidifiers, and dehumidifiers, supply air ducts, fans, fan housing, fan blades, spray eliminators, turning vanes, filters, filter housings, reheat coils, and supply diffusers are all considered part of the ventilation system.
3. **Air Filtration Device (also referred to as Negative Air Machine):** An external air moving device which can be temporarily connected to a section or sections of an ventilation system to create negative airflow for cleaning and remediation procedures, employing a minimum of DOP-tested HEPA final filtration if exhausted indoors.
4. **Air Washing:** For duct cleaning, this term applies to the use of pressurized air, in combination with a Vacuum Collection Device, for transporting dislodged debris into the vacuum collection equipment.
5. **Ceiling Plenum:** A non-ducted area between the ceiling over a conditioned building space and the floor above, through which air is transported to a conditioned space from an ventilation system (ceiling supply air plenum), or from a conditioned space to an ventilation system (ceiling return air plenum).
6. **Coils:** Devices inside the ventilation system, which temper and/or dehumidify the air transported by the ventilation system. These include heat exchangers, with or without extended surfaces, through which either water, ethylene glycol solution, brine, volatile refrigerant, steam, or electricity is circulated for the purpose of total cooling (sensible cooling plus latent cooling) or sensible heating of a forced-circulation air stream (See ASHRAE 33-78 and ARI 410-91).
7. **Debris:** Any solid materials, including particulate substances, in the ventilation system not intended to be present.
8. **DOP Testing:** The percentage of removal of 0.3 micrometer particles of dioctylphthalate (DOP) is used to rate high efficiency air filters, those with efficiencies above about 98 percent (See Military Standard 282, U.S. Department of Defense, 1956).
9. **Ductwork (Ducts):** A system of passageways for distribution and extraction of air (See ASHRAE Terminology of Heating, Ventilation, Air Conditioning, and Refrigeration, 1991).

10. **Encapsulation:** The application of a bridging (resurfacing) or penetrating compound on internal ventilation system surfaces to bond, mechanically resurface, or lock-down fibrous and other ventilation system components which have deteriorated or been damaged, to control the entrainment of particulates from these components into the airstream.
11. **Environmental Cleaning Contractor:** The Environmental Cleaning Contractor at 110 Liberty Street is WRS Infrastructure and Environment, Inc., as the authorized by the USEPA .
12. **Environmental Service Contractor:** An independent environmental contractor performing an initial assessment of the WTC-related dust, as authorized by the USEPA
13. **Fan:** A power driven machine that moves a volume of air by converting rotational mechanical energy to an increase in the total pressure of the moving air (See AMCA 99-86).
14. **HEPA Filter:** High efficiency particulate air filter capable of a 99.97% collection efficiency for a 0.3 micron size particle as per DOP testing.
15. **Mechanical Cleaning:** Physical removal of debris and other foreign matter from ventilation system surfaces.
16. **Negative Air (Vacuum Collection) Cleaning:** Procedure for removal of debris from a ventilation system using a HEPA-filtered Vacuum Collection Device for particulate control and capture.
17. **Non-Porous Surface:** Any surface of the ventilation system in contact with the air stream which cannot be penetrated by either solutions or air. This would exclude ventilation system materials such as wood, fiberboard, thermal/acoustic insulation, and concrete.
18. **Porous Surface:** Any surface of the ventilation system in contact with the air stream which can be penetrated by either solutions or air, including but not limited to ventilation system materials such as wood, fiberboard (ductboard), fibrous thermal/acoustic insulation, and concrete.
19. **Pressure Drop:** (1) Loss in pressure, as from one end of a refrigerant line to the other, from friction, static, heat, etc. (2) Difference in pressure between two points in a flow system, usually caused by frictional resistance to fluid flow in a conduit, filter, or other flow system (See ASHRAE Terminology of Heating, Ventilation, Air Conditioning, and Refrigeration, 1991).
20. **Sanitization:** A process to reduce the proliferation of microbial growth in an ventilation system, usually involving the application of a biocide agent.
21. **Source Removal:** An HVAC hygiene mitigation process, which involves the physical capture, removal, and controlled containment of foreign matter from an ventilation system.
22. **Static Pressure:** The normal force per unit area that is exerted on the interior surfaces of the ventilation system by the air.

23. **ULPA Filter:** High efficiency particulate air filter capable of a 99.99% collection efficiency for a 0.1 micron size particle.
24. **Vacuum Collection Device or Equipment:** a HEPA-filtered device for duct cleaning used to place a duct system or sections of a duct system under negative pressure and to collect and transport dust and debris that has been dislodged by mechanical cleaning. This device overcomes greater static pressures than those typical of air filtration devices.
25. **Ventilation system/duct cleaning firm:** Service firm contracted to provide ventilation system cleaning and/or hygiene remediation for a facility.
26. **Visibly Clean:** Determined by internal visual inspection, that all portions or components of the ventilation system are free of any visible debris.
27. **Visual Inspection:** Examination of ventilation system components to evaluate the presence of visible contamination using the human eye other optical instrument. Visual inspection may be aided by the use of telescoping inspection mirrors and flashlights inserted through service openings.
28. **Visual Inspection System (VIS):** Optical device such as a still camera, borescope, or CCTV (closed circuit television) video camera system employed to perform a visual hygiene evaluation and/or documentation of internal areas in an HVAC system.
29. **Zoning Device:** A physical barrier consisting of a balloon or other device for blocking/segregating a ventilation duct.

APPENDIX B

INSTALLATION OF SERVICE OPENINGS IN AIR HANDLING SYSTEMS

[B.1] Service openings in Sheet Metal Ventilation System Components: Any Service openings shall be made in such a way as to not significantly weaken the structural integrity of the metal ventilation system component and provide an air tight seal once secured. Ventilation system/duct cleaning firm must provide a finished surface deemed visually acceptable by the Client and in the opinion of the Client, not reduce the building's aesthetic qualities. Work cut and patched in an unsatisfactory manner shall be removed and replaced by the Ventilation system/duct cleaning firm at no additional cost to the Client. Upon completion of inspection and/or cleaning services, the Service openings shall be sealed in accordance with job specifications, with one of the following closure techniques:

- (1) Install gasketed removable Access Doors.
- (2) Install sheet metal panels fastened with sheet metal screws and sealed with silicone chalk, mastic or duct sealant.

[B.2] Service openings in Externally Insulated Sheet Metal Ventilation System Components: (See [C.1] Service openings in Sheet Metal Ventilation System Components) Upon closure of Access Hole, external insulation must be replaced as necessary and the edges secured with either an approved water-based bridging encapsulant for canvas-wrapped insulated duct exteriors or reinforced 4" wide foil tape on foil-faced insulated duct exteriors.

[B.3] Service openings in Fibrous Lined Sheet Metal Ventilation System Components: Any Service openings shall be made in such a way as to not significantly weaken the structural integrity of the metal ventilation system component or create fiber shed from the internal insulation at the cut area once the Access Hole is closed. Upon completion of inspection and/or cleaning services, the Service openings shall be sealed in accordance with the following closure techniques:

- (1) Install gasketed, insulated Access Doors. The cut edge of the internal insulation lining at the Access Hole must be sealed with an approved Bridging Encapsulant to prevent fiber shed, and the insulation on the cover plate should fit securely in the cut-out area.
- (2) Pressure fitting round hole plugs (for Service openings 3" diameter or smaller in low/medium positive air pressure applications) after an approved ventilation system Bridging Encapsulant has been applied to the cut edge of the internal insulation to prevent fibershed.
- (3) Install sheet metal panels affixed with similar insulation to match the removed portion of insulation from the service opening, fastened with sheet metal screws and sealed with silicone chalk, mastic or duct sealant. The cut edge of the internal insulation lining at the Access Hole must be sealed with an approved bridging encapsulant to prevent fiber shed, and the insulation on the cover plate should fit securely in the cut-out area.

[B.4] Service openings in Fibrous Glass Ventilation System Components (Duct board): Any Service openings shall be made in such a way as to not significantly weaken the structural integrity of the Fibrous Glass Ventilation System Component or create fiber shed from the product at the cut area once the Access Hole is closed. Upon completion of inspection and/or cleaning services, the Service openings shall be sealed in accordance with job specifications, with one of the following closure techniques:

- (1) Install gasketed, insulated Access Doors which will seal the internal cut edge to prevent fibershed, or after an approved ventilation system Bridging Encapsulant has been applied to the cut edge of the internal insulation to prevent fibershed
- (2) Make a shiplap or a 45 degree inward "pumpkin" access cut in the ductboard, and reinstall the cut piece after inspection and/or cleaning with a tape that complies with UL 181 or UL 181A closure systems (See NAIMA's Cleaning Fibrous Glass Insulated Air Duct Systems - Recommended Practice, 1993).

Attachment J

Reporting of Analytical Results

KEY FOR THE ANALYTICAL TABLES

<u>Compound/Type</u>	<u>Analytical Method</u>	<u>Units</u>	<u>Criterion</u>
<u>Asbestos</u>			
Air	PCM	f/cc	0.01 (secondary)
	TEM AHERA	S>0.5 μ /cc	0.022 (secondary)
	TEM PCMe	S>5 μ /cc	0.0009 (primary clearance))
Micro vacuum	TEM AHERA	S/cm ²	not available
Wipe	TEM AHERA	S/cm ²	not available
<u>Dioxin - TEQ EMPC (ND=1/2)</u>			
Air	Method 8290	ng/m ³	0.001 (primary clearance)
Wipe	Method 8290	ng/m ²	4 (primary clearance)
<u>Gypsum</u>			
Air	NIOSH 7500	mg/m ³	not available
Wipe	NIOSH 7500	mg/m ²	not available
<u>Lead</u>			
Air	NIOSH 7300	μ g/m ³	1 (primary clearance)
Micro vacuum	NIOSH 7300	μ g/ft ²	25 (comparison value)
Wipe	NIOSH 7300	μ g/ft ²	25 (primary clearance)
<u>Mineral: alpha-Quartz</u>			
Air	NIOSH 7500	mg/m ³	4 (primary clearance)
Wipe	NIOSH 7500	mg/m ²	not available
<u>Mineral: Calcite</u>			
Air	NIOSH 7500	mg/m ³	not available
Wipe	NIOSH 7500	mg/m ²	not available
<u>Mineral: Cristobalite</u>			
Air	NIOSH 7500	mg/m ³	not available
Wipe	NIOSH 7500	mg/m ²	not available
<u>Mineral: Tridymite</u>			
Air	NIOSH 7500	mg/m ³	not available
Wipe	NIOSH 7500	mg/m ²	not available
<u>MMVF</u>			
Air	SEM/PLM	mmvf_S/L	10 (primary clearance)
Wipe	SEM/PLM	mmvf_S/c (=S/cm ²)	not available
<u>PAH</u>			
Air	Method 8270	μ g/m ³	0.2 (primary clearance)
Wipe	Method 8270	μ g/m ²	300 (primary clearance)
<u>Total Dust</u>			
Micro vacuum	NADCA	mg/cm ²	0.5 (secondary)

Unit 2A Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-2A-006	Microvac		3561.48 S/cm2	Chrysotile
9094-M-2A-007	Microvac		30866.2 S/cm2	Chrysotile
9094-M-2A-008	Microvac		20973.2 S/cm2	Chrysotile
9094-M-2A-009	Microvac	ND	< 1582.88 S/cm2	
9094-W-2A-001	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-2A-002	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-2A-003	Wipe		56192.2 S/cm2	Chrysotile
9094-W-2A-004	Wipe		18994.6 S/cm2	Chrysotile
9094-W-2A-005	Wipe		3165.76 S/cm2	Chrysotile

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-A-2A-010	Air		0.003 f/cc	
9094-A-2A-011	Air		0.003 f/cc	
9094-A-2A-012	Air		0.002 f/cc	
9094-A-2A-010	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-2A-011	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-2A-012	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-2A-010	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-2A-011	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-2A-012	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-M-2A-022	Microvac		45903.5 S/cm2	Chrysotile
9094-M-2A-023	Microvac	ND	< 3165.76 S/cm2	Chrysotile. Asbestos detected below detection limit.
9094-M-2A-024	Microvac		13454.5 S/cm2	Chrysotile
9094-W-2A-017	Wipe	ND	< 1183.2 S/cm2	
9094-W-2A-018	Wipe	ND	< 1183.2 S/cm2	

Unit 2A Results

9094-W-2A-019	Wipe		4396.89	S/cm2	Chrysotile
9094-W-2A-020	Wipe	ND	< 2366.41	S/cm2	Chrysotile. Asbestos detected below detection limit.
9094-W-2A-021	Wipe	ND	< 1183.2	S/cm2	

Post 2nd Cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-A-2A-025	Air		0.001 f/cc	
9094-A-2A-026	Air		0.001 f/cc	
9094-A-2A-027	Air		0.001 f/cc	
9094-A-2A-028	Air		0.002 f/cc	
9094-A-2A-029	Air		0.001 f/cc	
9094-A-2A-030	Air		0.001 f/cc	
9094-A-2A-025	Air		0.0022 S>0.5u/cc	Chrysotile
9094-A-2A-026	Air		0.0013 S>0.5u/cc	Chrysotile
9094-A-2A-027	Air		0.0042 S>0.5u/cc	Chrysotile
9094-A-2A-028	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-2A-029	Air		0.0005 S>0.5u/cc	Chrysotile
9094-A-2A-030	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-2A-025	Air		0.0004 S>5u/cc	Chrysotile
9094-A-2A-026	Air		0.0009 S>5u/cc	Chrysotile
9094-A-2A-027	Air		0.0004 S>5u/cc	Chrysotile
9094-A-2A-028	Air	ND	< 0.0005 S>5u/cc	
9094-A-2A-029	Air	ND	< 0.0005 S>5u/cc	
9094-A-2A-030	Air	ND	< 0.0005 S>5u/cc	

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-2A-002	Wipe		0.585 ng/m2	
9094-W-2A-003	Wipe		1.21 ng/m2	
9094-W-2A-004	Wipe		0.752 ng/m2	
9094-W-2A-005	Wipe		0.843 ng/m2	

Unit 2A Results

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-W-2A-018	Wipe		0.557 ng/m2	
9094-W-2A-019	Wipe		0.507 ng/m2	
9094-W-2A-020	Wipe		0.556 ng/m2	
9094-W-2A-021	Wipe		0.647 ng/m2	

Gypsum

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-A-2A-015	Air	ND	< 0.016 mg/m3	
9094-A-2A-016	Air	ND	< 0.016 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-2A-006	Microvac		4.03 ug/ft2	
9094-M-2A-007	Microvac		14.4 ug/ft2	
9094-M-2A-008	Microvac		3.89 ug/ft2	
9094-M-2A-009	Microvac	ND	< 2.32 ug/ft2	
9094-W-2A-002	Wipe	ND	< 4.65 ug/ft2	
9094-W-2A-003	Wipe		49.4 ug/ft2	
9094-W-2A-004	Wipe		35.4 ug/ft2	
9094-W-2A-005	Wipe		44.6 ug/ft2	

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-A-2A-013	Air	ND	< 0.052 ug/m3	
9094-A-2A-014	Air	ND	< 0.052 ug/m3	
9094-M-2A-022	Microvac	ND	< 2.32 ug/ft2	
9094-M-2A-023	Microvac	ND	< 2.32 ug/ft2	
9094-M-2A-024	Microvac	ND	< 2.32 ug/ft2	
9094-W-2A-018	Wipe	ND	< 4.65 ug/ft2	

Unit 2A Results

9094-W-2A-019	Wipe		11.3	ug/ft2
9094-W-2A-020	Wipe	ND	< 4.65	ug/ft2
9094-W-2A-021	Wipe	ND	< 4.65	ug/ft2

Mineral: alpha-Quartz

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-A-2A-015	Air	ND	< 0.004 mg/m3	
9094-A-2A-016	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-A-2A-015	Air	ND	< 0.016 mg/m3	
9094-A-2A-016	Air	ND	< 0.016 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-A-2A-015	Air	ND	< 0.016 mg/m3	
9094-A-2A-016	Air	ND	< 0.016 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-A-2A-015	Air	ND	< 0.016 mg/m3	
9094-A-2A-016	Air	ND	< 0.016 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-2A-002	Wipe	ND	< 57.23 S/cm2	
9094-W-2A-003	Wipe		629.55 S/cm2	
9094-W-2A-004	Wipe		2117.56 S/cm2	
9094-W-2A-005	Wipe		343.39 S/cm2	

Unit 2A Results

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-A-2A-010	Air		0.825 S/L	
9094-A-2A-011	Air		0.617 S/L	
9094-A-2A-012	Air		1.284 S/L	
9094-W-2A-017	Wipe		57.23 S/cm2	
9094-W-2A-018	Wipe		114.46 S/cm2	
9094-W-2A-019	Wipe		171.69 S/cm2	
9094-W-2A-020	Wipe		57.23 S/cm2	
9094-W-2A-021	Wipe		114.46 S/cm2	

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-2A-002	Wipe	U	290 ug/m2	
9094-W-2A-003	Wipe		290 ug/m2	
9094-W-2A-004	Wipe	U	290 ug/m2	
9094-W-2A-005	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 1B

Sample ID	Matrix	Detected	Result	Comment
9094-W-2A-018	Wipe	U	290 ug/m2	
9094-W-2A-019	Wipe	U	290 ug/m2	
9094-W-2A-020	Wipe	U	290 ug/m2	
9094-W-2A-021	Wipe	U	290 ug/m2	

Unit 2B Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-2B-005	Microvac		6331.52 S/cm2	Chrysotile
9094-M-2B-006	Microvac		11871.6 S/cm2	Chrysotile
9094-M-2B-007	Microvac		25326.1 S/cm2	Chrysotile
9094-W-2B-001	Wipe	ND	< 2366.41 S/cm2	
9094-W-2B-002	Wipe	ND	< 2366.41 S/cm2	Anthophyllite/Chrysotile
9094-W-2B-003	Wipe		102096 S/cm2	Chrysotile
9094-W-2B-004	Wipe		5540.08 S/cm2	Chrysotile

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2B-008	Air		0.003 f/cc	
9094-A-2B-009	Air		0.005 f/cc	
9094-A-2B-010	Air		0.002 f/cc	
9094-A-2B-008	Air		0.0068 S>0.5u/cc	Chrysotile
9094-A-2B-009	Air		0.0095 S>0.5u/cc	Chrysotile
9094-A-2B-010	Air		0.0026 S>0.5u/cc	Chrysotile
9094-A-2B-008	Air	ND	< 0.0009 S>5u/cc	Chrysotile
9094-A-2B-009	Air	ND	< 0.0009 S>5u/cc	Chrysotile
9094-A-2B-010	Air	ND	< 0.0009 S>5u/cc	Chrysotile
9094-M-2B-020	Microvac		22160.3 S/cm2	Chrysotile
9094-M-2B-021	Microvac		10288.7 S/cm2	Chrysotile
9094-M-2B-022	Microvac		72284.9 S/cm2	Chrysotile
9094-M-2B-023	Microvac		11080.2 S/cm2	Chrysotile
9094-W-2B-015	Wipe	ND	< 5916.01 S/cm2	
9094-W-2B-016	Wipe	ND	< 5916.01 S/cm2	
9094-W-2B-017	Wipe	ND	< 5916.01 S/cm2	Chrysotile
9094-W-2B-018	Wipe	ND	< 5916.01 S/cm2	Chrysotile
9094-W-2B-019	Wipe		5935.8 S/cm2	Chrysotile

Unit 2B Results

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-2B-002	Wipe		0.488 ng/m2	
9094-W-2B-003	Wipe		0.526 ng/m2	
9094-W-2B-004	Wipe		0.642 ng/m2	

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-W-2B-016	Wipe		0.556 ng/m2	
9094-W-2B-017	Wipe		0.522 ng/m2	
9094-W-2B-018	Wipe		0.476 ng/m2	
9094-W-2B-019	Wipe		0.563 ng/m2	

Gypsum

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2B-013	Air	ND	< 0.016 mg/m3	
9094-A-2B-014	Air	ND	< 0.016 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-2B-005	Microvac	ND	< 2.32 ug/ft2	
9094-M-2B-006	Microvac		4.54 ug/ft2	
9094-M-2B-007	Microvac	ND	< 2.32 ug/ft2	
9094-W-2B-002	Wipe	ND	< 4.65 ug/ft2	
9094-W-2B-003	Wipe		97 ug/ft2	
9094-W-2B-004	Wipe		17.5 ug/ft2	

Unit 2B Results

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2B-011	Air		0.197 ug/m3	
9094-A-2B-012	Air		0.193 ug/m3	
9094-M-2B-020	Microvac	ND	< 2.32 ug/ft2	
9094-M-2B-021	Microvac	ND	< 2.32 ug/ft2	
9094-M-2B-022	Microvac	ND	< 2.32 ug/ft2	
9094-M-2B-023	Microvac	ND	< 2.32 ug/ft2	
9094-W-2B-016	Wipe	ND	< 4.65 ug/ft2	
9094-W-2B-017	Wipe		9.9 ug/ft2	
9094-W-2B-018	Wipe		18.7 ug/ft2	
9094-W-2B-019	Wipe		7.41 ug/ft2	

Post 2nd cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2B-024	Air		0.309 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2B-013	Air	ND	< 0.004 mg/m3	
9094-A-2B-014	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2B-013	Air	ND	< 0.016 mg/m3	
9094-A-2B-014	Air	ND	< 0.016 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2B-013	Air	ND	< 0.016 mg/m3	
9094-A-2B-014	Air	ND	< 0.016 mg/m3	

Unit 2B Results

Mineral: Tridymite

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2B-013	Air	ND	< 0.016 mg/m3	
9094-A-2B-014	Air	ND	< 0.016 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-2B-002	Wipe		629.55 S/cm2	
9094-W-2B-003	Wipe		13163.22 S/cm2	
9094-W-2B-004	Wipe		400.62 S/cm2	

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2B-008	Air		6.645 S/L	
9094-A-2B-009	Air		1.685 S/L	
9094-A-2B-010	Air		3.922 S/L	
9094-W-2B-015	Wipe	ND	< 57.23 S/cm2	
9094-W-2B-016	Wipe		114.46 S/cm2	
9094-W-2B-017	Wipe		228.93 S/cm2	
9094-W-2B-018	Wipe		171.69 S/cm2	
9094-W-2B-019	Wipe		171.69 S/cm2	

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-2B-002	Wipe	U	290 ug/m2	
9094-W-2B-003	Wipe	U	290 ug/m2	
9094-W-2B-004	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-W-2B-016	Wipe	U	290 ug/m2	
9094-W-2B-017	Wipe	U	290 ug/m2	
9094-W-2B-018	Wipe	U	290 ug/m2	
9094-W-2B-019	Wipe	U	290 ug/m2	

2nd Floor Hallway Results

Asbestos

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2ND-001	Air		0.003 f/cc	
9094-A-2ND-002	Air		0.002 f/cc	
9094-A-2ND-001	Air		0.0011 S>0.5u/cc	Chrysotile
9094-A-2ND-002	Air		0.0025 S>0.5u/cc	Chrysotile
9094-A-2ND-001	Air		0.0005 S>5u/cc	Chrysotile
9094-A-2ND-002	Air	ND	< 0.0005 S>5u/cc	

Gypsum

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2ND-005	Air	ND	< 0.009 mg/m3	
9094-A-2ND-006	Air	ND	< 0.009 mg/m3	

Lead

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2ND-003	Air	ND	< 0.052 ug/m3	
9094-A-2ND-004	Air	ND	< 0.052 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2ND-005	Air	ND	< 0.004 mg/m3	
9094-A-2ND-006	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2ND-005	Air	ND	< 0.017 mg/m3	
9094-A-2ND-006	Air	ND	< 0.017 mg/m3	

2nd Floor Hallway Results

Mineral: Cristobalite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2ND-005	Air	ND	< 0.017 mg/m3	
9094-A-2ND-006	Air	ND	< 0.017 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2ND-005	Air	ND	< 0.017 mg/m3	
9094-A-2ND-006	Air	ND	< 0.017 mg/m3	

MMVF

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-2ND-001	Air	ND	< 0.071 S/L	
9094-A-2ND-002	Air		0.067 S/L	

Unit 3A Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-005	Air		0.006 f/cc	
9094-A-3A-006	Air		0.004 f/cc	
9094-A-3A-005	Air	ND	< 0.0009 S>5u/cc	
9094-A-3A-006	Air	ND	< 0.0008 S>5u/cc	
9094-M-3A-006	Microvac		116688 S/cm2	Chrysotile
9094-M-3A-007	Microvac		435336 S/cm2	Chrysotile
9094-M-3A-008	Microvac		72805.3 S/cm2	Chrysotile
9094-M-3A-009	Microvac		80784 S/cm2	Chrysotile
9094-W-3A-001	Wipe	ND	< 2366.41 S/cm2	
9094-W-3A-002	Wipe	ND	< 2366.41 S/cm2	
9094-W-3A-003	Wipe	ND	< 2366.41 S/cm2	
9094-W-3A-004	Wipe		4748.64 S/cm2	Chrysotile

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-010	Air		0.004 f/cc	
9094-A-3A-011	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3A-012	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3A-010	Air		0.0009 S>0.5u/cc	Chrysotile
9094-A-3A-011	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3A-012	Air		0.0009 S>0.5u/cc	Chrysotile
9094-A-3A-010	Air	ND	< 0.0009 S>5u/cc	
9094-A-3A-011	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3A-012	Air	ND	< 0.0009 S>5u/cc	
9094-M-3A-022	Microvac		94972.8 S/cm2	Chrysotile
9094-M-3A-023	Microvac		23743.2 S/cm2	Chrysotile
9094-M-3A-024	Microvac		3957.2 S/cm2	Chrysotile
9094-M-3A-025	Microvac	ND	< 3165.76 S/cm2	
9094-W-3A-017	Wipe		15037.4 S/cm2	Chrysotile

Unit 3A Results

9094-W-3A-018	Wipe	ND	< 11832	S/cm2	Particulate matter, sensitivity (11832 s/cm2) not reached.
9094-W-3A-019	Wipe		3957.2	S/cm2	Chrysotile
9094-W-3A-020	Wipe		3165.76	S/cm2	Chrysotile
9094-W-3A-021	Wipe	ND	< 2366.41	S/cm2	Chrysotile

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3A-002	Wipe		0.54 ng/m2	
9094-W-3A-003	Wipe		0.616 ng/m2	
9094-W-3A-004	Wipe		0.592 ng/m2	

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-W-3A-018	Wipe		0.535 ng/m2	
9094-W-3A-019	Wipe		0.606 ng/m2	
9094-W-3A-020	Wipe		0.597 ng/m2	
9094-W-3A-021	Wipe		0.706 ng/m2	

Gypsum

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-015	Air	ND	< 0.016 mg/m3	
9094-A-3A-016	Air	ND	< 0.017 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-3A-006	Microvac	ND	< 4.65 ug/ft2	
9094-M-3A-007	Microvac	ND	< 4.65 ug/ft2	
9094-M-3A-008	Microvac	ND	< 4.65 ug/ft2	
9094-M-3A-009	Microvac	ND	< 4.65 ug/ft2	
9094-W-3A-002	Wipe	ND	< 4.65 ug/ft2	
9094-W-3A-003	Wipe		38.9 ug/ft2	
9094-W-3A-004	Wipe		12 ug/ft2	

Unit 3A Results

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-013	Air		0.116 ug/m3	Field blank contamination (Validation = R).
9094-A-3A-014	Air		0.131 ug/m3	Field blank contamination (Validation = R).
9094-M-3A-022	Microvac		4.85 ug/ft2	
9094-M-3A-023	Microvac	ND	< 2.32 ug/ft2	
9094-M-3A-024	Microvac		4.39 ug/ft2	
9094-M-3A-025	Microvac	ND	< 2.32 ug/ft2	
9094-W-3A-018	Wipe	ND	< 4.65 ug/ft2	
9094-W-3A-019	Wipe		10.5 ug/ft2	
9094-W-3A-020	Wipe		9.29 ug/ft2	
9094-W-3A-021	Wipe	ND	< 4.65 ug/ft2	

Mineral: alpha-Quartz

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-015	Air	ND	< 0.004 mg/m3	
9094-A-3A-016	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-015	Air	ND	< 0.016 mg/m3	
9094-A-3A-016	Air	ND	< 0.017 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-015	Air	ND	< 0.016 mg/m3	
9094-A-3A-016	Air	ND	< 0.017 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-015	Air	ND	< 0.016 mg/m3	
9094-A-3A-016	Air	ND	< 0.017 mg/m3	

Unit 3A Results

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-005	Air		3.283 S/L	
9094-A-3A-006	Air		0.903 S/L	
9094-W-3A-002	Wipe		57.23 S/cm2	
9094-W-3A-003	Wipe		801.24 S/cm2	
9094-W-3A-004	Wipe		686.78 S/cm2	

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-3A-010	Air		1.226 S/L	
9094-A-3A-011	Air		0.819 S/L	
9094-A-3A-012	Air		1.734 S/L	
9094-W-3A-017	Wipe	ND	< 22.89 S/cm2	
9094-W-3A-018	Wipe	ND	< 22.89 S/cm2	
9094-W-3A-019	Wipe	ND	< 22.89 S/cm2	
9094-W-3A-020	Wipe	ND	< 22.89 S/cm2	
9094-W-3A-021	Wipe	ND	< 22.89 S/cm2	

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3A-002	Wipe	U	290 ug/m2	
9094-W-3A-003	Wipe	U	290 ug/m2	
9094-W-3A-004	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-W-3A-018	Wipe	U	290 ug/m2	
9094-W-3A-019	Wipe	U	290 ug/m2	
9094-W-3A-020	Wipe	U	290 ug/m2	
9094-W-3A-021	Wipe	U	290 ug/m2	

Unit 3B Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-009	Air		0.03 f/cc	
9094-A-3B-010	Air		0.006 f/cc	
9094-A-3B-009	Air	ND	< 0.0009 S>5u/cc	
9094-A-3B-010	Air	ND	< 0.0009 S>5u/cc	
9094-M-3B-006	Microvac		20944 S/cm2	Chrysotile
9094-M-3B-007	Microvac		4986.67 S/cm2	Chrysotile
9094-M-3B-008	Microvac	ND	< 4488 S/cm2	
9094-W-3B-001	Wipe	ND	< 2366.41 S/cm2	
9094-W-3B-002	Wipe	ND	< 2366.41 S/cm2	
9094-W-3B-003	Wipe		3165.76 S/cm2	Chrysotile
9094-W-3B-004	Wipe	ND	< 2366.41 S/cm2	

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-011	Air		0.003 f/cc	
9094-A-3B-012	Air		0.003 f/cc	
9094-A-3B-013	Air		0.004 f/cc	
9094-A-3B-011	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3B-012	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3B-013	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3B-011	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3B-012	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3B-013	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-M-3B-023	Microvac		22951.8 S/cm2	Chrysotile
9094-M-3B-024	Microvac		33240.5 S/cm2	Chrysotile
9094-M-3B-025	Microvac		13454.5 S/cm2	Chrysotile

Unit 3B Results

9094-W-3B-018	Wipe		741.975	S/cm2	Chrysotile
9094-W-3B-019	Wipe	ND	< 739.502	S/cm2	Chrysotile - Asbestos detected below detection limit.
9094-W-3B-020	Wipe		4699.18	S/cm2	Chrysotile
9094-W-3B-021	Wipe		3957.2	S/cm2	Chrysotile
9094-W-3B-022	Wipe		2473.25	S/cm2	Chrysotile

Post 2nd cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-039	Air	ND	< 0.001 f/cc	
9094-A-3B-040	Air	ND	< 0.001 f/cc	
9094-A-3B-041	Air		0.001 f/cc	
9094-A-3B-039	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-3B-040	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-3B-041	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-3B-039	Air	ND	< 0.0005 S>5u/cc	
9094-A-3B-040	Air	ND	< 0.0005 S>5u/cc	
9094-A-3B-041	Air	ND	< 0.0005 S>5u/cc	

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3B-002	Wipe		0.712 ng/m2	
9094-W-3B-003	Wipe		0.506 ng/m2	
9094-W-3B-004	Wipe		1.13 ng/m2	
9094-W-3B-005	Wipe		0.526 ng/m2	

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-W-3B-019	Wipe		0.913 ng/m2	
9094-W-3B-020	Wipe		0.94 ng/m2	
9094-W-3B-021	Wipe		0.915 ng/m2	
9094-W-3B-022	Wipe		0.866 ng/m2	

Unit 3B Results

Gypsum

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-016	Air	ND	< 0.008 mg/m3	
9094-A-3B-017	Air	ND	< 0.008 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-3B-006	Microvac	ND	< 4.65 ug/ft2	
9094-M-3B-007	Microvac	ND	< 4.65 ug/ft2	
9094-M-3B-008	Microvac	ND	< 4.65 ug/ft2	
9094-W-3B-002	Wipe	ND	< 4.65 ug/ft2	
9094-W-3B-003	Wipe		11.5 ug/ft2	
9094-W-3B-004	Wipe		9.65 ug/ft2	
9094-W-3B-005	Wipe		0 ug/ft2	Sample lost by laboratory.

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-014	Air		0.225 ug/m3	
9094-A-3B-015	Air		0.238 ug/m3	
9094-M-3B-023	Microvac	ND	< 2.32 ug/ft2	
9094-M-3B-024	Microvac	ND	< 2.32 ug/ft2	
9094-M-3B-025	Microvac	ND	< 2.32 ug/ft2	
9094-W-3B-019	Wipe	ND	< 4.65 ug/ft2	
9094-W-3B-020	Wipe		51.6 ug/ft2	
9094-W-3B-021	Wipe		10.9 ug/ft2	
9094-W-3B-022	Wipe		7.27 ug/ft2	

Post 2nd cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-W-3B-037	Wipe		ug/ft2	Sample was received broken; not analyzed.
9094-W-3B-038	Wipe	ND	< 4.64 ug/ft2	

Unit 3B Results

Mineral: alpha-Quartz

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-016	Air	ND	< 0.004 mg/m3	
9094-A-3B-017	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-016	Air	ND	< 0.016 mg/m3	
9094-A-3B-017	Air	ND	< 0.016 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-016	Air	ND	< 0.016 mg/m3	
9094-A-3B-017	Air	ND	< 0.016 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-016	Air	ND	< 0.016 mg/m3	
9094-A-3B-017	Air	ND	< 0.016 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-009	Air		14.78 S/L	
9094-A-3B-010	Air		2.644 S/L	
9094-W-3B-002	Wipe		744.01 S/cm2	
9094-W-3B-003	Wipe		2289.26 S/cm2	
9094-W-3B-004	Wipe		744.01 S/cm2	

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3B-011	Air		1.528 S/L	
9094-A-3B-012	Air		2.209 S/L	
9094-A-3B-013	Air		0.946 S/L	
9094-W-3B-018	Wipe		57.23 S/cm2	

Unit 3B Results

9094-W-3B-019	Wipe	ND	< 57.23	S/cm2
9094-W-3B-020	Wipe	ND	< 57.23	S/cm2
9094-W-3B-021	Wipe		57.23	S/cm2
9094-W-3B-022	Wipe	ND	< 57.23	S/cm2

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3B-002	Wipe	U	290 ug/m2	
9094-W-3B-003	Wipe	U	290 ug/m2	
9094-W-3B-004	Wipe	U	290 ug/m2	
9094-W-3B-005	Wipe	U	290 ug/m2	

Post 1st cleaning - Scope A

Sample ID	Matrix	Detected	Result	Comment
9094-W-3B-019	Wipe	U	290 ug/m2	
9094-W-3B-020	Wipe	U	290 ug/m2	
9094-W-3B-021	Wipe	U	290 ug/m2	
9094-W-3B-022	Wipe	U	290 ug/m2	

Unit 3C Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-3C-005	Microvac		127160 S/cm2	Chrysotile
9094-M-3C-006	Microvac		286110 S/cm2	Chrysotile
9094-M-3C-007	Microvac		190740 S/cm2	Chrysotile
9094-M-3C-008	Microvac		589050 S/cm2	Chrysotile
9094-W-3C-001	Wipe	ND	< 2366.41 S/cm2	
9094-W-3C-002	Wipe		2374.32 S/cm2	Chrysotile
9094-W-3C-003	Wipe		55400.8 S/cm2	Chrysotile
9094-W-3C-004	Wipe		75978.2 S/cm2	Chrysotile/Amosite.

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-009	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3C-010	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3C-011	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3C-009	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-010	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-011	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-M-3C-021	Microvac		223582 S/cm2	Chrysotile
9094-M-3C-022	Microvac		39967.7 S/cm2	1 Actinolite and 100 Chrysotile
9094-M-3C-023	Microvac		888172 S/cm2	Chrysotile
9094-M-3C-024	Microvac		147406 S/cm2	Chrysotile
9094-W-3C-016	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-3C-017	Wipe		12663 S/cm2	Chrysotile
9094-W-3C-018	Wipe		77561.1 S/cm2	Chrysotile
9094-W-3C-019	Wipe	ND	< 2366.41 S/cm2	
9094-W-3C-020	Wipe		13454.5 S/cm2	Chrysotile

Unit 3C Results

Post 2nd cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-025	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3C-026	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3C-027	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3C-028	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3C-029	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3C-025	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-026	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-027	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-028	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-029	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-025	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-026	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-027	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-028	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3C-029	Air		S>5u/cc	Not analyzed due to overloading of particulates.

Post 3rd cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-032	Air	ND	< 0.001 f/cc	
9094-A-3C-033	Air	ND	< 0.001 f/cc	
9094-A-3C-034	Air	ND	< 0.001 f/cc	
9094-A-3C-035	Air		0.004 f/cc	
9094-A-3C-036	Air		0.002 f/cc	
9094-A-3C-037	Air		0.002 f/cc	
9094-A-3C-032	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-3C-033	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-3C-034	Air	ND	< 0.0005 S>0.5u/cc	

Unit 3C Results

9094-A-3C-035	Air	ND	< 0.0005	S>0.5u/cc
9094-A-3C-036	Air	ND	< 0.0005	S>0.5u/cc
9094-A-3C-037	Air	ND	< 0.0005	S>0.5u/cc
9094-A-3C-032	Air	ND	< 0.0005	S>5u/cc
9094-A-3C-033	Air	ND	< 0.0005	S>5u/cc
9094-A-3C-034	Air	ND	< 0.0005	S>5u/cc
9094-A-3C-035	Air	ND	< 0.0005	S>5u/cc
9094-A-3C-036	Air	ND	< 0.0005	S>5u/cc
9094-A-3C-037	Air	ND	< 0.0005	S>5u/cc

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3C-002	Wipe		0.558 ng/m2	
9094-W-3C-003	Wipe		6.2 ng/m2	
9094-W-3C-004	Wipe		1.32 ng/m2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-W-3C-017	Wipe		0.618 ng/m2	
9094-W-3C-018	Wipe		0.56 ng/m2	
9094-W-3C-019	Wipe		0.557 ng/m2	
9094-W-3C-020	Wipe		0.525 ng/m2	

Gypsum

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-014	Air	ND	< 0.016 mg/m3	
9094-A-3C-015	Air	ND	< 0.017 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-3C-005	Microvac		68.4 ug/ft2	
9094-M-3C-006	Microvac		135 ug/ft2	
9094-M-3C-007	Microvac		43.3 ug/ft2	
9094-M-3C-008	Microvac		39.4 ug/ft2	

Unit 3C Results

9094-W-3C-002	Wipe	ND	< 4.65	ug/ft2
9094-W-3C-003	Wipe		750	ug/ft2
9094-W-3C-004	Wipe		48.7	ug/ft2

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-012	Air		0.289 ug/m3	
9094-A-3C-013	Air		0.261 ug/m3	
9094-M-3C-021	Microvac		6.32 ug/ft2	
9094-M-3C-022	Microvac		9.66 ug/ft2	
9094-M-3C-023	Microvac		26.9 ug/ft2	
9094-M-3C-024	Microvac		6.47 ug/ft2	
9094-W-3C-017	Wipe		5.02 ug/ft2	
9094-W-3C-018	Wipe		8.03 ug/ft2	
9094-W-3C-019	Wipe		6.01 ug/ft2	
9094-W-3C-020	Wipe	ND	< 4.65 ug/ft2	

Post 2nd cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-030	Air		0.394 ug/m3	
9094-A-3C-031	Air		0.364 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-014	Air	ND	< 0.004 mg/m3	
9094-A-3C-015	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-014	Air		0.027 mg/m3	
9094-A-3C-015	Air	ND	< 0.019 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-014	Air	ND	< 0.016 mg/m3	
9094-A-3C-015	Air	ND	< 0.017 mg/m3	

Unit 3C Results

Mineral: Tridymite

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-014	Air	ND	< 0.016 mg/m3	
9094-A-3C-015	Air	ND	< 0.017 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3C-002	Wipe		343.39 S/cm2	
9094-W-3C-003	Wipe		744.01 S/cm2	
9094-W-3C-004	Wipe		343.39 S/cm2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-009	Air		1.793 S/L	
9094-A-3C-010	Air		2.431 S/L	
9094-A-3C-011	Air		3.883 S/L	
9094-W-3C-016	Wipe		57.23 S/cm2	
9094-W-3C-017	Wipe		171.69 S/cm2	
9094-W-3C-018	Wipe		400.62 S/cm2	
9094-W-3C-019	Wipe		114.46 S/cm2	
9094-W-3C-020	Wipe		114.46 S/cm2	

Post 2nd cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3C-025	Air		91.796 S/L	
9094-A-3C-026	Air		5.061 S/L	
9094-A-3C-027	Air		5.254 S/L	
9094-A-3C-028	Air		4.384 S/L	
9094-A-3C-029	Air		8.099 S/L	

Unit 3C Results

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3C-002	Wipe	U	290 ug/m2	
9094-W-3C-003	Wipe		1046.6 ug/m2	
9094-W-3C-004	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-W-3C-017	Wipe	U	290 ug/m2	
9094-W-3C-018	Wipe	U	290 ug/m2	
9094-W-3C-019	Wipe	U	290 ug/m2	
9094-W-3C-020	Wipe	U	290 ug/m2	

Unit 3D Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-3D-005	Microvac		280500 S/cm2	Chrysotile
9094-M-3D-006	Microvac		44880 S/cm2	Chrysotile
9094-M-3D-007	Microvac		64114.3 S/cm2	Chrysotile
9094-W-3D-001	Wipe		4748.64 S/cm2	Chrysotile
9094-W-3D-002	Wipe	ND	< 2366.41 S/cm2	
9094-W-3D-003	Wipe		172534 S/cm2	Chrysotile
9094-W-3D-004	Wipe		118716 S/cm2	Chrysotile
9094-W-3D-005	Wipe		4748.64 S/cm2	Chrysotile

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3D-008	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3D-009	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3D-010	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-3D-008	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3D-009	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3D-010	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-3D-008	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3D-009	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-3D-010	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-M-3D-020	Microvac	ND	< 3165.76 S/cm2	Chrysotile. Asbestos detected below detection limit.
9094-M-3D-021	Microvac		29283.3 S/cm2	Chrysotile
9094-M-3D-022	Microvac		34823.4 S/cm2	Chrysotile
9094-W-3D-015	Wipe		14245.9 S/cm2	Chrysotile
9094-W-3D-016	Wipe		3957.2 S/cm2	Chrysotile
9094-W-3D-017	Wipe		10288.7 S/cm2	Chrysotile

Unit 3D Results

9094-W-3D-018	Wipe	10288.7	S/cm2	Chrysotile
9094-W-3D-019	Wipe	10288.7	S/cm2	Chrysotile

Post 2nd cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3D-023	Air		0.001 f/cc	
9094-A-3D-024	Air	ND	< 0.001 f/cc	
9094-A-3D-025	Air		0.006 f/cc	
9094-A-3D-026	Air		0.005 f/cc	
9094-A-3D-023	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-3D-024	Air	ND	< 0.0004 S>0.5u/cc	
9094-A-3D-025	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-3D-026	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-3D-023	Air	ND	< 0.0005 S>5u/cc	
9094-A-3D-024	Air	ND	< 0.0004 S>5u/cc	
9094-A-3D-025	Air	ND	< 0.0005 S>5u/cc	
9094-A-3D-026	Air	ND	< 0.0005 S>5u/cc	

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3D-002	Wipe		0.492 ng/m2	
9094-W-3D-003	Wipe		1.77 ng/m2	
9094-W-3D-004	Wipe		1.24 ng/m2	
9094-W-3D-005	Wipe		0.663 ng/m2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-W-3D-016	Wipe		0.568 ng/m2	
9094-W-3D-017	Wipe		0.533 ng/m2	
9094-W-3D-018	Wipe		0.576 ng/m2	
9094-W-3D-019	Wipe		0.556 ng/m2	

Unit 3D Results

Gypsum

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3D-013	Air	ND	< 0.008 mg/m3	
9094-A-3D-014	Air	ND	< 0.008 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-3D-005	Microvac		50.7 ug/ft2	
9094-M-3D-006	Microvac	ND	< 4.65 ug/ft2	
9094-M-3D-007	Microvac	ND	< 4.65 ug/ft2	
9094-W-3D-002	Wipe	ND	< 4.65 ug/ft2	
9094-W-3D-003	Wipe		201 ug/ft2	
9094-W-3D-004	Wipe		112 ug/ft2	
9094-W-3D-005	Wipe	ND	< 4.65 ug/ft2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3D-011	Air		0.074 ug/m3	Field blank contamination (Validation = R).
9094-A-3D-012	Air		0.126 ug/m3	Field blank contamination (Validation = R).
9094-M-3D-020	Microvac	ND	< 2.32 ug/ft2	
9094-M-3D-021	Microvac		5.71 ug/ft2	Field blank contamination (Validation = R).
9094-M-3D-022	Microvac	ND	< 2.32 ug/ft2	
9094-W-3D-016	Wipe		8.22 ug/ft2	
9094-W-3D-017	Wipe		9.8 ug/ft2	
9094-W-3D-018	Wipe	ND	< 4.65 ug/ft2	
9094-W-3D-019	Wipe	ND	< 4.65 ug/ft2	

Mineral: alpha-Quartz

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3D-013	Air	ND	< 0.004 mg/m3	
9094-A-3D-014	Air	ND	< 0.004 mg/m3	

Unit 3D Results

Mineral: Calcite

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3D-013	Air	ND	< 0.016 mg/m3	
9094-A-3D-014	Air	ND	< 0.017 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3D-013	Air	ND	< 0.016 mg/m3	
9094-A-3D-014	Air	ND	< 0.017 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3D-013	Air	ND	< 0.016 mg/m3	
9094-A-3D-014	Air	ND	< 0.017 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3D-002	Wipe		228.93 S/cm2	
9094-W-3D-003	Wipe		572.31 S/cm2	
9094-W-3D-004	Wipe		1259.09 S/cm2	
9094-W-3D-005	Wipe		343.39 S/cm2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3D-008	Air		1.965 S/L	
9094-A-3D-009	Air		0.984 S/L	
9094-A-3D-010	Air		5.513 S/L	
9094-W-3D-015	Wipe	ND	< 22.89 S/cm2	
9094-W-3D-016	Wipe		22.89 S/cm2	
9094-W-3D-017	Wipe	ND	< 22.89 S/cm2	
9094-W-3D-018	Wipe	ND	< 22.89 S/cm2	
9094-W-3D-019	Wipe	ND	< 22.89 S/cm2	

Unit 3D Results

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-3D-002	Wipe	U	290 ug/m2	
9094-W-3D-003	Wipe		290 ug/m2	
9094-W-3D-004	Wipe	U	290 ug/m2	
9094-W-3D-005	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-W-3D-016	Wipe	U	290 ug/m2	
9094-W-3D-017	Wipe	U	290 ug/m2	
9094-W-3D-018	Wipe	U	290 ug/m2	
9094-W-3D-019	Wipe	U	290 ug/m2	

3rd Floor Hallway Results

Asbestos

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3RD-001	Air		0.005 f/cc	
9094-A-3RD-002	Air		0.004 f/cc	
9094-A-3RD-001	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-3RD-002	Air		0.0005 S>0.5u/cc	Chrysotile
9094-A-3RD-001	Air	ND	< 0.0005 S>5u/cc	
9094-A-3RD-002	Air	ND	< 0.0005 S>5u/cc	

Gypsum

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3RD-004	Air	ND	< 0.008 mg/m3	
9094-A-3RD-005	Air	ND	< 0.008 mg/m3	

Lead

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3RD-003	Air	ND	< 0.052 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3RD-004	Air	ND	< 0.004 mg/m3	
9094-A-3RD-005	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3RD-004	Air	ND	< 0.017 mg/m3	
9094-A-3RD-005	Air	ND	< 0.017 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3RD-004	Air	ND	< 0.017 mg/m3	
9094-A-3RD-005	Air	ND	< 0.017 mg/m3	

3rd Floor Hallway Results

Mineral: Tridymite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3RD-004	Air	ND	< 0.017 mg/m3	
9094-A-3RD-005	Air	ND	< 0.017 mg/m3	

MMVF

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-3RD-001	Air		0.095 S/L	
9094-A-3RD-002	Air		0.147 S/L	

Unit 4A Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-4A-005	Microvac		4664.88 S/cm2	Chrysotile
9094-M-4A-006	Microvac		11874.2 S/cm2	Chrysotile
9094-M-4A-007	Microvac		1696.32 S/cm2	Chrysotile
9094-W-4A-001	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-4A-002	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-4A-003	Wipe		2374.32 S/cm2	Chrysotile
9094-W-4A-004	Wipe	ND	< 2366.41 S/cm2	

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-008	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-4A-009	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-4A-010	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-4A-008	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-4A-009	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-4A-010	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-4A-008	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-4A-009	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-4A-010	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-M-4A-020	Microvac		3165.76 S/cm2	Chrysotile
9094-M-4A-021	Microvac	ND	< 3165.76 S/cm2	Chrysotile. Asbestos detected below detection limit.
9094-M-4A-022	Microvac		47486.4 S/cm2	Chrysotile
9094-W-4A-015	Wipe		1978.6 S/cm2	Chrysotile
9094-W-4A-016	Wipe		1582.88 S/cm2	Chrysotile
9094-W-4A-017	Wipe	ND	< 1183.2 S/cm2	Chrysotile. Asbestos detected below detection limit.
9094-W-4A-018	Wipe		6331.52 S/cm2	Chrysotile
9094-W-4A-019	Wipe	ND	< 1183.2 S/cm2	Chrysotile. Asbestos detected below detection limit.

Unit 4A Results

Post 2nd cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-023	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-4A-024	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-4A-025	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-4A-023	Air	ND	< 0.0009 S>0.5u/cc	
9094-A-4A-024	Air	ND	< 0.0008 S>0.5u/cc	
9094-A-4A-025	Air	ND	< 0.0009 S>0.5u/cc	
9094-A-4A-023	Air	ND	< 0.0009 S>5u/cc	
9094-A-4A-024	Air	ND	< 0.0008 S>5u/cc	
9094-A-4A-025	Air	ND	< 0.0009 S>5u/cc	

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4A-002	Wipe		0.836 ng/m2	
9094-W-4A-003	Wipe		0.583 ng/m2	
9094-W-4A-004	Wipe		0.553 ng/m2	

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-W-4A-016	Wipe		0.701 ng/m2	
9094-W-4A-017	Wipe		0.659 ng/m2	
9094-W-4A-018	Wipe		0.701 ng/m2	
9094-W-4A-019	Wipe		0.752 ng/m2	

Gypsum

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-013	Air	ND	< 0.008 mg/m3	
9094-A-4A-014	Air	ND	< 0.008 mg/m3	

Post 2nd cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-026	Air	ND	< 0.008 mg/m3	
9094-A-4A-027	Air	ND	< 0.008 mg/m3	

Unit 4A Results

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-4A-005	Microvac	ND	< 4.65 ug/ft2	
9094-M-4A-006	Microvac	ND	< 4.65 ug/ft2	
9094-M-4A-007	Microvac	ND	< 4.65 ug/ft2	
9094-W-4A-002	Wipe		5.66 ug/ft2	
9094-W-4A-003	Wipe		21.5 ug/ft2	
9094-W-4A-004	Wipe		9.41 ug/ft2	

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-011	Air		0.442 ug/m3	
9094-A-4A-012	Air		0.31 ug/m3	
9094-M-4A-020	Microvac	ND	< 2.32 ug/ft2	
9094-M-4A-021	Microvac	ND	< 2.32 ug/ft2	
9094-M-4A-022	Microvac		2.58 ug/ft2	
9094-W-4A-016	Wipe	ND	< 4.65 ug/ft2	
9094-W-4A-017	Wipe		10.7 ug/ft2	
9094-W-4A-018	Wipe	ND	< 4.65 ug/ft2	
9094-W-4A-019	Wipe	ND	< 4.65 ug/ft2	

Mineral: alpha-Quartz

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-013	Air		0.008 mg/m3	
9094-A-4A-014	Air	ND	< 0.004 mg/m3	

Post 2nd cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-026	Air	ND	< 0.004 mg/m3	
9094-A-4A-027	Air	ND	< 0.004 mg/m3	

Unit 4A Results

Mineral: Calcite

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-013	Air	ND	< 0.017 mg/m3	
9094-A-4A-014	Air	ND	< 0.016 mg/m3	

Post 2nd cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-026	Air	ND	< 0.017 mg/m3	
9094-A-4A-027	Air	ND	< 0.017 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-013	Air	ND	< 0.017 mg/m3	
9094-A-4A-014	Air	ND	< 0.016 mg/m3	

Post 2nd cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-026	Air	ND	< 0.017 mg/m3	
9094-A-4A-027	Air	ND	< 0.017 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-013	Air	ND	< 0.017 mg/m3	
9094-A-4A-014	Air	ND	< 0.016 mg/m3	

Post 2nd cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-026	Air	ND	< 0.017 mg/m3	
9094-A-4A-027	Air	ND	< 0.017 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4A-002	Wipe		400.62 S/cm2	
9094-W-4A-003	Wipe		629.55 S/cm2	
9094-W-4A-004	Wipe		171.69 S/cm2	

Unit 4A Results

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4A-008	Air		0.187 S/L	
9094-A-4A-009	Air		0.435 S/L	
9094-A-4A-010	Air		0.286 S/L	
9094-W-4A-015	Wipe	ND	< 22.89 S/cm2	
9094-W-4A-016	Wipe	ND	< 22.89 S/cm2	
9094-W-4A-017	Wipe		22.89 S/cm2	
9094-W-4A-018	Wipe	ND	< 22.89 S/cm2	
9094-W-4A-019	Wipe	ND	< 22.89 S/cm2	

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4A-002	Wipe	U	290 ug/m2	
9094-W-4A-003	Wipe	U	290 ug/m2	
9094-W-4A-004	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-W-4A-016	Wipe	U	290 ug/m2	
9094-W-4A-017	Wipe	U	290 ug/m2	
9094-W-4A-018	Wipe	U	290 ug/m2	
9094-W-4A-019	Wipe	U	290 ug/m2	

Unit 4B Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4B-001	Wipe	ND	< 2366.41 S/cm2	
9094-W-4B-002	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-4B-003	Wipe		18203.1 S/cm2	Chrysotile
9094-W-4B-004	Wipe		13454.5 S/cm2	Chrysotile
9094-W-4B-005	Wipe		3165.76 S/cm2	Chrysotile

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-4B-006	Air		0.006 f/cc	
9094-A-4B-007	Air		0.004 f/cc	
9094-A-4B-008	Air		0.005 f/cc	
9094-A-4B-006	Air	ND	< 0.0009 S>5u/cc	
9094-A-4B-007	Air	ND	< 0.0009 S>5u/cc	
9094-A-4B-008	Air	ND	< 0.0009 S>5u/cc	
9094-W-4B-013	Wipe	ND	< 2366.41 S/cm2	
9094-W-4B-014	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-4B-015	Wipe		4748.64 S/cm2	1 Anthophyllite and 5 Chrysotile
9094-W-4B-016	Wipe	ND	< 2366.41 S/cm2	
9094-W-4B-017	Wipe	ND	< 2366.41 S/cm2	

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4B-002	Wipe		1.14 ng/m2	
9094-W-4B-003	Wipe		0.653 ng/m2	
9094-W-4B-004	Wipe		0.979 ng/m2	
9094-W-4B-005	Wipe		0.889 ng/m2	

Unit 4B Results

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-W-4B-014	Wipe		2 ng/m2	
9094-W-4B-015	Wipe		0.614 ng/m2	
9094-W-4B-016	Wipe		0.647 ng/m2	
9094-W-4B-017	Wipe		0.582 ng/m2	

Gypsum

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-4B-011	Air	ND	< 0.016 mg/m3	
9094-A-4B-012	Air	ND	< 0.017 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4B-002	Wipe	ND	< 4.65 ug/ft2	
9094-W-4B-003	Wipe		50 ug/ft2	
9094-W-4B-004	Wipe		14 ug/ft2	
9094-W-4B-005	Wipe		30 ug/ft2	

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-4B-009	Air		0.241 ug/m3	
9094-A-4B-010	Air		0.246 ug/m3	
9094-W-4B-014	Wipe	ND	< 4.65 ug/ft2	
9094-W-4B-015	Wipe		6.68 ug/ft2	
9094-W-4B-016	Wipe	ND	< 4.65 ug/ft2	
9094-W-4B-017	Wipe	ND	< 4.65 ug/ft2	

Post 2nd cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-4B-018	Air		0.183 ug/m3	
9094-A-4B-019	Air		0.171 ug/m3	

Unit 4B Results

Mineral: alpha-Quartz

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-4B-011	Air	ND	< 0.004 mg/m3	
9094-A-4B-012	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-4B-011	Air	ND	< 0.016 mg/m3	
9094-A-4B-012	Air	ND	< 0.017 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-4B-011	Air	ND	< 0.016 mg/m3	
9094-A-4B-012	Air	ND	< 0.017 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-4B-011	Air	ND	< 0.016 mg/m3	
9094-A-4B-012	Air	ND	< 0.017 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4B-002	Wipe		286.16 S/cm2	
9094-W-4B-003	Wipe		629.55 S/cm2	
9094-W-4B-004	Wipe		400.62 S/cm2	
9094-W-4B-005	Wipe		686.78 S/cm2	

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-A-4B-006	Air		0.658 S/L	
9094-A-4B-007	Air		1.664 S/L	
9094-A-4B-008	Air		1.096 S/L	
9094-W-4B-013	Wipe		286.16 S/cm2	
9094-W-4B-014	Wipe		228.93 S/cm2	

Unit 4B Results

9094-W-4B-015	Wipe	400.62	S/cm2
9094-W-4B-016	Wipe	171.69	S/cm2
9094-W-4B-017	Wipe	57.23	S/cm2

PAH TEF (ND=1/2)**Before cleaning**

Sample ID	Matrix	Detected	Result	Comment
9094-W-4B-002	Wipe	U	290 ug/m2	
9094-W-4B-003	Wipe	U	290 ug/m2	
9094-W-4B-004	Wipe	U	290 ug/m2	
9094-W-4B-005	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 2B

Sample ID	Matrix	Detected	Result	Comment
9094-W-4B-014	Wipe	U	290 ug/m2	
9094-W-4B-015	Wipe	U	290 ug/m2	
9094-W-4B-016	Wipe	U	290 ug/m2	
9094-W-4B-017	Wipe	U	290 ug/m2	

Unit 4C Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-4C-005	Microvac		432562 S/cm2	Chrysotile
9094-M-4C-006	Microvac		349442 S/cm2	Chrysotile
9094-M-4C-007	Microvac		140795 S/cm2	Chrysotile
9094-M-4C-008	Microvac		252025 S/cm2	1 Amosite and 103 Chrysotile
9094-W-4C-001	Wipe	ND	< 2366.41 S/cm2	
9094-W-4C-002	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-4C-003	Wipe		49069.3 S/cm2	Chrysotile
9094-W-4C-004	Wipe		3165.76 S/cm2	Chrysotile

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4C-009	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-4C-010	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-4C-011	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-4C-009	Air		0.0038 S>0.5u/cc	Chrysotile
9094-A-4C-010	Air		0.0026 S>0.5u/cc	Chrysotile
9094-A-4C-011	Air		0.0026 S>0.5u/cc	Chrysotile
9094-A-4C-009	Air		0.0009 S>5u/cc	Chrysotile
9094-A-4C-010	Air	ND	< 0.0009 S>5u/cc	
9094-A-4C-011	Air	ND	< 0.0009 S>5u/cc	
9094-M-4C-023	Microvac		23347.5 S/cm2	Chrysotile
9094-M-4C-024	Microvac		23743.2 S/cm2	29 Chrysotile and 1 Actinolite
9094-M-4C-025	Microvac		126630 S/cm2	Chrysotile
9094-W-4C-018	Wipe	ND	< 2366.41 S/cm2	
9094-W-4C-019	Wipe	ND	< 2366.41 S/cm2	
9094-W-4C-020	Wipe		3165.76 S/cm2	Chrysotile

Unit 4C Results

9094-W-4C-021	Wipe	< 2366.41	S/cm2	Chrysotile
9094-W-4C-022	Wipe	< 2366.41	S/cm2	Chrysotile

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4C-002	Wipe		0.57 ng/m2	
9094-W-4C-003	Wipe		1.36 ng/m2	
9094-W-4C-004	Wipe		0.975 ng/m2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-W-4C-019	Wipe		0.507 ng/m2	
9094-W-4C-020	Wipe		0.606 ng/m2	
9094-W-4C-021	Wipe		0.511 ng/m2	
9094-W-4C-022	Wipe		0.512 ng/m2	

Gypsum

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4C-014	Air	ND	< 0.016 mg/m3	
9094-A-4C-015	Air	ND	< 0.016 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-4C-005	Microvac		76.1 ug/ft2	
9094-M-4C-006	Microvac		83.7 ug/ft2	
9094-M-4C-007	Microvac		69.8 ug/ft2	
9094-M-4C-008	Microvac		70.8 ug/ft2	
9094-W-4C-002	Wipe	ND	< 4.65 ug/ft2	
9094-W-4C-003	Wipe		181 ug/ft2	
9094-W-4C-004	Wipe		77.5 ug/ft2	

Unit 4C Results

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4C-012	Air		0.131 ug/m3	
9094-A-4C-013	Air		0.195 ug/m3	
9094-M-4C-023	Microvac	ND	< 2.32 ug/ft2	
9094-M-4C-024	Microvac	ND	< 2.32 ug/ft2	
9094-M-4C-025	Microvac	ND	< 2.32 ug/ft2	
9094-W-4C-019	Wipe		ug/ft2	Sample was not received at the laboratory.
9094-W-4C-020	Wipe		14.9 ug/ft2	Field blank contamination (Validation = R).
9094-W-4C-021	Wipe		8.28 ug/ft2	Field blank contamination (Validation = R).
9094-W-4C-022	Wipe		7.81 ug/ft2	Field blank contamination (Validation = R).

Post 2nd cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4C-026	Air		0.374 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4C-014	Air	ND	< 0.004 mg/m3	
9094-A-4C-015	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4C-014	Air	ND	< 0.016 mg/m3	
9094-A-4C-015	Air	ND	< 0.016 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4C-014	Air	ND	< 0.016 mg/m3	
9094-A-4C-015	Air	ND	< 0.016 mg/m3	

Unit 4C Results

Mineral: Tridymite

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4C-014	Air	ND	< 0.016 mg/m3	
9094-A-4C-015	Air	ND	< 0.016 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4C-002	Wipe		57.23 S/cm2	
9094-W-4C-003	Wipe		1030.17 S/cm2	
9094-W-4C-004	Wipe		343.39 S/cm2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4C-009	Air		6.316 S/L	
9094-A-4C-010	Air		4.119 S/L	
9094-A-4C-011	Air		2.549 S/L	
9094-W-4C-018	Wipe		57.23 S/cm2	
9094-W-4C-019	Wipe		228.93 S/cm2	
9094-W-4C-020	Wipe		343.39 S/cm2	
9094-W-4C-021	Wipe		114.46 S/cm2	
9094-W-4C-022	Wipe		228.93 S/cm2	

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4C-002	Wipe	U	290 ug/m2	
9094-W-4C-003	Wipe		290 ug/m2	
9094-W-4C-004	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 1A

Sample ID	Matrix	Detected	Result	Comment
-----------	--------	----------	--------	---------

Unit 4C Results

9094-A-4C-016	Air	U	0.174	µg/m3
9094-A-4C-017	Air	U	0.16	µg/m3
9094-W-4C-019	Wipe	U	290	ug/m2
9094-W-4C-020	Wipe	U	290	ug/m2
9094-W-4C-021	Wipe	U	290	ug/m2
9094-W-4C-022	Wipe	U	290	ug/m2

Unit 4D Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-4D-006	Microvac		241883 S/cm2	Chrysotile
9094-M-4D-007	Microvac		101779 S/cm2	Chrysotile
9094-M-4D-008	Microvac		91601.3 S/cm2	Chrysotile
9094-M-4D-009	Microvac		79727 S/cm2	Chrysotile
9094-M-4D-010	Microvac		68700.8 S/cm2	Chrysotile
9094-M-4D-011	Microvac		39580.8 S/cm2	Chrysotile
9094-W-4D-001	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-4D-002	Wipe	ND	< 2366.41 S/cm2	
9094-W-4D-003	Wipe		34031.9 S/cm2	Chrysotile
9094-W-4D-004	Wipe		2374.32 S/cm2	Chrysotile
9094-W-4D-005	Wipe		3165.76 S/cm2	Chrysotile

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4D-012	Air		0.004 f/cc	
9094-A-4D-013	Air		0.02 f/cc	
9094-A-4D-014	Air		0.004 f/cc	
9094-A-4D-012	Air		0.0009 S>0.5u/cc	Chrysotile
9094-A-4D-013	Air		0.0055 S>0.5u/cc	Chrysotile
9094-A-4D-014	Air		0.0009 S>0.5u/cc	Chrysotile
9094-A-4D-012	Air	ND	< 0.0009 S>5u/cc	
9094-A-4D-013	Air		0.0009 S>5u/cc	Chrysotile
9094-A-4D-014	Air	ND	< 0.0009 S>5u/cc	
9094-M-4D-024	Microvac		29679 S/cm2	Chrysotile
9094-M-4D-025	Microvac		44518.5 S/cm2	Chrysotile
9094-M-4D-026	Microvac		24732.5 S/cm2	Chrysotile

Unit 4D Results

9094-M-4D-027	Microvac	37593.4	S/cm2	Chrysotile
9094-M-4D-028	Microvac	45507.8	S/cm2	Chrysotile
9094-M-4D-029	Microvac	25721.8	S/cm2	Chrysotile
9094-W-4D-019	Wipe	2374.32	S/cm2	Chrysotile
9094-W-4D-020	Wipe	< 2366.41	S/cm2	Chrysotile
9094-W-4D-021	Wipe	26117.5	S/cm2	Chrysotile
9094-W-4D-022	Wipe	43529.2	S/cm2	Chrysotile
9094-W-4D-023	Wipe	18994.6	S/cm2	Chrysotile

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4D-002	Wipe		0.878 ng/m2	
9094-W-4D-003	Wipe		2.51 ng/m2	
9094-W-4D-004	Wipe		0.728 ng/m2	
9094-W-4D-005	Wipe		0.692 ng/m2	

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-W-4D-020	Wipe		0.571 ng/m2	
9094-W-4D-021	Wipe		0.694 ng/m2	
9094-W-4D-022	Wipe		0.522 ng/m2	
9094-W-4D-023	Wipe		0.557 ng/m2	

Gypsum

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4D-017	Air	ND	< 0.016 mg/m3	
9094-A-4D-018	Air	ND	< 0.016 mg/m3	

Unit 4D Results

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-4D-006	Microvac		83.5 ug/ft2	
9094-M-4D-007	Microvac		66 ug/ft2	
9094-M-4D-008	Microvac		26.2 ug/ft2	
9094-M-4D-009	Microvac		39.9 ug/ft2	
9094-M-4D-010	Microvac		78.2 ug/ft2	
9094-M-4D-011	Microvac		72.1 ug/ft2	
9094-W-4D-002	Wipe	ND	< 4.65 ug/ft2	
9094-W-4D-003	Wipe		169 ug/ft2	
9094-W-4D-004	Wipe		17.4 ug/ft2	
9094-W-4D-005	Wipe		17.1 ug/ft2	

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4D-015	Air		0.146 ug/m3	Lab blank contamination (Validation = R).
9094-A-4D-016	Air		0.137 ug/m3	Lab blank contamination (Validation = R).
9094-M-4D-024	Microvac		2.4 ug/ft2	
9094-M-4D-025	Microvac	ND	< 2.32 ug/ft2	
9094-M-4D-026	Microvac	ND	< 2.32 ug/ft2	
9094-M-4D-027	Microvac	ND	< 2.32 ug/ft2	
9094-M-4D-028	Microvac	ND	< 2.32 ug/ft2	
9094-M-4D-029	Microvac	ND	< 2.32 ug/ft2	
9094-W-4D-020	Wipe		20.4 ug/ft2	Lab blank contamination (Validation = R).
9094-W-4D-021	Wipe		66 ug/ft2	Lab blank contamination (Validation = R).
9094-W-4D-022	Wipe		10.6 ug/ft2	Lab blank contamination (Validation = R).
9094-W-4D-023	Wipe		15.6 ug/ft2	Lab blank contamination (Validation = R).

Post 2nd cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4D-030	Air		0.055 ug/m3	
9094-W-4D-031	Wipe	ND	< 4.65 ug/ft2	

Unit 4D Results

Mineral: alpha-Quartz

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4D-017	Air	ND	< 0.004 mg/m3	
9094-A-4D-018	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4D-017	Air	ND	< 0.016 mg/m3	
9094-A-4D-018	Air	ND	< 0.016 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4D-017	Air	ND	< 0.016 mg/m3	
9094-A-4D-018	Air	ND	< 0.016 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4D-017	Air	ND	< 0.016 mg/m3	
9094-A-4D-018	Air	ND	< 0.016 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4D-002	Wipe		400.62 S/cm2	
9094-W-4D-003	Wipe		2174.79 S/cm2	
9094-W-4D-004	Wipe		286.16 S/cm2	
9094-W-4D-005	Wipe		457.85 S/cm2	

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4D-012	Air		1.398 S/L	
9094-A-4D-013	Air		9.553 S/L	
9094-A-4D-014	Air		2.124 S/L	
9094-W-4D-019	Wipe		57.23 S/cm2	
9094-W-4D-020	Wipe		171.69 S/cm2	

Unit 4D Results

9094-W-4D-021	Wipe	572.31	S/cm2
9094-W-4D-022	Wipe	228.93	S/cm2
9094-W-4D-023	Wipe	228.93	S/cm2

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-4D-002	Wipe	U	290 ug/m2	
9094-W-4D-003	Wipe		325.8 ug/m2	
9094-W-4D-004	Wipe	U	290 ug/m2	
9094-W-4D-005	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 2A

Sample ID	Matrix	Detected	Result	Comment
9094-W-4D-020	Wipe	U	290 ug/m2	
9094-W-4D-021	Wipe	U	290 ug/m2	
9094-W-4D-022	Wipe	U	290 ug/m2	
9094-W-4D-023	Wipe	U	290 ug/m2	

Unit 4th Floor Hallway Results

Asbestos

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4TH-001	Air		0.003 f/cc	
9094-A-4TH-001	Air	ND	< 0.0009 S>0.5u/cc	
9094-A-4TH-001	Air	ND	< 0.0009 S>5u/cc	

Gypsum

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4TH-003	Air	ND	< 0.008 mg/m3	

Lead

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4TH-002	Air		0.184 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4TH-003	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4TH-003	Air	ND	< 0.016 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4TH-003	Air	ND	< 0.016 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4TH-003	Air	ND	< 0.016 mg/m3	

Unit 4th Floor Hallway Results

MMVF

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-4TH-001	Air		0.735 S/L	

Unit 5A Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-5A-005	Microvac		319742 S/cm2	Chrysotile
9094-M-5A-006	Microvac		139821 S/cm2	Chrysotile
9094-M-5A-007	Microvac		5935.8 S/cm2	Chrysotile
9094-M-5A-008	Microvac	ND	< 3165.76 S/cm2	
9094-M-5A-009	Microvac		64106.6 S/cm2	Chrysotile
9094-M-5A-010	Microvac		33240.5 S/cm2	Chrysotile
9094-M-5A-011	Microvac		34625.5 S/cm2	Chrysotile
9094-W-5A-001	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-5A-002	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-5A-003	Wipe		233475 S/cm2	Chrysotile
9094-W-5A-004	Wipe		22951.8 S/cm2	Chrysotile

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-012	Air		0.009 f/cc	
9094-A-5A-013	Air		0.005 f/cc	
9094-A-5A-014	Air		0.004 f/cc	
9094-A-5A-012	Air		0.0009 S>5u/cc	
9094-A-5A-013	Air	ND	< 0.0009 S>5u/cc	
9094-A-5A-014	Air	ND	< 0.0007 S>5u/cc	
9094-M-5A-024	Microvac		30866.2 S/cm2	Chrysotile
9094-M-5A-025	Microvac		41154.9 S/cm2	Chrysotile
9094-M-5A-026	Microvac		40363.4 S/cm2	Chrysotile
9094-M-5A-027	Microvac	ND	< 3165.76 S/cm2	Chrysotile
9094-M-5A-028	Microvac		3561.48 S/cm2	Chrysotile
9094-M-5A-029	Microvac		7914.4 S/cm2	Chrysotile

Unit 5A Results

9094-M-5A-030	Microvac		75186.8	S/cm2	Chrysotile
9094-W-5A-019	Wipe	ND	< 2366.41	S/cm2	
9094-W-5A-020	Wipe	ND	< 2366.41	S/cm2	
9094-W-5A-021	Wipe	ND	< 2366.41	S/cm2	Chrysotile
9094-W-5A-022	Wipe	ND	< 2366.41	S/cm2	
9094-W-5A-023	Wipe	ND	< 2366.41	S/cm2	

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-5A-002	Wipe		0.528 ng/m2	
9094-W-5A-003	Wipe		0.565 ng/m2	
9094-W-5A-004	Wipe		0.747 ng/m2	

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-W-5A-020	Wipe		0.587 ng/m2	
9094-W-5A-021	Wipe		0.604 ng/m2	
9094-W-5A-022	Wipe		0.57 ng/m2	
9094-W-5A-023	Wipe		0.569 ng/m2	

Gypsum

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-017	Air	ND	< 0.028 mg/m3	
9094-A-5A-018	Air	ND	< 0.016 mg/m3	

Post 2nd cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-034	Air	ND	< 0.009 mg/m3	
9094-A-5A-035	Air	ND	< 0.009 mg/m3	

Unit 5A Results

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-5A-005	Microvac	ND	< 2.23 ug/ft2	
9094-M-5A-006	Microvac	ND	< 2.23 ug/ft2	
9094-M-5A-007	Microvac	ND	< 2.23 ug/ft2	
9094-M-5A-008	Microvac	ND	< 2.23 ug/ft2	
9094-M-5A-009	Microvac	ND	< 2.23 ug/ft2	
9094-M-5A-010	Microvac		3.46 ug/ft2	
9094-M-5A-011	Microvac	ND	< 2.23 ug/ft2	
9094-W-5A-002	Wipe		4.79 ug/ft2	
9094-W-5A-003	Wipe		191 ug/ft2	
9094-W-5A-004	Wipe		2000 ug/ft2	

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-015	Air		0.083 ug/m3	
9094-A-5A-016	Air		0.07 ug/m3	
9094-M-5A-024	Microvac		2.6 ug/ft2	Sample was analyzed by graphite furnace AA.
9094-M-5A-025	Microvac		4.15 ug/ft2	Sample was analyzed by graphite furnace AA.
9094-M-5A-026	Microvac		2.6 ug/ft2	Sample was analyzed by graphite furnace AA.
9094-M-5A-027	Microvac		0.78 ug/ft2	Sample was analyzed by graphite furnace AA.
9094-M-5A-028	Microvac		0.975 ug/ft2	Sample was analyzed by graphite furnace AA.
9094-M-5A-029	Microvac		1.02 ug/ft2	Sample was analyzed by graphite furnace AA.
9094-M-5A-030	Microvac		5.27 ug/ft2	Sample was analyzed by graphite furnace AA.
9094-W-5A-020	Wipe	ND	< 4.65 ug/ft2	
9094-W-5A-021	Wipe		43.5 ug/ft2	
9094-W-5A-022	Wipe		10.5 ug/ft2	
9094-W-5A-023	Wipe		39.7 ug/ft2	

Unit 5A Results

Post 2nd cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-W-5A-031	Wipe		8.55 ug/ft2	Estimated concentration (J).
9094-W-5A-032	Wipe	ND	< 4.65 ug/ft2	
9094-W-5A-033	Wipe	ND	< 4.65 ug/ft2	

Mineral: alpha-Quartz

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-017	Air	ND	< 0.007 mg/m3	
9094-A-5A-018	Air	ND	< 0.004 mg/m3	

Post 2nd cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-034	Air	ND	< 0.004 mg/m3	
9094-A-5A-035	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-017	Air	ND	< 0.028 mg/m3	
9094-A-5A-018	Air	ND	< 0.016 mg/m3	

Post 2nd cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-034	Air	ND	< 0.017 mg/m3	
9094-A-5A-035	Air	ND	< 0.017 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-017	Air	ND	< 0.028 mg/m3	
9094-A-5A-018	Air	ND	< 0.016 mg/m3	

Post 2nd cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-034	Air	ND	< 0.017 mg/m3	
9094-A-5A-035	Air	ND	< 0.017 mg/m3	

Unit 5A Results

Mineral: Tridymite

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-017	Air	ND	< 0.028 mg/m3	
9094-A-5A-018	Air	ND	< 0.016 mg/m3	

Post 2nd cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-034	Air	ND	< 0.017 mg/m3	
9094-A-5A-035	Air	ND	< 0.017 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-5A-002	Wipe		297.6 S/cm2	
9094-W-5A-003	Wipe		1308.15 S/cm2	
9094-W-5A-004	Wipe		792.45 S/cm2	

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5A-012	Air		1.499 S/L	
9094-A-5A-013	Air		2.603 S/L	
9094-A-5A-014	Air		0.651 S/L	
9094-W-5A-019	Wipe		286.16 S/cm2	
9094-W-5A-020	Wipe		57.23 S/cm2	
9094-W-5A-021	Wipe		114.46 S/cm2	
9094-W-5A-022	Wipe		57.23 S/cm2	
9094-W-5A-023	Wipe		114.46 S/cm2	

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-5A-002	Wipe	U	290 ug/m2	
9094-W-5A-003	Wipe	U	290 ug/m2	
9094-W-5A-004	Wipe	U	290 ug/m2	

Unit 5A Results

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-W-5A-020	Wipe	U	290 ug/m2	
9094-W-5A-021	Wipe	U	290 ug/m2	
9094-W-5A-022	Wipe	U	290 ug/m2	
9094-W-5A-023	Wipe	U	290 ug/m2	

Unit 5C Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-5C-005	Microvac		132284 S/cm2	Chrysotile
9094-M-5C-006	Microvac		136128 S/cm2	Chrysotile
9094-M-5C-007	Microvac		117133 S/cm2	Chrysotile
9094-W-5C-001	Wipe		9497.28 S/cm2	Chrysotile
9094-W-5C-002	Wipe		3165.76 S/cm2	Chrysotile
9094-W-5C-003	Wipe		97347.1 S/cm2	Chrysotile
9094-W-5C-004	Wipe		30074.7 S/cm2	Chrysotile

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-009	Air		0.004 f/cc	
9094-A-5C-010	Air		0.015 f/cc	
9094-A-5C-011	Air		0.005 f/cc	
9094-A-5C-009	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-010	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-011	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-M-5C-021	Microvac	ND	< 1582.88 S/cm2	Chrysotile
9094-M-5C-022	Microvac		174117 S/cm2	Chrysotile
9094-M-5C-023	Microvac		74395.4 S/cm2	Chrysotile
9094-W-5C-016	Wipe		2374.32 S/cm2	Chrysotile
9094-W-5C-017	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-5C-018	Wipe	ND	< 2366.41 S/cm2	
9094-W-5C-019	Wipe		3165.76 S/cm2	Chrysotile
9094-W-5C-020	Wipe		3165.76 S/cm2	Chrysotile

Post 2nd cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-024	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-5C-025	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-5C-026	Air		f/cc	Not analyzed due to overloading of particulates.

Unit 5C Results

9094-A-5C-027	Air	f/cc	Not analyzed due to overloading of particulates.
9094-A-5C-028	Air	f/cc	Not analyzed due to overloading of particulates.
9094-A-5C-024	Air	S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-025	Air	S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-026	Air	S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-027	Air	S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-028	Air	S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-024	Air	S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-025	Air	S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-026	Air	S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-027	Air	S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-5C-028	Air	S>5u/cc	Not analyzed due to overloading of particulates.

Post 3rd cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-031	Air		0.001 f/cc	
9094-A-5C-032	Air	ND	< 0.001 f/cc	
9094-A-5C-033	Air		0.001 f/cc	
9094-A-5C-034	Air		0.003 f/cc	
9094-A-5C-031	Air		0.0026 S>0.5u/cc	Chrysotile
9094-A-5C-032	Air		0.0004 S>0.5u/cc	Chrysotile
9094-A-5C-033	Air		0.0026 S>0.5u/cc	Chrysotile
9094-A-5C-034	Air		0.0021 S>0.5u/cc	Chrysotile
9094-A-5C-031	Air		0.0004 S>5u/cc	Chrysotile
9094-A-5C-032	Air	ND	< 0.0004 S>5u/cc	
9094-A-5C-033	Air		0.0016 S>5u/cc	Chrysotile
9094-A-5C-034	Air		0.0015 S>5u/cc	Chrysotile

Unit 5C Results

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-5C-002	Wipe		0.79 ng/m2	
9094-W-5C-003	Wipe		2.55 ng/m2	
9094-W-5C-004	Wipe		0.575 ng/m2	

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-W-5C-017	Wipe		0.794 ng/m2	
9094-W-5C-018	Wipe		0.494 ng/m2	
9094-W-5C-019	Wipe		0.567 ng/m2	
9094-W-5C-020	Wipe		0.556 ng/m2	

Gypsum

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-014	Air	ND	< 0.016 mg/m3	
9094-A-5C-015	Air	ND	< 0.016 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-5C-005	Microvac		104 ug/ft2	
9094-M-5C-006	Microvac		293 ug/ft2	
9094-M-5C-007	Microvac		133 ug/ft2	
9094-W-5C-002	Wipe		6.95 ug/ft2	
9094-W-5C-003	Wipe		336 ug/ft2	
9094-W-5C-004	Wipe		43.6 ug/ft2	

Unit 5C Results

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-012	Air		0.095 ug/m3	
9094-A-5C-013	Air		0.101 ug/m3	
9094-M-5C-021	Microvac	ND	< 2.32 ug/ft2	
9094-M-5C-022	Microvac	ND	< 2.32 ug/ft2	
9094-M-5C-023	Microvac	ND	< 2.32 ug/ft2	
9094-W-5C-017	Wipe		ug/m2	Sample was received broken; not analyzed.
9094-W-5C-018	Wipe		10.3 ug/ft2	
9094-W-5C-019	Wipe		7.69 ug/ft2	
9094-W-5C-020	Wipe		6.86 ug/ft2	

Post 2nd cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-029	Air		0.674 ug/m3	
9094-A-5C-030	Air		0.757 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-014	Air	ND	< 0.004 mg/m3	
9094-A-5C-015	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-014	Air	ND	< 0.016 mg/m3	
9094-A-5C-015	Air	ND	< 0.016 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-014	Air	ND	< 0.016 mg/m3	
9094-A-5C-015	Air	ND	< 0.016 mg/m3	

Unit 5C Results

Mineral: Tridymite

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-014	Air		0.027 mg/m3	
9094-A-5C-015	Air	ND	< 0.016 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-5C-002	Wipe		457.85 S/cm2	
9094-W-5C-003	Wipe		457.85 S/cm2	
9094-W-5C-004	Wipe		1144.63 S/cm2	

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-009	Air		13.399 S/L	
9094-A-5C-010	Air		19.25 S/L	
9094-A-5C-011	Air		8.129 S/L	
9094-W-5C-016	Wipe		1774.17 S/cm2	
9094-W-5C-017	Wipe		744.01 S/cm2	
9094-W-5C-018	Wipe		4211.37 S/cm2	
9094-W-5C-019	Wipe		2758.14 S/cm2	
9094-W-5C-020	Wipe		1316.32 S/cm2	

Post 2nd cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-024	Air		2.266 S/L	
9094-A-5C-025	Air		16.598 S/L	
9094-A-5C-026	Air		12.621 S/L	
9094-A-5C-027	Air		1.614 S/L	
9094-A-5C-028	Air		0.829 S/L	

Post 3rd cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5C-031	Air	ND	< 0.066 S/L	
9094-A-5C-032	Air	ND	< 0.064 S/L	

Unit 5C Results

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-5C-002	Wipe	U	290 ug/m2	
9094-W-5C-003	Wipe		303.5 ug/m2	
9094-W-5C-004	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 3A

Sample ID	Matrix	Detected	Result	Comment
9094-W-5C-017	Wipe	U	290 ug/m2	
9094-W-5C-018	Wipe	U	290 ug/m2	
9094-W-5C-019	Wipe	U	290 ug/m2	
9094-W-5C-020	Wipe	U	290 ug/m2	

Unit 5D Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-5D-006	Microvac		83892.6 S/cm2	Chrysotile
9094-M-5D-007	Microvac		470907 S/cm2	Chrysotile
9094-W-5D-001	Wipe	ND	< 2366.41 S/cm2	Amosite
9094-W-5D-002	Wipe	ND	< 2366.41 S/cm2	
9094-W-5D-003	Wipe	ND	< 2366.41 S/cm2	Chrysotile
9094-W-5D-004	Wipe		4748.64 S/cm2	Chrysotile
9094-W-5D-005	Wipe		36406.2 S/cm2	Chrysotile

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5D-008	Air		0.004 f/cc	
9094-A-5D-009	Air		0.002 f/cc	
9094-A-5D-010	Air		0.004 f/cc	
9094-A-5D-008	Air	ND	< 0.0006 S>5u/cc	
9094-A-5D-009	Air	ND	< 0.0007 S>5u/cc	
9094-A-5D-010	Air	ND	< 0.0007 S>5u/cc	
9094-M-5D-020	Microvac		284918 S/cm2	Chrysotile
9094-M-5D-021	Microvac		12267.3 S/cm2	Chrysotile
9094-W-5D-015	Wipe	ND	< 5916.01 S/cm2	
9094-W-5D-016	Wipe	ND	< 5916.01 S/cm2	
9094-W-5D-017	Wipe	ND	< 5916.01 S/cm2	
9094-W-5D-018	Wipe	ND	< 5916.01 S/cm2	
9094-W-5D-019	Wipe	ND	< 5916.01 S/cm2	

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-5D-002	Wipe		0.668 ng/m2	
9094-W-5D-003	Wipe		0.56 ng/m2	
9094-W-5D-004	Wipe		0.562 ng/m2	
9094-W-5D-005	Wipe		0.609 ng/m2	

Unit 5D Results

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-W-5D-016	Wipe		0.498 ng/m2	
9094-W-5D-017	Wipe		0.608 ng/m2	
9094-W-5D-018	Wipe		0.55 ng/m2	
9094-W-5D-019	Wipe		0.631 ng/m2	

Gypsum

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5D-013	Air	ND	< 0.016 mg/m3	
9094-A-5D-014	Air	ND	< 0.016 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-5D-006	Microvac		27.1 ug/ft2	
9094-M-5D-007	Microvac		49.1 ug/ft2	
9094-W-5D-002	Wipe		7.35 ug/ft2	
9094-W-5D-003	Wipe		4.68 ug/ft2	
9094-W-5D-004	Wipe		25.3 ug/ft2	
9094-W-5D-005	Wipe		32.1 ug/ft2	

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5D-011	Air		0.079 ug/m3	
9094-A-5D-012	Air		0.08 ug/m3	
9094-M-5D-020	Microvac	ND	< 2.32 ug/ft2	
9094-M-5D-021	Microvac	ND	< 2.32 ug/ft2	
9094-W-5D-016	Wipe	ND	< 4.65 ug/ft2	
9094-W-5D-017	Wipe		12.8 ug/ft2	
9094-W-5D-018	Wipe	ND	< 4.65 ug/ft2	
9094-W-5D-019	Wipe	ND	< 4.65 ug/ft2	

Unit 5D Results

Mineral: alpha-Quartz

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5D-013	Air	ND	< 0.004 mg/m3	
9094-A-5D-014	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5D-013	Air	ND	< 0.016 mg/m3	
9094-A-5D-014	Air	ND	< 0.016 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5D-013	Air	ND	< 0.016 mg/m3	
9094-A-5D-014	Air	ND	< 0.016 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5D-013	Air	ND	< 0.016 mg/m3	
9094-A-5D-014	Air	ND	< 0.016 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-5D-002	Wipe		251.82 S/cm2	
9094-W-5D-003	Wipe		206.03 S/cm2	
9094-W-5D-004	Wipe		712.21 S/cm2	
9094-W-5D-005	Wipe		595.21 S/cm2	

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-A-5D-008	Air		9.814 S/L	
9094-A-5D-009	Air		7.358 S/L	
9094-A-5D-010	Air		8.424 S/L	
9094-W-5D-015	Wipe		171.69 S/cm2	
9094-W-5D-016	Wipe		228.93 S/cm2	

Unit 5D Results

9094-W-5D-017	Wipe	171.69	S/cm2
9094-W-5D-018	Wipe	114.46	S/cm2
9094-W-5D-019	Wipe	228.93	S/cm2

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-5D-002	Wipe	U	290 ug/m2	
9094-W-5D-003	Wipe	U	290 ug/m2	
9094-W-5D-004	Wipe	U	290 ug/m2	
9094-W-5D-005	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 3B

Sample ID	Matrix	Detected	Result	Comment
9094-W-5D-016	Wipe	U	290 ug/m2	
9094-W-5D-017	Wipe	U	290 ug/m2	
9094-W-5D-018	Wipe	U	290 ug/m2	
9094-W-5D-019	Wipe	U	290 ug/m2	

5th Floor Hallway Results

Asbestos

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5TH-001	Air		0.004 f/cc	
9094-A-5TH-002	Air		0.004 f/cc	
9094-A-5TH-001	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-5TH-002	Air		S>5u/cc	Not analyzed due to overloading of particulates.

Post 2nd cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5TH-005	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-5TH-006	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-5TH-005	Air	ND	< 0.0009 S>0.5u/cc	
9094-A-5TH-006	Air	ND	< 0.0009 S>0.5u/cc	
9094-A-5TH-005	Air	ND	< 0.0009 S>5u/cc	
9094-A-5TH-006	Air	ND	< 0.0009 S>5u/cc	

Gypsum

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5TH-004	Air	ND	< 0.016 mg/m3	

Lead

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5TH-003	Air		0.189 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5TH-004	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5TH-004	Air	ND	< 0.016 mg/m3	

Unit 5th Floor Hallway Results

Mineral: Cristobalite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5TH-004	Air	ND	< 0.016 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5TH-004	Air	ND	< 0.016 mg/m3	

MMVF

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-5TH-001	Air		0.617 S/L	
9094-A-5TH-002	Air		0.562 S/L	

Barber Shop Results

Asbestos

Post 1st cleaning - Test 4A, 4E

Sample ID	Matrix	Detected	Result	Comment
9094-A-BS-005	Air	ND	< 0.001 f/cc	
9094-A-BS-006	Air	ND	< 0.001 f/cc	
9094-A-BS-007	Air	ND	< 0.001 f/cc	
9094-A-BS-005	Air	ND	< 0.0004 S>0.5u/cc	
9094-A-BS-006	Air	ND	< 0.0004 S>0.5u/cc	
9094-A-BS-007	Air	ND	< 0.0004 S>0.5u/cc	
9094-A-BS-005	Air	ND	< 0.0004 S>5u/cc	
9094-A-BS-006	Air	ND	< 0.0004 S>5u/cc	
9094-A-BS-007	Air	ND	< 0.0004 S>5u/cc	

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-BS-001	Wipe		0.661 NG/M2	
9094-W-BS-002	Wipe		0.692 NG/M2	
9094-W-BS-003	Wipe		0.636 NG/M2	
9094-W-BS-004	Wipe		0.767 NG/M2	

Post 1st cleaning - Test 4A, 4E

Sample ID	Matrix	Detected	Result	Comment
9094-W-BS-010	Wipe		0.503 NG/M2	
9094-W-BS-011	Wipe		0.526 NG/M2	
9094-W-BS-012	Wipe		0.5 NG/M2	
9094-W-BS-013	Wipe		0.577 NG/M2	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-BS-001	Wipe	ND	< 4.64 ug/ft2	
9094-W-BS-002	Wipe		12.1 ug/ft2	Field blank contamination (Validation = R).
9094-W-BS-003	Wipe		25.9 ug/ft2	Field blank contamination (Validation = R).
9094-W-BS-004	Wipe		42.9 ug/ft2	

Barber Shop Results

Post 1st cleaning - Test 4A, 4E

Sample ID	Matrix	Detected	Result	Comment
9094-A-BS-008	Air	ND	< 0.051 ug/m3	
9094-A-BS-009	Air	ND	< 0.052 ug/m3	
9094-W-BS-010	Wipe	ND	< 4.65 ug/ft2	
9094-W-BS-011	Wipe	ND	< 4.65 ug/ft2	
9094-W-BS-012	Wipe	ND	< 4.65 ug/ft2	
9094-W-BS-013	Wipe	ND	< 4.65 ug/ft2	

MMVF

Post 1st cleaning - Test 4A, 4E

Sample ID	Matrix	Detected	Result	Comment
9094-A-BS-005	Air	ND	< 0.067 S/L	
9094-A-BS-006	Air		0.302 S/L	
9094-A-BS-007	Air		0.078 S/L	

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-W-BS-001	Wipe	U	290 ug/m2	
9094-W-BS-002	Wipe	U	290 ug/m2	
9094-W-BS-003	Wipe	U	290 ug/m2	
9094-W-BS-004	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 4A, 4E

Sample ID	Matrix	Detected	Result	Comment
9094-W-BS-010	Wipe	U	290 ug/m2	
9094-W-BS-011	Wipe	U	290 ug/m2	
9094-W-BS-012	Wipe	U	290 ug/m2	
9094-W-BS-013	Wipe		290 ug/m2	

Cedar Street Staircase Results

Asbestos

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CS3-001	Air		0.003 f/cc	
9094-A-CS5-001	Air		0.001 f/cc	
9094-A-CS3-001	Air		0.001 S>0.5u/cc	Chrysotile
9094-A-CS5-001	Air		0.0015 S>0.5u/cc	Chrysotile
9094-A-CS3-001	Air	ND	< 0.0005 S>5u/cc	
9094-A-CS5-001	Air		0.0005 S>5u/cc	Chrysotile

Gypsum

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CS3-003	Air	ND	< 0.009 mg/m3	
9094-A-CS5-003	Air	ND	< 0.009 mg/m3	

Lead

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CS3-002	Air	ND	< 0.052 ug/m3	
9094-A-CS5-002	Air	ND	< 0.051 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CS3-003	Air	ND	< 0.004 mg/m3	
9094-A-CS5-003	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CS3-003	Air	ND	< 0.017 mg/m3	
9094-A-CS5-003	Air	ND	< 0.017 mg/m3	

Cedar Street Staircase Results

Mineral: Cristobalite

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CS3-003	Air	ND	< 0.017 mg/m3	
9094-A-CS5-003	Air	ND	< 0.017 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CS3-003	Air	ND	< 0.017 mg/m3	
9094-A-CS5-003	Air	ND	< 0.017 mg/m3	

MMVF

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CS3-001	Air	ND	< 0.069 S/L	
9094-A-CS5-001	Air		0.068 S/L	

Chiropractor's Office Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-010	Air		0.016 f/cc	
9094-A-CHR-011	Air		0.006 f/cc	
9094-A-CHR-010	Air	ND	< 0.0009 S>5u/cc	
9094-A-CHR-011	Air	ND	< 0.0009 S>5u/cc	
9094-M-CHR-006	Microvac		601494 S/cm2	Chrysotile
9094-M-CHR-007	Microvac		166202 S/cm2	Chrysotile
9094-M-CHR-008	Microvac		1709500 S/cm2	Chrysotile
9094-M-CHR-009	Microvac		10967100 S/cm2	Chrysotile
9094-W-CHR-001	Wipe		17411.7 S/cm2	Chrysotile
9094-W-CHR-002	Wipe		145625 S/cm2	Chrysotile/Amosite.
9094-W-CHR-003	Wipe		18203.1 S/cm2	Chrysotile
9094-W-CHR-004	Wipe		84684.1 S/cm2	Chrysotile/Amosite.
9094-W-CHR-005	Wipe		51443.6 S/cm2	Chrysotile

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-014	Air		f/cc	Not analyzed, uneven distribution of material on the
9094-A-CHR-015	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-016	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-014	Air		S>0.5u/cc	Not analyzed, uneven distribution of material on the
9094-A-CHR-015	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-016	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-014	Air		S>5u/cc	Not analyzed, uneven distribution of material on the
9094-A-CHR-015	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-016	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-M-CHR-026	Microvac		4748.64 S/cm2	Chrysotile
9094-M-CHR-027	Microvac		164619.52 S/cm2	Chrysotile
9094-M-CHR-028	Microvac		22753.9 S/cm2	22 Chrysotile and 1 Anthophyllite

Chiropractor's Office Results

9094-M-CHR-029	Microvac		23743.2	S/cm2	Chrysotile
9094-W-CHR-021	Wipe		2967.9	S/cm2	Chrysotile
9094-W-CHR-022	Wipe		3957.2	S/cm2	Chrysotile
9094-W-CHR-023	Wipe		109219	S/cm2	Chrysotile
9094-W-CHR-024	Wipe		89432.7	S/cm2	1 Amosite and 112 Chrysotile
9094-W-CHR-025	Wipe	ND	< 739.502	S/cm2	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-030	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-031	Air		0.441 f/cc	
9094-A-CHR-032	Air		0.018 f/cc	
9094-A-CHR-030	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-031	Air		0.1767 S>0.5u/cc	Chrysotile
9094-A-CHR-032	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-030	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-031	Air		0.039 S>5u/cc	Chrysotile
9094-A-CHR-032	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-W-CHR-037	Wipe		< 6720.06 S/cm2	Chrysotile
9094-W-CHR-038	Wipe		12480.1 S/cm2	Chrysotile
9094-W-CHR-039	Wipe		115201 S/cm2	1 Amosite and 59 Chrysotile
9094-W-CHR-040	Wipe		15360.1 S/cm2	Chrysotile
9094-W-CHR-041	Wipe		< 5740.85 S/cm2	Chrysotile

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-042	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-043	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-044	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-045	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-046	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-042	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.

Chiropractor's Office Results

9094-A-CHR-043	Air		0.0075	S>0.5u/cc	
9094-A-CHR-044	Air			S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-045	Air		0.0007	S>0.5u/cc	
9094-A-CHR-046	Air			S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-042	Air			S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-043	Air		0.0033	S>5u/cc	
9094-A-CHR-044	Air			S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-CHR-045	Air	ND	< 0.0007	S>5u/cc	
9094-A-CHR-046	Air			S>5u/cc	Not analyzed due to overloading of particulates.
9094-M-CHR-051	Microvac		21504.2	S/cm2	Chrysotile
9094-M-CHR-052	Microvac		31488.3	S/cm2	Chrysotile
9094-M-CHR-053	Microvac		54144.5	S/cm2	Chrysotile
9094-M-CHR-054	Microvac		59520.6	S/cm2	Chrysotile

Post 1st cleaning - Test 4D

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-056	Air		0.001 f/cc	
9094-A-CHR-057	Air		0.001 f/cc	
9094-A-CHR-058	Air		0.003 f/cc	
9094-A-CHR-056	Air	ND	< 0.0004 S>0.5u/cc	
9094-A-CHR-057	Air	ND	< 0.0004 S>0.5u/cc	
9094-A-CHR-058	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-CHR-056	Air	ND	< 0.0004 S>5u/cc	
9094-A-CHR-057	Air	ND	< 0.0004 S>5u/cc	S>5u/cc

Chiropractor's Office Results

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-012	Air		0.000305 ng/m3	
9094-W-CHR-002	Wipe		1.03 ng/m2	
9094-W-CHR-003	Wipe		0.547 ng/m2	
9094-W-CHR-004	Wipe		0.788 ng/m2	
9094-W-CHR-005	Wipe		0.544 ng/m2	
9094-A-CHR-058	Air		ND < 0.0005	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-W-CHR-022	Wipe		1.01 ng/m2	
9094-W-CHR-023	Wipe		0.999 ng/m2	
9094-W-CHR-024	Wipe		1.2 ng/m2	
9094-W-CHR-025	Wipe		1.15 ng/m2	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-W-CHR-038	Wipe		0.933 ng/m2	
9094-W-CHR-039	Wipe		1.12 ng/m2	
9094-W-CHR-040	Wipe		0.982 ng/m2	
9094-W-CHR-041	Wipe		0.712 ng/m2	

Post 1st cleaning - Test 4E

Sample ID	Matrix	Detected	Result	Comment
9094-W-CHR-061	Wipe		0.598 NG/M2	
9094-W-CHR-062	Wipe		0.616 NG/M2	
9094-W-CHR-063	Wipe		0.645 NG/M2	

Pre-water wipe

Sample ID	Matrix	Detected	Result	Comment
9094-W-CHR-055	Wipe		0.708 NG/M2	

Gypsum

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-019	Air	ND	< 0.017 mg/m3	
9094-A-CHR-020	Air	ND	< 0.008 mg/m3	

Chiropractor's Office Results

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-035	Air		0.014 mg/m3	
9094-A-CHR-036	Air		0.011 mg/m3	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-049	Air		0.009 mg/m3	
9094-A-CHR-050	Air		0.012 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-CHR-006	Microvac		28.2 ug/ft2	
9094-M-CHR-007	Microvac		7.22 ug/ft2	Estimated concentration (J).
9094-M-CHR-008	Microvac		181 ug/ft2	Estimated concentration (J).
9094-M-CHR-009	Microvac		69.3 ug/ft2	Estimated concentration (J).
9094-W-CHR-002	Wipe		433 ug/ft2	
9094-W-CHR-003	Wipe		346 ug/ft2	
9094-W-CHR-004	Wipe		116 ug/ft2	
9094-W-CHR-005	Wipe		74.7 ug/ft2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-017	Air		0.617 ug/m3	
9094-A-CHR-018	Air		0.499 ug/m3	
9094-M-CHR-026	Microvac		9.66 ug/ft2	
9094-M-CHR-027	Microvac		3.67 ug/ft2	
9094-M-CHR-028	Microvac		5.25 ug/ft2	
9094-M-CHR-029	Microvac		9.23 ug/ft2	
9094-W-CHR-022	Wipe		11.2 ug/ft2	
9094-W-CHR-023	Wipe		146 ug/ft2	
9094-W-CHR-024	Wipe		64.5 ug/ft2	
9094-W-CHR-025	Wipe		5.97 ug/ft2	

Chiropractor's Office Results

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-033	Air		0.503 ug/m3	
9094-A-CHR-034	Air		0.486 ug/m3	
9094-W-CHR-038	Wipe		7.12 ug/ft2	
9094-W-CHR-039	Wipe		147 ug/ft2	
9094-W-CHR-040	Wipe		556 ug/ft2	
9094-W-CHR-041	Wipe		6.61 ug/ft2	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-047	Air		1.89 ug/m3	
9094-A-CHR-048	Air		2.56 ug/m3	
9094-M-CHR-051	Microvac		14.5 ug/ft2	
9094-M-CHR-052	Microvac		18.5 ug/ft2	
9094-M-CHR-053	Microvac		17.4 ug/ft2	
9094-M-CHR-054	Microvac		17.9 ug/ft2	

Post 1st cleaning - Test 4D

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-059	Air	ND	< 0.052 ug/m3	
9094-A-CHR-060	Air	ND	< 0.052 ug/m3	

Post 1st cleaning - Test 4E

Sample ID	Matrix	Detected	Result	Comment
9094-W-CHR-061	Wipe	ND	< 4.65 ug/ft2	
9094-W-CHR-062	Wipe		954 ug/ft2	
9094-W-CHR-063	Wipe	ND	< 4.65 ug/ft2	

Mineral: alpha-Quartz

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-019	Air	ND	< 0.008 mg/m3	
9094-A-CHR-020	Air	ND	< 0.004 mg/m3	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-035	Air	ND	< 0.004 mg/m3	
9094-A-CHR-036	Air	ND	< 0.004 mg/m3	

Chiropractor's Office Results

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-049	Air	ND	< 0.004 mg/m3	
9094-A-CHR-050	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-019	Air	ND	< 0.034 mg/m3	
9094-A-CHR-020	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-035	Air	ND	< 0.017 mg/m3	
9094-A-CHR-036	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-049	Air	ND	< 0.017 mg/m3	
9094-A-CHR-050	Air	ND	< 0.016 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-019	Air	ND	< 0.034 mg/m3	
9094-A-CHR-020	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-035	Air	ND	< 0.017 mg/m3	
9094-A-CHR-036	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-049	Air	ND	< 0.017 mg/m3	
9094-A-CHR-050	Air	ND	< 0.016 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-019	Air	ND	< 0.034 mg/m3	
9094-A-CHR-020	Air	ND	< 0.016 mg/m3	

Chiropractor's Office Results

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-035	Air	ND	< 0.017 mg/m3	
9094-A-CHR-036	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-049	Air	ND	< 0.017 mg/m3	
9094-A-CHR-050	Air	ND	< 0.016 mg/m3	

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-010	Air		4.579 S/L	
9094-A-CHR-011	Air		7.869 S/L	
9094-W-CHR-002	Wipe		53415.98 S/cm2	
9094-W-CHR-003	Wipe		30523.42 S/cm2	
9094-W-CHR-004	Wipe		18314.25 S/cm2	
9094-W-CHR-005	Wipe		744.01 S/cm2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-014	Air		0.522 S/L	
9094-A-CHR-015	Air		1.461 S/L	
9094-A-CHR-016	Air		1.843 S/L	
9094-W-CHR-021	Wipe		57.23 S/cm2	
9094-W-CHR-022	Wipe		57.23 S/cm2	
9094-W-CHR-023	Wipe		515.08 S/cm2	
9094-W-CHR-024	Wipe		457.85 S/cm2	
9094-W-CHR-025	Wipe	ND	< 57.23 S/cm2	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-030	Air		17.579 S/L	
9094-A-CHR-031	Air		60.606 S/L	
9094-A-CHR-032	Air		5.598 S/L	
9094-W-CHR-037	Wipe	ND	< 57.23 S/cm2	

Chiropractor's Office Results

9094-W-CHR-038	Wipe	57.23	S/cm2
9094-W-CHR-039	Wipe	228.93	S/cm2
9094-W-CHR-040	Wipe	68.86	S/cm2
9094-W-CHR-041	Wipe	171.69	S/cm2

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-042	Air		1.668 S/L	
9094-A-CHR-043	Air		0.35 S/L	
9094-A-CHR-044	Air		5.499 S/L	
9094-A-CHR-045	Air		0.126 S/L	
9094-A-CHR-046	Air		0.514 S/L	

Post 1st cleaning - Test 4D

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-056	Air		0.135 S/L	
9094-A-CHR-057	Air		0.539 S/L	
9094-A-CHR-058	Air		0.7 S/L	

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-CHR-012	Air		0.15 µg/m3	
9094-A-CHR-013	Air		0.16 µg/m3	
9094-W-CHR-002	Wipe		290 ug/m2	Estimated concentration (J).
9094-W-CHR-003	Wipe		290 ug/m2	Estimated concentration (J).
9094-W-CHR-004	Wipe	U	290 ug/m2	
9094-W-CHR-005	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-W-CHR-022	Wipe	U	290 ug/m2	
9094-W-CHR-023	Wipe	U	290 ug/m2	
9094-W-CHR-024	Wipe	U	290 ug/m2	
9094-W-CHR-025	Wipe	U	290 ug/m2	

Chiropractor's Office Results

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-W-CHR-038	Wipe	U	290 ug/m2	
9094-W-CHR-039	Wipe	U	290 ug/m2	
9094-W-CHR-040	Wipe	U	290 ug/m2	
9094-W-CHR-041	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 4E

Sample ID	Matrix	Detected	Result	Comment
9094-W-CHR-061	Wipe	U	290 ug/m2	
9094-W-CHR-062	Wipe	U	290 ug/m2	
9094-W-CHR-063	Wipe	U	290 ug/m2	

Pre-water wipe

Sample ID	Matrix	Detected	Result	Comment
9094-W-CHR-055	Wipe	U	290 ug/m2	

Elevator Shaft Results

Asbestos

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-ELV-001	Air		0.001 f/cc	
9094-A-ELV-002	Air	ND	< 0.001 f/cc	
9094-A-ELV-005	Air	ND	< 0.001 f/cc	
9094-A-ELV-001	Air	ND	< 0.0004 S>0.5u/cc	
9094-A-ELV-002	Air	ND	< 0.0004 S>0.5u/cc	
9094-A-ELV-005	Air	ND	< 0.0004 S>0.5u/cc	
9094-A-ELV-001	Air	ND	< 0.0004 S>5u/cc	
9094-A-ELV-002	Air	ND	< 0.0004 S>5u/cc	
9094-A-ELV-005	Air	ND	< 0.0004 S>5u/cc	

Lead

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-ELV-003	Air	ND	< 0.05 ug/m3	
9094-A-ELV-004	Air	ND	< 0.052 ug/m3	

MMVF

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-ELV-001	Air		0.67 S/L	
9094-A-ELV-002	Air		0.167 S/L	
9094-A-ELV-005	Air		0.203 S/L	

The Food Exchange Results

Asbestos

Before Cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-W-FE-001	Wipe	ND	< 302504 S/cm2	

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-018	Air		0.001 f/cc	
9094-A-FE-019	Air		0.001 f/cc	
9094-A-FE-020	Air		0.001 f/cc	
9094-A-FE-018	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-FE-019	Air		0.0005 S>0.5u/cc	Chrysotile
9094-A-FE-020	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-FE-018	Air	ND	< 0.0005 S>5u/cc	
9094-A-FE-019	Air		0.0005 S>5u/cc	Chrysotile
9094-A-FE-020	Air	ND	< 0.0005 S>5u/cc	
9094-W-FE-015	Wipe	ND	< 30250.4 S/cm2	
9094-W-FE-016	Wipe	ND	< 30250.4 S/cm2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-002	Air		0.001 f/cc	
9094-A-FE-003	Air	ND	< 0.001 f/cc	
9094-A-FE-004	Air		0.001 f/cc	
9094-A-FE-005	Air	ND	< 0.001 f/cc	
9094-A-FE-008	Air	ND	< 0.001 f/cc	
9094-A-FE-009	Air	ND	< 0.001 f/cc	
9094-A-FE-010	Air	ND	< 0.001 f/cc	
9094-A-FE-011	Air	ND	< 0.001 f/cc	
9094-A-FE-002	Air		0.001 S>0.5u/cc	Chrysotile
9094-A-FE-003	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-FE-004	Air	ND	< 0.0005 S>0.5u/cc	Chrysotile
9094-A-FE-005	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-FE-008	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-FE-009	Air	ND	< 0.0005 S>0.5u/cc	

The Food Exchange Results

9094-A-FE-010	Air	ND	< 0.0005	S>0.5u/cc
9094-A-FE-011	Air	ND	< 0.0005	S>0.5u/cc
9094-A-FE-002	Air	ND	< 0.0005	S>5u/cc
9094-A-FE-003	Air	ND	< 0.0005	S>5u/cc
9094-A-FE-004	Air	ND	< 0.0005	S>5u/cc
9094-A-FE-005	Air	ND	< 0.0005	S>5u/cc
9094-A-FE-008	Air	ND	< 0.0005	S>5u/cc
9094-A-FE-009	Air	ND	< 0.0005	S>5u/cc
9094-A-FE-010	Air	ND	< 0.0005	S>5u/cc
9094-A-FE-011	Air	ND	< 0.0005	S>5u/cc

Gypsum

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-023	Air	ND	< 0.008 mg/m3	

Lead

Before Cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-W-FE-001	Wipe		1310 ug/ft2	

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-021	Air	ND	< 0.053 ug/m3	Estimated concentration (J).
9094-A-FE-022	Air	ND	< 0.052 ug/m3	Estimated concentration (J).
9094-W-FE-015	Wipe		136 ug/ft2	
9094-W-FE-016	Wipe		183 ug/ft2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-006	Air	ND	< 0.053 ug/m3	
9094-A-FE-007	Air	ND	< 0.05 ug/m3	
9094-A-FE-012	Air	ND	< 0.052 ug/m3	
9094-A-FE-013	Air	ND	< 0.052 ug/m3	
9094-A-FE-014	Air	ND	< 0.05 ug/m3	

The Food Exchange Results

Mineral: alpha-Quartz

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-023	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-023	Air	ND	< 0.017 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-023	Air	ND	< 0.017 mg/m3	

Mineral: Tridymite

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-023	Air	ND	< 0.017 mg/m3	

MMVF

Before Cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-W-FE-001	Wipe		11732.44 S/cm2	

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-018	Air	ND	< 0.066 S/L	
9094-A-FE-019	Air	ND	< 0.066 S/L	
9094-A-FE-020	Air	ND	< 0.067 S/L	
9094-W-FE-015	Wipe	ND	< 57.23 S/cm2	
9094-W-FE-016	Wipe	ND	< 57.23 S/cm2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-FE-002	Air	ND	< 0.069 S/L	
9094-A-FE-003	Air	ND	< 0.072 S/L	
9094-A-FE-004	Air	ND	< 0.086 S/L	
9094-A-FE-005	Air	ND	< 0.074 S/L	
9094-A-FE-008	Air		0.14 S/L	

The Food Exchange Results

9094-A-FE-009	Air		0.145	S/L
9094-A-FE-010	Air	ND	< 0.079	S/L
9094-A-FE-011	Air	ND	< 0.072	S/L

Total Dust - NADCA vacuum

Post 1st cleaning - HVAC System (NADCA)

Sample ID	Matrix	Detected	Result	Comment
9094-M-FE-017	Microvac		0.013 mg/cm2	

Lemongrass Grill Results

Asbestos

Before cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-W-LG-009	Wipe	ND	< 30250.4 S/cm2	

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-023	Air		0.001 f/cc	
9094-A-LG-024	Air		0.001 f/cc	
9094-A-LG-025	Air		0.001 f/cc	
9094-A-LG-026	Air		0.001 f/cc	
9094-A-LG-023	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-LG-024	Air		0.0005 S>0.5u/cc	Chrysotile
9094-A-LG-025	Air		0.0005 S>0.5u/cc	Chrysotile
9094-A-LG-026	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-LG-023	Air	ND	< 0.0005 S>5u/cc	
9094-A-LG-024	Air	ND	< 0.0005 S>5u/cc	
9094-A-LG-025	Air	ND	< 0.0005 S>5u/cc	
9094-A-LG-026	Air	ND	< 0.0005 S>5u/cc	
9094-W-LG-020	Wipe	ND	< 12100.2 S/cm2	
9094-W-LG-021	Wipe	ND	< 12100.2 S/cm2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-001	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-LG-002	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-LG-003	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-LG-004	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-LG-005	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-LG-018	Air	ND	< 0.001 f/cc	
9094-A-LG-001	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-LG-002	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-LG-003	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.

Lemongrass Grill Results

9094-A-LG-004	Air			S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-LG-005	Air			S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-LG-018	Air	ND	< 0.0005	S>0.5u/cc	
9094-A-LG-001	Air			S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-LG-002	Air			S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-LG-003	Air			S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-LG-004	Air			S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-LG-005	Air			S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-LG-018	Air	ND	< 0.0005	S>5u/cc	

Post 2nd cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-010	Air	ND	< 0.001 f/cc	
9094-A-LG-011	Air	ND	< 0.001 f/cc	
9094-A-LG-012	Air	ND	< 0.001 f/cc	
9094-A-LG-013	Air	ND	< 0.001 f/cc	
9094-A-LG-014	Air		0.001 f/cc	
9094-A-LG-015	Air		0.001 f/cc	
9094-A-LG-016	Air		0.001 f/cc	
9094-A-LG-010	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-LG-011	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-LG-012	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-LG-013	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-LG-014	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-LG-015	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-LG-016	Air		0.0005 S>0.5u/cc	Chrysotile
9094-A-LG-010	Air	ND	< 0.0005 S>5u/cc	
9094-A-LG-011	Air	ND	< 0.0005 S>5u/cc	
9094-A-LG-012	Air	ND	< 0.0005 S>5u/cc	
9094-A-LG-013	Air	ND	< 0.0005 S>5u/cc	
9094-A-LG-014	Air	ND	< 0.0005 S>5u/cc	

Lemongrass Grill Results

9094-A-LG-015	Air	ND	< 0.0005	S>5u/cc	
9094-A-LG-016	Air		0.0005	S>5u/cc	Chrysotile

Gypsum

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-030	Air	ND	< 0.009 mg/m3	

Lead

Before cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-W-LG-009	Wipe		10700 ug/ft2	Estimated concentration (J)

Post 1st Cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-027	Air	ND	< 0.053 ug/m3	Estimated concentration (J).
9094-A-LG-028	Air	ND	< 0.052 ug/m3	Estimated concentration (J).
9094-A-LG-029	Air	ND	< 0.053 ug/m3	Estimated concentration (J).
9094-W-LG-020	Wipe		25.9 ug/ft2	Method blank contamination (Validation = R).
9094-W-LG-021	Wipe		166 ug/ft2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-006	Air		0.168 ug/m3	
9094-A-LG-007	Air		0.16 ug/m3	
9094-A-LG-008	Air		0.347 ug/m3	
9094-A-LG-019	Air	ND	< 0.059 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-030	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-030	Air	ND	< 0.017 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-030	Air	ND	< 0.017 mg/m3	

Lemongrass Grill Results

Mineral: Tridymite

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-030	Air	ND	< 0.017 mg/m3	

MMVF

Before cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-W-LG-009	Wipe	ND	< 57.23 S/cm2	

Post 1st cleaning - HVAC System

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-023	Air	ND	< 0.096 S/L	
9094-A-LG-024	Air	ND	< 0.086 S/L	
9094-A-LG-025	Air	ND	< 0.067 S/L	
9094-A-LG-026	Air	ND	< 0.089 S/L	
9094-W-LG-020	Wipe	ND	< 57.23 S/cm2	
9094-W-LG-021	Wipe	ND	< 57.23 S/cm2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-LG-001	Air	ND	< 0.075 S/L	
9094-A-LG-002	Air	ND	< 0.068 S/L	
9094-A-LG-003	Air	ND	< 0.082 S/L	
9094-A-LG-004	Air	ND	< 0.066 S/L	
9094-A-LG-005	Air	ND	< 0.063 S/L	
9094-A-LG-018	Air	ND	< 0.072 S/L	

Total Dust - NADCA vacuum

Post 1st cleaning - HVAC System (NADCA)

Sample ID	Matrix	Detected	Result	Comment
9094-M-LG-022	Microvac		0.005 mg/cm2	

Liberty Street Staircase Results

Asbestos

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-LS3-001	Air		0.005 f/cc	
9094-A-LS5-001	Air		0.003 f/cc	
9094-A-LS3-001	Air	ND	< 0.0005 S>0.5u/cc	
9094-A-LS5-001	Air		0.0005 S>0.5u/cc	Chrysotile
9094-A-LS3-001	Air	ND	< 0.0005 S>5u/cc	
9094-A-LS5-001	Air		0.0005 S>5u/cc	Chrysotile

Gypsum

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-LS3-003	Air	ND	< 0.009 mg/m3	
9094-A-LS5-003	Air	ND	< 0.008 mg/m3	

Lead

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-LS3-002	Air	ND	< 0.052 ug/m3	
9094-A-LS5-002	Air	ND	< 0.052 ug/m3	

Mineral: alpha-Quartz

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-LS3-003	Air		0.022 mg/m3	
9094-A-LS5-003	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-LS3-003	Air	ND	< 0.017 mg/m3	
9094-A-LS5-003	Air	ND	< 0.017 mg/m3	

Mineral: Cristobalite

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-LS3-003	Air	ND	< 0.017 mg/m3	
9094-A-LS5-003	Air	ND	< 0.017 mg/m3	

Liberty Street Staircase Results

Mineral: Tridymite

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-LS3-003	Air	ND	< 0.017 mg/m3	
9094-A-LS5-003	Air	ND	< 0.017 mg/m3	

MMVF

Post 1st cleaning - Test 4A, 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-LS3-001	Air		0.14 S/L	
9094-A-LS5-001	Air		0.072 S/L	

Mattress Shop Results

Asbestos

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-012	Air		0.025 f/cc	
9094-A-MAT-013	Air		0.283 f/cc	
9094-A-MAT-014	Air		0.008 f/cc	
9094-A-MAT-015	Air		0.004 f/cc	
9094-A-MAT-012	Air	ND	< 0.0009 S>5u/cc	
9094-A-MAT-013	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-014	Air	ND	< 0.0008 S>5u/cc	
9094-A-MAT-015	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-M-MAT-005	Microvac		378132 S/cm2	Chrysotile
9094-M-MAT-006	Microvac		371977 S/cm2	Chrysotile
9094-M-MAT-007	Microvac		39572 S/cm2	Chrysotile
9094-M-MAT-008	Microvac		823098 S/cm2	Chrysotile
9094-M-MAT-009	Microvac		182031 S/cm2	Chrysotile
9094-M-MAT-010	Microvac		123465 S/cm2	Chrysotile
9094-M-MAT-011	Microvac		72812.5 S/cm2	Chrysotile
9094-W-MAT-002	Wipe		7122.96 S/cm2	Chrysotile
9094-W-MAT-003	Wipe		11080.2 S/cm2	Chrysotile
9094-W-MAT-004	Wipe		10288.7 S/cm2	Chrysotile

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-018	Air		0.006 f/cc	
9094-A-MAT-019	Air		0.006 f/cc	
9094-A-MAT-020	Air		0.009 f/cc	
9094-A-MAT-018	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-019	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-020	Air		0.0009 S>0.5u/cc	Chrysotile
9094-A-MAT-018	Air		S>5u/cc	Not analyzed due to overloading of particulates.

Mattress Shop Results

9094-A-MAT-019	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-020	Air	0.0009	S>5u/cc	Chrysotile
9094-M-MAT-030	Microvac	18203.1	S/cm2	Chrysotile - Field Blank contamination (Validation = J).
9094-M-MAT-031	Microvac	35614.8	S/cm2	Chrysotile - Field Blank contamination (Validation = J).
9094-M-MAT-032	Microvac	53817.9	S/cm2	Chrysotile - Field Blank contamination (Validation = J).
9094-M-MAT-033	Microvac	56983.7	S/cm2	Chrysotile - Field Blank contamination (Validation = J).
9094-M-MAT-034	Microvac	58566.6	S/cm2	Chrysotile - Field Blank contamination (Validation = J).
9094-M-MAT-035	Microvac	23743.2	S/cm2	Chrysotile - Field Blank contamination (Validation = J).
9094-M-MAT-036	Microvac	47486.4	S/cm2	Chrysotile - Field Blank contamination (Validation = J).
9094-W-MAT-026	Wipe	1582.88	S/cm2	Chrysotile
9094-W-MAT-027	Wipe	48277.8	S/cm2	Chrysotile
9094-W-MAT-028	Wipe	197860	S/cm2	Chrysotile
9094-W-MAT-029	Wipe	134545	S/cm2	Chrysotile

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-037	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-038	Air		0.042 f/cc	
9094-A-MAT-039	Air		f/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-037	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-038	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-039	Air		S>0.5u/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-037	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-038	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-A-MAT-039	Air		S>5u/cc	Not analyzed due to overloading of particulates.
9094-W-MAT-045	Wipe		2374.32 S/cm2	Chrysotile
9094-W-MAT-046	Wipe		27304.7 S/cm2	Chrysotile
9094-W-MAT-047	Wipe		35614.8 S/cm2	44 Chrysotile and 1 Anthophyllite
9094-W-MAT-048	Wipe	ND	< 23664.1 S/cm2	Particulate matter; sensitivity (7914 s/cm2) not reached.

Mattress Shop Results

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result		Comment
9094-A-MAT-049	Air		0.006	f/cc	
9094-A-MAT-050	Air		0.006	f/cc	
9094-A-MAT-051	Air		0.008	f/cc	
9094-A-MAT-052	Air		0.008	f/cc	
9094-A-MAT-053	Air		0.007	f/cc	
9094-A-MAT-049	Air		0.0067	S>0.5u/cc	Chrysotile
9094-A-MAT-050	Air		0.0032	S>0.5u/cc	Chrysotile
9094-A-MAT-051	Air		0.0106	S>0.5u/cc	Chrysotile
9094-A-MAT-052	Air		0.0041	S>0.5u/cc	Chrysotile
9094-A-MAT-053	Air		0.0047	S>0.5u/cc	Chrysotile
9094-A-MAT-049	Air		0.0025	S>5u/cc	Chrysotile
9094-A-MAT-050	Air		0.0016	S>5u/cc	Chrysotile
9094-A-MAT-051	Air		0.0025	S>5u/cc	Chrysotile
9094-A-MAT-052	Air		0.0016	S>5u/cc	Chrysotile
9094-A-MAT-053	Air		0.0016	S>5u/cc	Chrysotile
9094-M-MAT-058	Microvac	ND	< 3840.04	S/cm2	
9094-M-MAT-059	Microvac	ND	< 3840.04	S/cm2	Chrysotile - Asbestos detected below detection limit.
9094-M-MAT-060	Microvac		12480.1	S/cm2	Chrysotile
9094-M-MAT-061	Microvac		95040.9	S/cm2	Chrysotile
9094-M-MAT-062	Microvac		6720.06	S/cm2	Chrysotile
9094-M-MAT-063	Microvac		4800.04	S/cm2	Chrysotile
9094-M-MAT-064	Microvac	ND	< 3840.04	S/cm2	Chrysotile - Asbestos detected below detection limit.

Post 1st cleaning - Test 4D

Sample ID	Matrix	Detected	Result		Comment
9094-A-MAT-067	Air	ND	< 0.001	f/cc	
9094-A-MAT-068	Air	ND	< 0.001	f/cc	
9094-A-MAT-071	Air	ND	< 0.001	f/cc	
9094-A-MAT-067	Air	ND	< 0.0005	S>0.5u/cc	
9094-A-MAT-068	Air	ND	< 0.0005	S>0.5u/cc	
9094-A-MAT-071	Air	ND	< 0.0005	S>0.5u/cc	

Mattress Shop Results

9094-A-MAT-067	Air	ND	< 0.0005	S>5u/cc
9094-A-MAT-068	Air	ND	< 0.0005	S>5u/cc
9094-A-MAT-071	Air	ND	< 0.0005	S>5u/cc

Dioxin TEQ EMPC (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-016	Air		0.000221 ng/m3	
9094-A-MAT-017	Air		0.00017 ng/m3	
9094-W-MAT-002	Wipe		0.584 ng/m2	
9094-W-MAT-003	Wipe		0.647 ng/m2	
9094-W-MAT-004	Wipe		0.598 ng/m2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-026	Wipe		0.797 ng/m2	
9094-W-MAT-027	Wipe		0.805 ng/m2	
9094-W-MAT-028	Wipe		0.691 ng/m2	
9094-W-MAT-029	Wipe		0.846 ng/m2	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-045	Wipe		0.812 ng/m2	
9094-W-MAT-046	Wipe		0.903 ng/m2	
9094-W-MAT-047	Wipe		0.838 ng/m2	
9094-W-MAT-048	Wipe		0.678 ng/m2	

Post 1st cleaning - Test 4E

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-072	Wipe		0.647 NG/M2	
9094-W-MAT-073	Wipe		0.613 NG/M2	

Pre-water wipe

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-065	Wipe		0.849 NG/M2	
9094-W-MAT-066	Wipe		0.698 NG/M2	

Unit Mattress Shop Results

Gypsum

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-023	Air	ND	< 0.008 mg/m3	
9094-A-MAT-024	Air	ND	< 0.008 mg/m3	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-042	Air	ND	< 0.008 mg/m3	
9094-A-MAT-043	Air	ND	< 0.008 mg/m3	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-056	Air	ND	< 0.008 mg/m3	
9094-A-MAT-057	Air	ND	< 0.008 mg/m3	

Lead

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-M-MAT-005	Microvac		5.56 ug/ft2	Estimated concentration (J).
9094-M-MAT-006	Microvac		18.4 ug/ft2	Estimated concentration (J).
9094-M-MAT-007	Microvac		7.66 ug/ft2	Estimated concentration (J).
9094-M-MAT-008	Microvac		5.28 ug/ft2	
9094-M-MAT-009	Microvac		3.52 ug/ft2	
9094-M-MAT-010	Microvac		2.62 ug/ft2	
9094-M-MAT-011	Microvac	ND	< 2.32 ug/ft2	
9094-W-MAT-002	Wipe	ND	< 4.65 ug/ft2	
9094-W-MAT-003	Wipe		38.9 ug/ft2	
9094-W-MAT-004	Wipe		77 ug/ft2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-021	Air		0.198 ug/m3	
9094-A-MAT-022	Air		0.195 ug/m3	
9094-M-MAT-030	Microvac	ND	< 2.32 ug/ft2	
9094-M-MAT-031	Microvac	ND	< 2.32 ug/ft2	
9094-M-MAT-032	Microvac	ND	< 2.32 ug/ft2	

Mattress Shop Results

9094-M-MAT-033	Microvac	ND	<	2.32	ug/ft2
9094-M-MAT-034	Microvac			3.29	ug/ft2
9094-M-MAT-035	Microvac			2.56	ug/ft2
9094-M-MAT-036	Microvac	ND	<	2.32	ug/ft2
9094-W-MAT-026	Wipe	ND	<	4.65	ug/ft2
9094-W-MAT-027	Wipe			22.2	ug/ft2
9094-W-MAT-028	Wipe			43.9	ug/ft2
9094-W-MAT-029	Wipe			42.2	ug/ft2

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected		Result	Comment
9094-A-MAT-040	Air			0.363 ug/m3	
9094-A-MAT-041	Air			0.352 ug/m3	
9094-W-MAT-045	Wipe	ND	<	4.65 ug/ft2	
9094-W-MAT-046	Wipe			10.6 ug/ft2	
9094-W-MAT-047	Wipe			91.5 ug/ft2	
9094-W-MAT-048	Wipe			79.3 ug/ft2	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected		Result	Comment
9094-A-MAT-054	Air			0.174 ug/m3	
9094-A-MAT-055	Air			0.189 ug/m3	
9094-M-MAT-058	Microvac	ND	<	2.32 ug/ft2	
9094-M-MAT-059	Microvac	ND	<	2.32 ug/ft2	
9094-M-MAT-060	Microvac	ND	<	2.32 ug/ft2	
9094-M-MAT-061	Microvac	ND	<	2.32 ug/ft2	
9094-M-MAT-062	Microvac			3.82 ug/ft2	
9094-M-MAT-063	Microvac	ND	<	2.32 ug/ft2	
9094-M-MAT-064	Microvac	ND	<	2.32 ug/ft2	

Post 1st cleaning - Test 4D

Sample ID	Matrix	Detected		Result	Comment
9094-A-MAT-069	Air	ND	<	0.051 ug/m3	
9094-A-MAT-070	Air	ND	<	0.051 ug/m3	

Mattress Shop Results

Post 1st cleaning - Test 4E

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-072	Wipe		19.5 ug/ft2	Sample was broken at the laboratory; ID not confirmed.
9094-W-MAT-073	Wipe		5.06 ug/ft2	Sample was broken at the laboratory; ID not confirmed.
9094-W-MAT-074	Wipe		38.2 ug/ft2	

Pre-water wipe

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-065	Wipe	ND	< 4.65 ug/ft2	
9094-W-MAT-066	Wipe		20 ug/ft2	Estimated concentration (J).

Mineral: alpha-Quartz

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-023	Air	ND	< 0.004 mg/m3	
9094-A-MAT-024	Air	ND	< 0.004 mg/m3	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-042	Air	ND	< 0.004 mg/m3	
9094-A-MAT-043	Air	ND	< 0.004 mg/m3	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-056	Air	ND	< 0.004 mg/m3	
9094-A-MAT-057	Air	ND	< 0.004 mg/m3	

Mineral: Calcite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-023	Air	ND	< 0.016 mg/m3	
9094-A-MAT-024	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-042	Air	ND	< 0.016 mg/m3	
9094-A-MAT-043	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-056	Air	ND	< 0.017 mg/m3	
9094-A-MAT-057	Air	ND	< 0.017 mg/m3	

Mattress Shop Results

Mineral: Cristobalite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-023	Air	ND	< 0.016 mg/m3	
9094-A-MAT-024	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-042	Air	ND	< 0.016 mg/m3	
9094-A-MAT-043	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-056	Air	ND	< 0.017 mg/m3	
9094-A-MAT-057	Air	ND	< 0.017 mg/m3	

Mineral: Tridymite

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-023	Air	ND	< 0.016 mg/m3	
9094-A-MAT-024	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-042	Air	ND	< 0.016 mg/m3	
9094-A-MAT-043	Air	ND	< 0.016 mg/m3	

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-056	Air	ND	< 0.017 mg/m3	
9094-A-MAT-057	Air	ND	< 0.017 mg/m3	

Mattress Shop Results

MMVF

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-012	Air		11.716 S/L	
9094-A-MAT-013	Air		92.184 S/L	
9094-A-MAT-014	Air		3.766 S/L	
9094-A-MAT-015	Air		4.159 S/L	
9094-W-MAT-002	Wipe		1201.86 S/cm2	
9094-W-MAT-003	Wipe		23710.15 S/cm2	
9094-W-MAT-004	Wipe		572.31 S/cm2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-018	Air		3.19 S/L	
9094-A-MAT-019	Air		2.834 S/L	
9094-A-MAT-020	Air		3.802 S/L	
9094-W-MAT-026	Wipe		114.46 S/cm2	
9094-W-MAT-027	Wipe	ND	< 57.23 S/cm2	
9094-W-MAT-028	Wipe		228.93 S/cm2	
9094-W-MAT-029	Wipe		686.78 S/cm2	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-037	Air		1.457 S/L	
9094-A-MAT-038	Air		6.206 S/L	
9094-A-MAT-039	Air		1.753 S/L	
9094-W-MAT-045	Wipe	ND	< 57.23 S/cm2	
9094-W-MAT-046	Wipe		171.69 S/cm2	
9094-W-MAT-047	Wipe		286.16 S/cm2	
9094-W-MAT-048	Wipe		286.16 S/cm2	

Mattress Shop Results

Post 1st cleaning - Test 4C

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-049	Air		4.723 S/L	
9094-A-MAT-050	Air		1.051 S/L	
9094-A-MAT-051	Air		1.203 S/L	
9094-A-MAT-052	Air		2.127 S/L	
9094-A-MAT-053	Air		2.092 S/L	

Post 1st cleaning - Test 4D

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-067	Air	ND	< 0.067 S/L	
9094-A-MAT-068	Air	ND	< 0.069 S/L	
9094-A-MAT-071	Air	ND	< 0.047 S/L	

PAH TEF (ND=1/2)

Before cleaning

Sample ID	Matrix	Detected	Result	Comment
9094-A-MAT-016	Air	U	2.7 µg/m3	
9094-W-MAT-002	Wipe	U	290 ug/m2	
9094-W-MAT-003	Wipe		290 ug/m2	
9094-W-MAT-004	Wipe		290 ug/m2	

Post 1st cleaning - Test 4A

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-026	Wipe	U	290 ug/m2	
9094-W-MAT-027	Wipe	U	290 ug/m2	
9094-W-MAT-028	Wipe	U	290 ug/m2	
9094-W-MAT-029	Wipe	U	290 ug/m2	

Post 1st cleaning - Test 4B

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-045	Wipe	U	290 ug/m2	
9094-W-MAT-046	Wipe	U	290 ug/m2	
9094-W-MAT-047	Wipe	U	290 ug/m2	
9094-W-MAT-048	Wipe	U	290 ug/m2	

Mattress Shop Results

Post 1st cleaning - Test 4E

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-072	Wipe	U	290 ug/m2	
9094-W-MAT-073	Wipe	U	290 ug/m2	

Pre-water wipe

Sample ID	Matrix	Detected	Result	Comment
9094-W-MAT-065	Wipe	U	290 ug/m2	
9094-W-MAT-066	Wipe	U	290 ug/m2	

Attachment K

Summary of Mercury Vapor Results Using the Lumex Vapor Analyzer

Summary of Mercury Vapor Results Using the Lumex[®] Vapor Analyzer

Statistics for Combined Data WTC Residential Confirmation Cleaning Study¹

<i>Statistic</i>	<i>Value</i>
N	163
Mean	53.6
Std	39.1
Skew	1.3
cv	0.73
var	1525
stderr	3.1
max	210
P99	180
P95	130
P90	107
Q3	74
median	46
Q1	22
P5	11
min	3
S-W ^a	0.90
P_S-W ^b	2.64E-09

^aShapiro-Wilk test statistic for normality

^bProbability that the data come from a normal distribution

¹This information was provided by Dr. Clyde Johnson, Assistant Professor of Environmental Sciences at Medgar Evers College (City University of New York).

Summary of Mercury Vapor Results Using the Lumex® Vapor Analyzer¹

WTC Residential Confirmation Cleaning Study – Statistics by Area Type

Area	n	mean	std	skew	cv	var	Std err	max	P99	P95	P90	Q3	Med ian	Q1	P5	min	S-W ^a	P_S-W ^b
Apt 2A	16	79.7	15.9	-1.42	0.20	252.8	4.0	102	102	102	99	89	80	72.5	34	34	0.89	0.05
Apt 2B	11	49.5	6.6	0.81	0.13	43.7	2.0	62	62	62	59	55	47	45	42	42	0.91	0.25
Apt 3C	13	33.5	14.6	0.88	0.44	213.4	4.1	67	67	67	49	42	35	22	15	15	0.93	0.31
Apt 3D	10	22.8	13.9	1.35	0.61	193.5	4.4	50	50	50	47.5	27	17	14	10	10	0.80	0.02
Apt 4A	20	70.1	41.9	2.35	0.60	1753.9	9.4	210	210	177	125.5	69.5	59.5	52	28.5	15	0.72	< 0.00
Apt 4B	11	34.8	25.7	2.97	0.74	661.6	7.8	110	110	110	40	34	27	21	20	20	0.57	< 0.00
Apt 4C	11	25.9	14.8	1.35	0.57	218.1	4.5	60	60	60	41	34	20	15	11	11	0.87	0.08
Apt 4D	10	24.4	8.2	-0.02	0.34	67.4	2.6	35	35	35	34.5	30	26	16	15	15	0.85	0.05
Apt 5A	12	64.6	20.0	1.00	0.31	401.2	5.8	104	104	104	98	75.5	58.5	49.5	40	40	0.89	0.12
Apt 5C	10	32.3	41.6	3.08	1.29	1733.3	13.2	150	150	150	88	23	20.5	19	11	11	0.47	< 0.00
Apt 5D	7	19.9	38.0	2.64	1.91	1445.1	14.4	106	106	106	106	7	6	4	3	3	0.49	< 0.00
1800 Mattress Office	7	53.0	10.3	-0.01	0.19	106.3	3.9	69	69	69	69	59	53	46	37	37	0.99	> 0.99
Chiropractor Office	15	114.9	27.5	0.59	0.24	756.8	7.1	179	179	179	144	130	114	91	77	77	0.95	0.58
Common Areas ^c	8	66.4	66.1	1.15	1.00	4371.4	23.4	180	180	180	180	113.5	36	24	4	4	0.82	0.04
Outdoor	2	35.0	29.7	.	0.85	882.0	21.0	56	56	56	56	56	35	14	14	14	.	.

^aShapiro-Wilk test statistic for normality

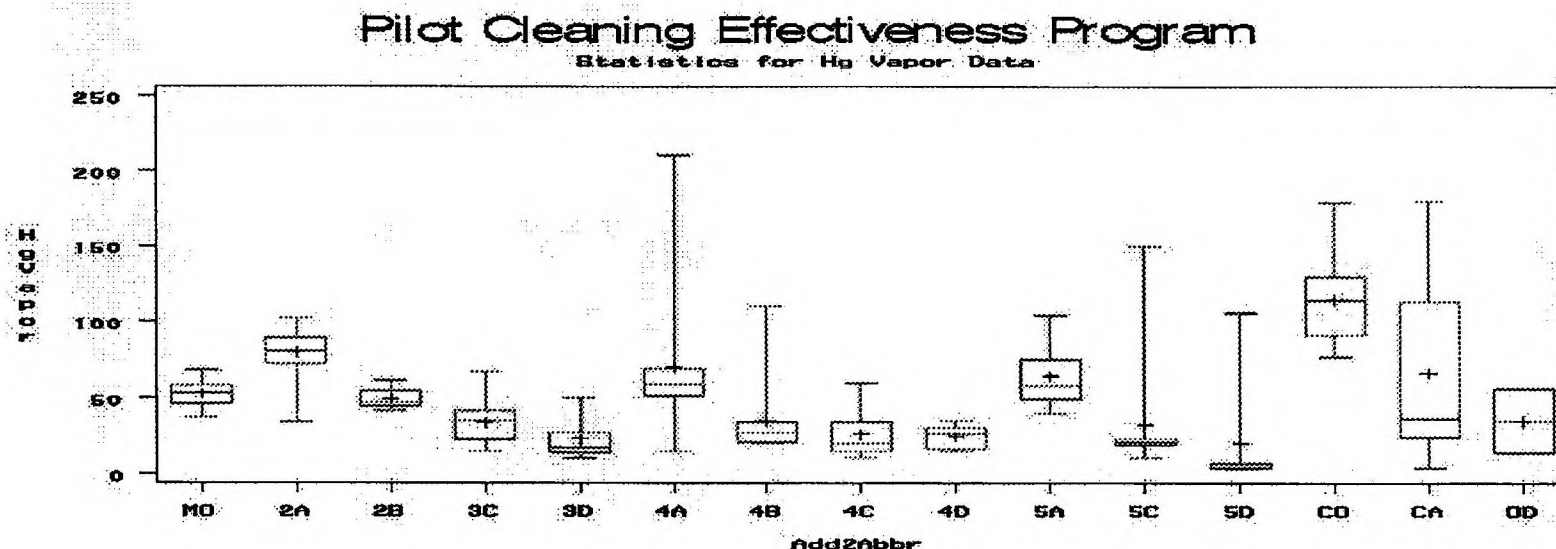
^bProbability that the data come from a normal distribution

^cCommon Areas: lobbies, hallways, trash compactor room

¹This information was provided by Dr. Clyde Johnson, Assistant Professor of Environmental Sciences at Medgar Evers College (City University of New York).



WTC Residential Confirmation Cleaning Study Summary of Mercury Vapor Results Using the Lumex® Vapor Analyzer



Legend

Abbreviation	Description	Sample Size
O	1800 Mattress Office	7
2#	Apartment Number	7 - 20
CO	Chiropractor Office	15
CA	Common Areas (hallways, lobbies)	8
OD	Outdoor	2

Note: The figure shows 'box and whisker' plots for each room type. The plus signs (+) in the 'box' represent the mean mercury vapor reading; the horizontal bars within the box represent the median; the bottom and top of the box represent the 25th and 75th percentiles (or Q1 and Q3), respectively; and the bottom and top whiskers represent the 5th and 95th percentiles (P5 and P95), respectively.

¹This information was provided by Dr. Clyde Johnson, Assistant Professor of Environmental Sciences at Medgar Evers College (City University of New York).

Attachment L

Photo Documentation