APPENDIX D

HAZARDOUS MATERIALS

APPENDIX D. HAZARDOUS MATERIALS

HAZARDOUS WASTE SCREENING STUDY

The Louis Berger Group, Inc. (Berger) was retained by the Lower Manhattan Development Corporation (LMDC) to perform a Hazardous Waste Screening (HWS) Study in support of the Generic Environmental Impact Statement (GEIS) for the proposed World Trade WTC Memorial and Redevelopment Plan (Proposed Action). The HWS Study was performed to assess the presence of hazardous materials within the Study Area that would impact, or be impacted by, the Proposed Action.

The Study Area is bound to the north by Murray Street, to the south by Carlisle/Thames Street, to the west by the Hudson River, and to the east by Broadway and includes the Project Area, comprised of the WTC Site, 130 Liberty Street, 140 Liberty Street, and Site 26. The WTC Site is bound to the north by Vesey Street, to the south by Liberty Street, to the west by West Street, and to the east by Church Street. The property located at 130 Liberty Street is bound to the north by Liberty Street, to the south by Albany Street, to west by Washington Street and to the east by Greenwich Street. The property located at 140 Liberty Street is bound to the north by Liberty Street, to the south by Cedar Street, to the west by Route 9A (West Street), and to the east by Washington Street. Site 26 is bound to the north by Murray Street, to the east by Route 9A, to the south by Vesey Street, and to the west by North End Avenue.

The HWS Study consisted of the following tasks:

- Review of Study Area history;
- Reconnaissance of the Study Area and review of existing conditions; and
- Review of Local, State, and Federal government records for sites located within the Study Area.

The historic events of September 11, 2001, may have resulted in unknown releases of petroleum and/or chemicals from building materials located at the WTC Site. Impacted soil and/or groundwater may be present in portions of the Project Area that are to proposed to be excavated. The presence of contamination in soil and/or groundwater has the potential to affect handling, management and disposal requirements. As a result of the events of September 11, 2001, it is likely that the 27,000 gallon combined capacity of petroleum storage tanks, present at the WTC Site ruptured, releasing their contents. It is expected that some quantity of fuel oil was consumed by fires, while the remaining quantity was removed during the subsequent rescue and recovery activities.

A review of Sanborn Fire Insurance Maps indicated that the eastern portion of the WTC Site was used by the Hudson and Manhattan Railroad lines. The railroad was constructed between 1894 and 1923 and was in existence until the WTC was constructed in the late 1960's. The use of the eastern portion of the WTC Site as a rail yard is of environmental concern since it is possible that petroleum products and other hazardous materials were used, stored, or disposed of in a manner inconsistent with present day regulations. Portions of the former railroad station remain in the eastern portion of the WTC Site. Lead based paint (LBP) and Asbestos Containing Material (ACM) may be present on these structures.

The regulatory database review indicated the presence of two (2) hazardous materials spills at or adjacent to the that may be potential RECs. One spill consists of an unknown quantity of dielectric fluid that was released at the intersection of Fulton and Church Street, potentially contaminating soil and groundwater in the vicinity of the WTC Site. The other spill consisted of approximately 10,000 gallons of fuel oil and 1,000 gallons of diesel fuel released from ruptured petroleum storage tanks formerly located at 130 Liberty Street, as a result of the events of September 11, 2001. The releases at this property may have resulted in petroleum-impacted soil and/or groundwater.

The regulatory database review indicated the presence of a spill of hazardous materials within the Study Area due to the events of September 11, 2001. The spill resulted in the release of more than 100,000 gallons of dielectric fluid from transformers and oil-filled electric feeders present in the former Con Edison substations located at 7 WTC, located north of the WTC Site.

It is recommended that further evaluation of the environmental concerns identified in the HWS Study be performed through performance of an Environmental Investigation, which includes the following tasks:

- *Geophysical Investigation* to identify subsurface utilities or structures that may be sources of contamination, migratory pathways for contamination and/or interfere with investigation or construction activities;
- *Surficial and Subsurface Soil Sampling and Analyses* to assess physical and chemical characteristics of fill and unconsolidated deposits throughout the Site and impacts from the events of September 11, 2001 and surrounding sites with potential sources of contamination;
- *Groundwater Sampling and Analyses* to assess physical and chemical characteristics of groundwater present within the Site for potential impacts by the events of September 11, 2001 and evaluation of surrounding sites with potential sources of contamination.
- *Sampling and Analyses* to assess chemical characteristics of material potentially deposited on structures located in the eastern portion of the WTC Site.

The findings of the Environmental Site Investigation will then be evaluated to assist in:

- Determining the need for, and extent of, construction health and safety measures to protect workers, the general public, and the environment from hazardous materials that may be encountered during the construction and operation of the Proposed Action.

- Developing procedures for managing and disposing of hazardous materials encountered during construction activities.

ENVIRONMENTAL SITE INVESTIGATION

The Louis Berger Group, Inc. (Berger) was retained by the Lower Manhattan Development Corporation (LMDC) to perform an Environmental Site Investigation (ESI) in support of the Generic Environmental Impact Statement (GEIS) for the proposed World Trade (WTC) Memorial and Redevelopment Plan (Proposed Action). The ESI was performed to assess the presence of hazardous materials within the Study Area that would impact, or be impacted by, the Proposed Action.

The ESI consisted of the following activities:

- *Geophysical Investigation* to identify subsurface utilities or structures that may be sources of contamination, migratory pathways for contamination and/or interfere with investigation or construction activities;
- *Surficial and Subsurface Soil Sampling and Analyses* to assess physical and chemical characteristics of fill and unconsolidated deposits throughout the Site and impacts from the events of September 11, 2001 and surrounding sites with potential sources of contamination;
- *Groundwater Sampling and Analyses* to assess physical and chemical characteristics of groundwater present within the Site for potential impacts by the events of September 11, 2001 and evaluation of surrounding sites with potential sources of contamination.
- *Sampling and Analyses* to assess chemical characteristics of material potentially deposited on structures located in the eastern portion of the WTC Site.

The ESI was performed in November and December, 2003. Nine (9) surficial or former grade soil samples were collected for laboratory analyses. Six (6) soil borings were advanced in areas that would be excavated as part of the Proposed Action. Three (3) soil borings were advanced within the eastern portion of the WTC Site; one (1) soil boring was located at 140 Liberty Street, within the area of the former St. Nicholas Church; one (1) soil boring was located adjacent to the Cedar Street right-of-way; and, one (1) soil boring was located at the intersection of Washington and Albany Streets. In total, twelve (12) subsurface soil samples were collected from the soil borings for laboratory analyses. Three (3) of the soil borings were converted to temporary groundwater well points and three (3) groundwater samples were collected for laboratory analyses. Fifteen (15) samples were collected from the surfaces of structures present in the eastern portion of the WTC Site.

SOILS

Eight (8) surficial/former grade soil samples were taken from the soil borings. Fill materials were encountered in the soil borings at depths ranging from approximately 15 to 65 feet below grade (ftbg). Soil representative of native deposits was noted beneath the fill materials. Field screening of the subsurface soils recovered during the ESI revealed no visual or olfactory evidence of contamination.

The ESI identified elevated concentrations of SVOC and metals in the surficial / former grade soil and fill material and elevated concentrations of metals in native soil. These materials are common in urban settings and are note anticipated to be the result of a release of hazardous materials; rather they are expected to reflect background concentrations. Based on the laboratory results, the excavated soils would be characterized as non-hazardous waste.

GROUNDWATER

Groundwater was encountered at depths of ranging from 6 to 45 ftbg. The laboratory results revealed the presence of elevated concentrations of volatile organic compounds (VOCs) typically associated with petroleum in the groundwater sampled at the intersection of Washington and Albany Streets. Based on the results of the investigation, it is unlikely that groundwater will require pre-treatment prior to discharge.

SURFACE SAMPLING

Fifteen (15) samples were collected from the surfaces of structures located in the eastern portion of the WTC Site to assess the presence of materials deposited as a result of the events of September 11. Four (4) samples were collected from the concrete foundation walls in the southeast corner of the WTC Site; seven (7) samples were collected from surfaces in the mezzanine in the eastern portion of the WTC Site; and, four (4) samples were collected from the generator pit.

The laboratory results indicated that elevated concentrations of asbestos and metals were present on the sampled surfaces. Based on the results of the investigation, cleaning of the surfaces of these structures is recommended prior to performing construction activities.

Appendix D. Table 1
Summary of VOCs in Surficial and Former Grade Soil
WTC Investigation
New York, New York

Sample ID	101,S,S,0-3	102,S,S,0-3	112,S,S,0-3	103,S,S,0-3	104,S,S,0-3	105,S,S,0-3	106,S,S.0-3	107,S,S,4-5	109,S,S,3-4	Technical and Administrative Guidance Memorandun #4046 (TAGM) Recommended Soil Clean Up Objectives (RSCOs) (ug/kg)	USEPA HEAST Human Health Guidance Values (ug/kg)
Lab ID	0311-282-001	0311-282-004	0311-282-007	0311-305-001	0311-305-005	0311-305-007	0311-305-010	0311-353-001	0312-023-001		
Date Collected	11/17/2003	11/17/2003	11/17/2003	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/26/03		
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Depth	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	4-5'	3-4'		
Analyte	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		
Vinyl Chloride	12U	12U	13U	11U	11U	12U	12U	11U	10U	200	NS
Chloromethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
Bromomethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
Chloroethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	1,900	NS
1,1 Dichloroethelyene	12U	12U	13U	11U	11U	12U	12U	11U	10U	400	NS
Acetone	33	12U	13U	11U	11U	12U	12U	130	10U	200	NS
Methylene Chloride	3 JB	4 JB	9 JB	3 JB	3 JB	4 JB	3 JB	7 JB	6JB	100	NS
trans-1,2 Dichloroethene	12U	12U	13U	11U	11U	12U	12U	11U	10U	300	NS
1,1 Dichoroethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	200	NS
2-Butanone	12U	12U	13U	11U	11U	12U	12U	11U	10U	300	NS
cis-1,2 Dichloroethylene	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
Carbon Disulfide	12U	12U	13U	11U	11U	12U	12U	11U	10U	2,700	NS
1,1,2 Trichloroethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
2-Hexanone	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
Chloroform	12U	12U	13U	11U	11U	12U	12U	11U	10U	300	NS
1,1,1-Trichloroethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	800	NS
Carbon Tetrachloride	12U	12U	13U	11U	11U	12U	12U	11U	10U	600	NS
Benzene	12U	12U	13U	11U	11U	12U	12U	11U	10U	60 or MDL	2.4×10^4
1,2 Dichloroethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	100	NS
Trichloroethylene	12U	12U	13U	11U	11U	12U	12U	11U	10U	700	NS
1,2 Dichloropropane	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
4-Methyl-2-pentanone	12U	12U	13U	11U	11U	12U	12U	11U	10U	1,000	NS
cis-1,2 Dichloropropene	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
Toluene	12U	12U	13U	11U	11U	12U	12U	11U	4J	1,500	2.0×10^7
trans-1,3-Dichloropropene	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
Bromodichloromethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
Tetrachloroethylene	12U	12U	13U	11U	11U	12U	12U	11U	10U	1,400	NS
Dibromochloromethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	NA	NS
Chlorobenzene	12U	12U	13U	11U	11U	12U	12U	11U	10U	1,700	NS
1,1,2,2,Tetrachloroethane	12U	12U	13U	11U	11U	12U	12U	11U	10U	600	NS
Ethylbenzene	12U	12U	13U	11U	11U	12U	12U	11U	10U	5,500	8.0×10^6
O xylene	12U	12U	13U	11U	11U	12U	12U	11U	10U	*	*
M&P xylene	12U	12U	13U	11U	11U	12U	12U	11U	4J	1,200	2.0×10^8
Styrene	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS
Bromoform	12U	12U	13U	11U	11U	12U	12U	11U	10U	NS	NS

NOTES:
* - Standard only for total (M&P) Xylene
ug/kg- micrograms per kilogram
U - Analyte not detected at method detection level
NS - No Standard
MDL - Method Detection Limit
J - Analyte detected below the quantitation limits
B - Analyte detected in method blank

Appendix D. Table 1
Summary of VOCs in Subsurface Fill
WTC Investigation
New York, New York

Sample ID	104,S,F,33-35	105,S,F,8-10	106,S,F,5-6	107,S,F,14-14.5	108,S,F,14-16	109,S,F,9-10	Technical and Administrative Guidance Memorandun #4046 (TAGM) Recommended Soil Clean Up Objectives (RSCOs) (ug/kg)	USEPA HEAST Human Health Guidance Values (ug/kg)
Lab ID	0312-025-001	0312-024-001	0311-398-001	0311-353-004	0312-037-001	0312-023-004		
Date Collected	11/29/03	11/28/03	11/22/03	11/20/03	12/1/03	11/26/03		
Matrix	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Depth	33-35'	8-10'	5-6'	14-14.5'	14-16'	9-10'		
Analyte	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		
Vinyl Chloride	12U	12U	12U	12U	13U	13U	200	NS
Chloromethane	12U	12U	12U	12U	13U	13U	NS	NS
Bromomethane	12U	12U	12U	12U	13U	13U	NS	NS
Chloroethane	12U	12U	12U	12U	13U	13U	1,900	NS
1,1 Dichloroethelyene	12U	12U	12U	12U	13U	13U	400	NS
Acetone	12U	12U	12U	12U	13U	13U	200	NS
Methylene Chloride	4JB	4JB	12U	10 JB	4J	5JB	100	NS
trans-1,2 Dichloroethene	12U	12U	12U	12U	13U	13U	300	NS
1,1 Dichoroethane	12U	12U	12U	12U	13U	13U	200	NS
2-Butanone	12U	12U	12U	12U	13U	13U	300	NS
cis-1,2 Dichloroethylene	12U	12U	12U	12U	13U	13U	NS	NS
Carbon Disulfide	12U	12U	12U	12U	13U	13U	2,700	NS
1,1,2 Trichloroethane	12U	12U	12U	12U	13U	13U	NS	NS
2-Hexanone	12U	12U	12U	12U	13U	13U	NS	NS
Chloroform	12U	12U	12U	12U	13U	13U	300	NS
1,1,1-Trichloroethane	12U	12U	12U	12U	13U	13U	800	NS
Carbon Tetrachloride	12U	12U	12U	12U	13U	13U	600	NS
Benzene	12U	12U	12U	12U	13U	13U	60 or MDL	2.4×10^4
1,2 Dichloroethane	12U	12U	12U	12U	13U	13U	100	NS
Trichloroethylene	12U	12U	12U	12U	13U	13U	700	NS
1,2 Dichloropropane	12U	12U	12U	12U	13U	13U	NS	NS
4-Methyl-2-pentanone	12U	12U	12U	12U	13U	13U	1,000	NS
cis-1,2 Dichloropropene	12U	12U	12U	12U	13U	13U	NS	NS
Toluene	12U	12U	12U	12U	13U	13U	1,500	2.0×10^7
trans-1,3-Dichloropropene	12U	12U	12U	12U	13U	13U	NS	NS
Bromodichloromethane	12U	12U	12U	12U	13U	13U	NS	NS
Tetrachloroethylene	2J	12U	12U	12U	13U	13U	1,400	NS
Dibromochloromethane	12U	12U	12U	12U	13U	13U	NA	NS
Chlorobenzene	12U	12U	12U	12U	13U	13U	1,700	NS
1,1,2,2,Tetrachloroethane	12U	12U	12U	12U	13U	13U	600	NS
Ethylbenzene	12U	12U	12U	12U	13U	13U	5,500	8.0×10^6
O xylene	12U	12U	12U	12U	13U	13U	*	*
M&P xylene	12U	12U	12U	12U	13U	13U	1,200	2.0×10^8
Styrene	12U	12U	12U	12U	13U	13U	NS	NS
Bromoform	12U	12U	12U	12U	13U	13U	NS	NS

NOTES:
* - Standard only for total (M&P) Xylene
ug/kg- micrograms per kilogram
U - Analyte not detected at method detection level
NS - No Standard
MDL - Method Detection Limit
J - Analyte detected below the quantitation limits
B - Analyte detected in method blank

Appendix D. Table 1
Summary of VOCs in Native Soil
WTC Investigation
New York, New York

Sample ID	104,S,N,57-58	105,S,N,36-37	106,S,N,35-37	107,S,N,16-16.5	108,S,N,23-25	109,S,N,41-42	Technical and Administrative Guidance Memorandun #4046 (TAGM) Recommended Soil Clean Up Objectives (RSCOs) (ug/kg)	USEPA HEAST Human Health Guidance Values (ug/kg)
Lab ID	0312-025-003	0312-024-003	0311-398-004	0311-353-007	0312-037-004	0312-023-007		
Date Collected	11/29/03	11/28/03	11/22/03	11/20/03	12/1/03	11/26/03		
Matrix	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Depth	57-58'	36-37'	35-37'	16-16.5'	23-25'	41-42'		
Analyte	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		
Vinyl Chloride	11U	12U	13U	13U	15U	15U	200	NS
Chloromethane	11U	12U	13U	13U	15U	15U	NS	NS
Bromomethane	11U	12U	13U	13U	15U	15U	NS	NS
Chloroethane	11U	12U	13U	13U	15U	15U	1,900	NS
1,1 Dichloroethelyene	11U	12U	13U	13U	15U	15U	400	NS
Acetone	11U	12U	13U	61	78	140	200	NS
Methylene Chloride	6JB	6JB	13U	8 JB	6J	13JB	100	NS
trans-1,2 Dichloroethene	11U	12U	13U	13U	15U	15U	300	NS
1,1 Dichoroethane	11U	12U	13U	13U	15U	15U	200	NS
2-Butanone	11U	12U	13U	13U	15U	15U	300	NS
cis-1,2 Dichloroethylene	3J	31	9J	13U	15U	15U	NS	NS
Carbon Disulfide	11U	12U	13U	13U	15U	15U	2,700	NS
1,1,2 Trichloroethane	11U	12U	13U	13U	15U	15U	NS	NS
2-Hexanone	11U	12U	13U	13U	15U	15U	NS	NS
Chloroform	11U	12U	13U	13U	15U	15U	300	NS
1,1,1-Trichloroethane	11U	12U	13U	13U	15U	15U	800	NS
Carbon Tetrachloride	11U	12U	13U	13U	15U	15U	600	NS
Benzene	11U	12U	13U	13U	15U	15U	60 or MDL	2.4×10^4
1,2 Dichloroethane	11U	12U	13U	13U	15U	15U	100	NS
Trichloroethylene	11U	12U	13U	13U	15U	15U	700	NS
1,2 Dichloropropane	11U	12U	13U	13U	15U	15U	NS	NS
4-Methyl-2-pentanone	11U	12U	13U	13U	15U	15U	1,000	NS
cis-1,2 Dichloropropene	11U	12U	13U	13U	15U	15U	NS	NS
Toluene	2	12U	13U	13U	15U	7J	1,500	2.0×10^7
trans-1,3-Dichloropropene	11U	12U	13U	13U	15U	15U	NS	NS
Bromodichloromethane	11U	12U	13U	13U	15U	15U	NS	NS
Tetrachloroethylene	11U	12U	13U	13U	15U	15U	1,400	NS
Dibromochloromethane	11U	12U	13U	13U	15U	15U	NA	NS
Chlorobenzene	11U	12U	13U	13U	15U	15U	1,700	NS
1,1,2,2,Tetrachloroethane	11U	12U	13U	13U	15U	15U	600	NS
Ethylbenzene	11U	12U	13U	13U	15U	15U	5,500	8.0×10^6
O xylene	11U	12U	13U	13U	15U	15U	*	*
M&P xylene	2J	12U	13U	13U	15U	9J	1,200	2.0×10^8
Styrene	11U	12U	13U	13U	15U	15U	NS	NS
Bromoform	11U	12U	13U	13U	15U	15U	NS	NS

NOTES:
* - Standard only for total (M&P) Xylene
ug/kg- micrograms per kilogram
U - Analyte not detected at method detection level
NS - No Standard
MDL - Method Detection Limit
J - Analyte detected below the quantitation limits
B - Analyte detected in method blank

Appendix D. Table 2
Summary of SVOCs in Surficial and Former Grade Soil
WTC Investigation
New York, New York

Sample ID	101,S,S,0-3"	102,S,S,0-3"	112,S,S,0-3"	103,S,S,0-3"	104,S,S,0-3"	105,S,S,0-3"	106,S,S,0-3"	107,S,S,4-5'	109,S,S,3-4	Technical and Administrative Guidance Memorandun #4046 (TAGM) Recommended Soil Clean Up Objectives (RSCOs) (ug/kg)	USEPA HEAST Human Health Guidance Values (ug/kg)
Lab ID	0311-282-002	0311-282-005	0311-282-008	0311-305-002	0311-305-005	0311-305-008	0311-305-011	0311-353-002	0311-398-002		
Date Collected	11/17/2003	11/17/2003	11/17/2003	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/22/03		
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Depth	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	4-5'	3-4'		
Analyte	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		
bis(2-Chloroethyl) Ether	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
Phenol	2000U	2000U	4000U	3600U	3600U	1800U	3900U	270	370U	30 or MDL	NS
2-Chlorophenol	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	800	NS
1,3 Dichlorobenzene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	1,600	NS
1,4 Dichlorobenzene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	8,500	NS
1,2 Dichlorobenzene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	7,900	NS
2-Methylphenol	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	100 or MDL	NS
Hexachloroethane	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
N-Nitroso-di-n-propylamine	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
3&4-Methylphenol	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	900	NS
Nitrobenzene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	200 or MDL	NS
Isophorone	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	4,400	NS
2-Nitrophenol	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	330 or MDL	NS
2,4 Dimethylphenol	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
bis (2-Chloroethoxy) Methane	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
2,4 Dichlorophenol	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	400	NS
1,2,4 Trichlorobenzene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	3,400	NS
Naphthalene	2000U	2000U	4000U	3600U	3600U	110J	750J	180J	370U	13,000	3.0×10^5
4-Chloroanaline	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	220 or MDL	NS
Hexachlorobutadiene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
4-Chloro-3-Methylphenol	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	240 or MDL	NS
2-Methyl Naphthalene	2000U	2000U	4000U	3600U	3600U	1800U	600J	140J	370U	36,400	NS
Hexachlorocyclopentadiene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
2,4,6 Trichlorophenol	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
2,4,5 Trichlorophenol	5000U	5100U	10000U	9000U	9000U	4500U	9800U	4500U	930U	100	NS
2-Chloronaphthalene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
2-Nitroaniline	5000U	2100U	10000U	9000U	9000U	4500U	9800U	4500U	930U	430 or MDL	NS
Acenaphthylene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	41,000	NS
Dimethyl Phthalate	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	2,000	NS
2,6 Dinitrotoluene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	1,000	NS
Acenaphthene	110 J	140 J	340 J	3600U	3600U	120J	420J	180J	370U	50,000***	5.0×10^6
3-Nitroaniline	5000U	2100U	10000U	9000U	9000U	1800U	9800U	1800U	930U	500 or MDL	NS
2,4 Dinitrophenol	5000U	5100U	10000U	9000U	9000U	4500U	9800U	4500U	930U	200 or MDL	NS
Dibenzofuran	2000U	140 J	4000U	3600U	3600U	94J	260J	140J	370U	6,200	NS
2,4 Dinitrotoluene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	1,000	NS
4- Nitrophenol	5000U	5100U	4000U	9000U	9000U	4500U	9800U	4500U	930U	100 or MDL	NS
Fluorene	110 J	230 J	390 J	3600U	3600U	210J	330J	210J	370U	50,000***	3.0×10^6
4-Chlorophenyl-phenyl Ether	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	800	NS
Diethyl Phthalate	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	7,100	NS
4-Nitroaniline	5000U	5100U	10000U	9000U	9000U	4500U	9800U	4500U	930U	NS	NS
2-Methyl 4,6-Dinitrophenol	5000U	5100U	4000U	3600U	3600U	4500U	9800U	4500U	930U	NS	NS
N-Nitrosodiphenylamine (1)	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
4-Bromophenyl-phenyl Ether	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
Hexachlorobenzene	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	410	NS
Pentachlorophenol	5000U	5100U	10000U	9000U	9000U	4500U	9800U	4500U	930U	1,000 or MDL	NS
Phenanthrene	1100 J	1600 J	4200	1200J	1100J	1700J	3400J	1600J	200J	50,000***	NS
Anthracene	250 J	520 J	2400 J	360J	370J	500J	610J	360J	46J	50,000***	2.0×10^7
Di-n-butylphthalante	3400	2000U	4000U	3600U	3100	210J	3900U	1800U	370U	8,100	NS
Fluoranthene	1000 J	1800 J	9200	1700J	2000J	2000J	2700J	1900	270J	50,000***	3.0×10^6
Pyrene	680 J	1300 J	7100	1400J	1800J	1500J	1800J	1700J	250J	50,000***	NS
Butyl Benzyl Phthalate	2800	2000U	4000U	280J	3000J	180J	3900U	1800U	370U	50,000***	NS
3,3' Dichlorobenzidine	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NA	NS
Benzo (a) anthracene	**330 J**	**690 J**	**3800J**	**810J**	**930J**	**880J**	**870J**	**880J**	160J	224 or MDL	220
Chrysene	390 J	**700 J**	**4200**	**920J**	**950J**	**810J**	**1000J**	**970J**	170J	400	NS
bis (2-Ethylhexyl)phthalate	2100	120 J	4000U	3600U	340J	130J	360J	1800U	370U	50,000***	NS
Di-n-octylphthalate	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	50,000***	NS
Indeno (1,2,3-cd) pyrene	230 J	380 J	2200 J	450J	470J	610J	510J	420J	110J	3,200	NS
Benzo (b,k) fluoranthene	720 J	**1300 J**	**6600 J**	**1700J**	**1700J**	**1900**	**1600J**	**1500**	310J	1,100	220
2,2' Oxybis(1-Chloropropane)	2000U	2000U	4000U	3600U	3600U	1800U	3900U	1800U	370U	NS	NS
Carbazole	120 J	2000U	340 J	3600U	3600U	180J	3900U	120J	370U	NS	NS
Benzo (a) pyrene	**390 J**	**750 J**	**4000 J**	**1000J**	**950J**	**1100J**	**880J**	**820J**	**170J**	61 or MDL	61
Dibenzo (a,h) anthracene	2000U	2000U	**620 J**	3600U	3600U	**200J**	3900U	**130J**	370U	14 or MDL	14
Benzo (g,h,i) perylene	2000U	420 J	240J	580J	500J	670J	600J	470J	140J	50,000***	NS

NOTES:
ug/kg - micrograms per kilogram
U - Analyte not detected at method detection level
NS - No Standard
MDL - Method Detection Limit
J - Analyte detected below the quantitation limits
*** - As per TAGM #4046, Total Semi-VOCs <500,000 ug/kg and Individual Semi-VOCs <50,000 ug/kg
E - Analyte detected outside calibrated range of instrument
B - Analyte detected in method blank
Shading - Detected concentration meets or exceeds TAGM RSCOs or USEPA HEAST Human Health Guidance Values
Bold results exceed TAGM RSCOs
Underlined results exceed USEPA HEAST Human Health Guidance Values

Appendix D. Table 2
Summary of SVOCs in Subsurface Fill
WTC Investigation
New York, New York

Sample ID	104,S,F,33-35	105,S,F,8-10	106,S,F,5-6	107,S,F,14-14.5'	108,S,F,14-16	109,S,F,9-10	Technical and Administrative Guidance Memorandun #4046 (TAGM) Recommended Soil Clean Up Objectives (RSCOs) (ug/kg)	USEPA HEAST Human Health Guidance Values (ug/kg)
Lab ID	0312-025-003	0312-025-002	0311-398-002	0311-353-005	0312-037-002	0312-023-005		
Date Collected	11/29/03	11/28/03	11/22/03	11/20/03	12/1/03	11/22/03		
Matrix	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Depth	33-35'	8-10'	5-6'	14-14.5'	14-16'	9-10'		
Analyte	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		
bis(2-Chloroethyl) Ether	400U	400U	410U	380U	620U	380U	NS	NS
Phenol	400U	400U	410U	380U	620U	380U	30 or MDL	NS
2-Chlorophenol	400U	400U	410U	380U	620U	380U	800	NS
1,3 Dichlorobenzene	400U	400U	410U	380U	620U	380U	1,600	NS
1,4 Dichlorobenzene	400U	400U	410U	380U	620U	380U	8,500	NS
1,2 Dichlorobenzene	400U	400U	410U	380U	620U	380U	7,900	NS
2-Methylphenol	400U	400U	410U	380U	620U	380U	100 or MDL	NS
Hexachloroethane	400U	400U	410U	380U	620U	380U	NS	NS
N-Nitroso-di-n-propylamine	400U	400U	410U	380U	620U	380U	NS	NS
3&4-Methylphenol	400U	400U	410U	380U	620U	380U	900	NS
Nitrobenzene	400U	400U	410U	380U	620U	380U	200 or MDL	NS
Isophorone	400U	400U	410U	380U	620U	380U	4,400	NS
2-Nitrophenol	400U	400U	410U	380U	620U	380U	330 or MDL	NS
2,4 Dimethylphenol	400U	400U	410U	380U	620U	380U	NS	NS
bis (2-Chloroethoxy) Methane	400U	400U	410U	380U	620U	380U	NS	NS
2,4 Dichlorophenol	400U	400U	410U	380U	620U	380U	400	NS
1,2,4 Trichlorobenzene	400U	400U	410U	380U	620U	380U	3,400	NS
Naphthalene	400U	400U	410U	380U	620U	380U	13,000	3.0×10^5
4-Chloroanaline	400U	400U	410U	380U	620U	380U	220 or MDL	NS
Hexachlorobutadiene	400U	400U	410U	380U	620U	380U	NS	NS
4-Chloro-3-Methylphenol	400U	400U	410U	380U	620U	380U	240 or MDL	NS
2-Methyl Naphthalene	400U	400U	410U	380U	620U	380U	36,400	NS
Hexachlorocyclopentadiene	400U	400U	410U	380U	620U	380U	NS	NS
2,4,6 Trichlorophenol	400U	400U	410U	380U	620U	380U	NS	NS
2,4,5 Trichlorophenol	1000U	1000U	1000U	950U	1500U	950U	100	NS
2-Chloronaphthalene	400U	410U	410U	380U	620U	380U	NS	NS
2-Nitroaniline	1000U	1000U	1000U	950U	1500U	950U	430 or MDL	NS
Acenaphthylene	400U	410U	410U	380U	620U	380U	41,000	NS
Dimethyl Phthalate	400U	410U	410U	380U	620U	380U	2,000	NS
2,6 Dinitrotoluene	400U	410U	410U	380U	620U	380U	1,000	NS
Acenaphthene	400U	410U	410U	380U	620U	380U	50,000***	5.0×10^6
3-Nitroaniline	1000U	1000U	1000U	950U	1500U	950U	500 or MDL	NS
2,4 Dinitrophenol	400U	1000U	1000U	950U	1500U	950U	200 or MDL	NS
Dibenzofuran	400U	410U	410U	380U	620U	380U	6,200	NS
2,4 Dinitrotoluene	400U	410U	410U	380U	620U	380U	1,000	NS
4- Nitrophenol	1000U	1000U	1,000U	950U	1500U	950U	100 or MDL	NS
Fluorene	400U	410U	410U	380U	620U	380U	50,000***	3.0×10^6
4-Chlorophenyl-phenyl Ether	400U	410U	410U	380U	620U	380U	800	NS
Diethyl Phthalate	400U	410U	410U	380U	620U	380U	7,100	NS
4-Nitroaniline	1000U	1000U	1000U	950U	1500U	950U	NS	NS
2-Methyl 4,6-Dinitrophenol	1000U	1000U	1000U	950U	1500U	950U	NS	NS
N-Nitrosodiphenylamine (1)	400U	410U	410U	380U	620U	380U	NS	NS
4-Bromophenyl-phenyl Ether	400U	410U	410U	380U	620U	380U	NS	NS
Hexachlorobenzene	400U	410U	410U	380U	620U	380U	410	NS
Pentachlorophenol	1000U	1000U	1000U	950U	1500U	950U	1,000 or MDL	NS
Phenanthrene	400U	410U	410U	380U	140J	380U	50,000***	NS
Anthracene	400U	410U	410U	380U	37J	380U	50,000***	2.0×10^7
Di-n-butylphthalante	400U	410U	410U	380U	620U	380U	8,100	NS
Fluoranthene	400U	410U	410U	380U	110J	380U	50,000***	3.0×10^6
Pyrene	400U	410U	410U	380U	120J	380U	50,000***	NS
Butyl Benzyl Phthalate	400U	410U	410U	380U	620U	380U	50,000***	NS
3,3' Dichlorobenzidine	400U	410U	410U	380U	620U	380U	NA	NS
Benzo (a) anthracene	400U	410U	410U	380U	50J	380U	224 or MDL	220
Chrysene	400U	410U	410U	380U	60J	380U	400	NS
bis (2-Ethylhexyl)phthalate	400U	410U	410U	380U	620U	380U	50,000***	NS
Di-n-octylphthalate	400U	410U	410U	380U	620U	380U	50,000***	NS
Indeno (1,2,3-cd) pyrene	400U	410U	410U	380U	620U	380U	3,200	NS
Benzo (b,k) fluoranthene	800U	810U	810U	760U	620U	760U	1,100	220
2,2' Oxybis(1-Chloropropane)	400U	410U	410U	380U	620U	380U	NS	NS
Carbazole	400U	410U	410U	380U	620U	380U	NS	NS
Benzo (a) pyrene	400U	410U	410U	380U	54J	380U	61 or MDL	61
Dibenzo (a,h) anthracene	400U	410U	410U	380U	620U	380U	14 or MDL	14
Benzo (g,h,i) perylene	400U	410U	410U	380U	620U	380U	50,000***	NS

NOTES:
ug/kg - micrograms per kilogram
U - Analyte not detected at method detection level
NS - No Standard
MDL - Method Detection Limit
J - Analyte detected below the quantitation limits
*** - As per TAGM #4046, Total Semi-VOCs <500,000 ug/kg and Individual Semi-VOCs <50,000 ug/kg
E - Analyte detected outside calibrated range of instrument
B - Analyte detected in method blank
Shading - Detected concentration meets or exceeds TAGM RSCOs or USEPA HEAST Human Health Guidance Values
Bold results exceed TAGM RSCOs
Underlined results exceed USEPA HEAST Human Health Guidance Values

Appendix D. Table 2
Summary of SVOCs in Native Soil
WTC Investigation
New York, New York

Sample ID	104,S,N,57-58	105,S,N,36-37	106,S,N,35-37	107,S,N,16-16.5	108,S,N,23-25	109,S,N,41-42	Technical and Administrative Guidance Memorandun #4046 (TAGM) Recommended Soil Clean Up Objectives (RSCOs) (ug/kg)	USEPA HEAST Human Health Guidance Values (ug/kg)
Lab ID	0312-025-006	0312-024-005	0311-398-005	0311-353-008	0312-037-005	0312-023-008		
Date Collected	11/29/03	11/28/03	11/22/03	11/20/03	12/1/03	11/26/03		
Matrix	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Depth	57-58'	36-37'	35-37'	16-16.5'	23-25'	41-42'		
Analyte	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		
bis(2-Chloroethyl) Ether	410U	420U	420U	400U	530U	380U	NS	NS
Phenol	410U	420U	420U	400U	530U	380U	30 or MDL	NS
2-Chlorophenol	410U	420U	420U	400U	530U	380U	800	NS
1,3 Dichlorobenzene	410U	420U	420U	400U	530U	380U	1,600	NS
1,4 Dichlorobenzene	410U	420U	420U	400U	530U	380U	8,500	NS
1,2 Dichlorobenzene	410U	420U	420U	400U	530U	380U	7,900	NS
2-Methylphenol	410U	420U	420U	400U	530U	380U	100 or MDL	NS
Hexachloroethane	410U	420U	420U	400U	530U	380U	NS	NS
N-Nitroso-di-n-propylamine	410U	420U	420U	400U	530U	380U	NS	NS
3&4-Methylphenol	410U	420U	420U	400U	530U	380U	900	NS
Nitrobenzene	410U	420U	420U	400U	530U	380U	200 or MDL	NS
Isophorone	410U	420U	420U	400U	530U	380U	4,400	NS
2-Nitrophenol	410U	420U	420U	400U	530U	380U	330 or MDL	NS
2,4 Dimethylphenol	410U	420U	420U	400U	530U	380U	NS	NS
bis (2-Chloroethoxy) Methane	410U	420U	420U	400U	530U	380U	NS	NS
2,4 Dichlorophenol	410U	420U	420U	400U	530U	380U	400	NS
1,2,4 Trichlorobenzene	410U	420U	420U	400U	530U	380U	3,400	NS
Naphthalene	410U	420U	420U	400U	530U	380U	13,000	3.0×10^5
4-Chloroanaline	410U	420U	420U	400U	530U	380U	220 or MDL	NS
Hexachlorobutadiene	410U	420U	420U	400U	530U	380U	NS	NS
4-Chloro-3-Methylphenol	410U	420U	420U	400U	530U	380U	240 or MDL	NS
2-Methyl Naphthalene	410U	420U	420U	400U	530U	380U	36,400	NS
Hexachlorocyclopentadiene	410U	420U	420U	400U	530U	380U	NS	NS
2,4,6 Trichlorophenol	410U	420U	420U	400U	530U	380U	NS	NS
2,4,5 Trichlorophenol	1000U	1,100U	1,100U	1000U	1300U	960U	100	NS
2-Chloronaphthalene	410U	420U	420U	400U	530U	380U	NS	NS
2-Nitroaniline	1000U	1,100U	1,100U	1000U	1300U	960U	430 or MDL	NS
Acenaphthylene	410U	420U	420U	400U	530U	380U	41,000	NS
Dimethyl Phthalate	410U	420U	420U	400U	530U	380U	2,000	NS
2,6 Dinitrotoluene	410U	420U	420U	400U	530U	380U	1,000	NS
Acenaphthene	410U	420U	420U	400U	530U	380U	50,000***	5.0×10^6
3-Nitroaniline	1000U	1100U	1100U	1000U	1300U	960U	500 or MDL	NS
2,4 Dinitrophenol	1000U	1100U	1100U	400U	1300U	960U	200 or MDL	NS
Dibenzofuran	410U	420U	420U	400U	530U	380U	6,200	NS
2,4 Dinitrotoluene	410U	420U	420U	400U	530U	380U	1,000	NS
4- Nitrophenol	1,000U	1100U	1100U	1000U	530U	960U	100 or MDL	NS
Fluorene	410U	420U	420U	400U	530U	380U	50,000***	3.0×10^6
4-Chlorophenyl-phenyl Ether	410U	420U	420U	400U	530U	380U	800	NS
Diethyl Phthalate	410U	420U	420U	400U	530U	380U	7,100	NS
4-Nitroaniline	1000U	1100U	1100U	1000U	1300U	960U	NS	NS
2-Methyl 4,6-Dinitrophenol	1000U	1100U	1100U	1000U	1300U	960U	NS	NS
N-Nitrosodiphenylamine (1)	410U	420U	420U	400U	530U	380U	NS	NS
4-Bromophenyl-phenyl Ether	410U	420U	420U	400U	530U	380U	NS	NS
Hexachlorobenzene	410U	420U	420U	400U	530U	380U	410	NS
Pentachlorophenol	1000U	1100U	1100U	1000U	1300U	960U	1,000 or MDL	NS
Phenanthrene	410U	420U	420U	400U	530U	380U	50,000***	NS
Anthracene	410U	420U	420U	400U	530U	380U	50,000***	2.0×10^7
Di-n-butylphthalante	410U	420U	420U	400U	530U	380U	8,100	NS
Fluoranthene	410U	420U	420U	400U	530U	380U	50,000***	3.0×10^6
Pyrene	410U	420U	420U	400U	530U	380U	50,000***	NS
Butyl Benzyl Phthalate	410U	420U	420U	400U	530U	380U	50,000***	NS
3,3' Dichlorobenzidine	410U	420U	420U	400U	530U	380U	NA	NS
Benzo (a) anthracene	410U	420U	420U	400U	530U	380U	224 or MDL	220
Chrysene	410U	420U	420U	400U	530U	380U	400	NS
bis (2-Ethylhexyl)phthalate	410U	420U	420U	400U	530U	380U	50,000***	NS
Di-n-octylphthalate	410U	420U	420U	400U	530U	380U	50,000***	NS
Indeno (1,2,3-cd) pyrene	410U	420U	420U	400U	530U	380U	3,200	NS
Benzo (b,k) fluoranthene	810U	840U	830U	800U	530U	770U	1,100	220
2,2' Oxybis(1-Chloropropane)	410U	420U	420U	400U	530U	380U	NS	NS
Carbazole	410U	420U	420U	400U	530U	380U	NS	NS
Benzo (a) pyrene	410U	420U	420U	400U	530U	380U	61 or MDL	61
Dibenzo (a,h) anthracene	410U	420U	420U	400U	530U	380U	14 or MDL	14
Benzo (g,h,i) perylene	410U	420U	420U	400U	530U	380U	50,000***	NS

NOTES:
ug/kg - micrograms per kilogram
U - Analyte not detected at method detection level
NS - No Standard
MDL - Method Detection Limit
J - Analyte detected below the quantitation limits
*** - As per TAGM #4046, Total Semi-VOCs <500,000 ug/kg and Individual Semi-VOCs <50,000 ug/kg
E - Analyte detected outside calibrated range of instrument
B - Analyte detected in method blank
Shading - Detected concentration meets or exceeds TAGM RSCOs or USEPA HEAST Human Health Guidance Values
Bold results exceed TAGM RSCOs
Underlined results exceed USEPA HEAST Human Health Guidance Values

Appendix D. Table 3
Summary of Metals in Surficial and Former Grade Soil
WTC Investigation
New York, New York

Sample ID	**101,S,S,0-3"**	**102,S,S,0-3"**	**112,S,S,0-3"**	**103,S,S,0-3"**	**104,S,S,0-3"**	**105,S,S,0-3"**	**106,S,S,0-3"**	**107,S,S,4-5'**	**109,S,S,3-4**	**Technical and Administrative**	**Eastern USA Soil**
Lab ID	0311-282-003	0311-282-006	0311-282-009	0311-305-003	0311-305-006	0311-305-009	0311-305-012	0311-353-003	0312-023-003	**Guidance Memorandun #4046**	**Background**
Date Collected	11/17/03	11/17/03	11/17/03	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/26/03	**(TAGM) Recommended**	**Concentrations**
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	**Soil Clean Up Objectives**	**(ppm)**
Sample Depth	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	4-5'	3-4'	**(RSCOs)**	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	**(mg/kg)**	
Aluminum	6,130	7,700	8,210	4,670	5,800	3,920	6,360	4,920	5,570	SB	33,000
Antimony	1.22	1.61	0.978	1.11	1.13	0.566	1.11	0.857	1.05	SB	N/A
Arsenic	3.51	3.78	4.31	2.54	3.41	2.70	3.19	3.63	2.63	7.5 or SB	3-12
Barium	60.7	80.8	78.6	53.0	74.9	40.6	60.1	86.3	64.8	300 or SB	15-600
Beryllium	**0.394**	**0.457**	**0.456**	**0.357**	**0.395**	**0.249**	**0.551**	**0.344**	**0.359**	0.16 (HEAST) or SB	0-1.75
Cadmium	0.115U	0.123U	0.121U	0.0985U	0.103	0.105U	0.105U	0.438	0.140	1 or SB	0.1-1
Calcium	55,600	64,200	61,600	42,200	36,000	21,900	57,300	52,500	10,800	SB	130-35,000
Chromium	**21**	**21.2**	**20.4**	**11.1**	**19.2**	**11.5**	**17.7**	**12.3**	**11.2**	10 or SB	1.5-40
Cobalt	4.77	5.97	5.11	4.33	4.96	3.00	5.18	4.94	5.63	30 or SB	2.5-60
Copper	**33.9**	**40.2**	**31.8**	**29.1**	**33.8**	19.2	24.0	**99.7**	**28.9**	25 or SB	1.0-50
Iron	**10,200**	**13,900**	**11,800**	**9,210**	**11,000**	**6,760**	**10,600**	**10,400**	**9,960**	2,000 or SB	2,000-550,000
Lead	74.1	53.4	46.7	54.8	88.6	20.6	29.5	173	138	SB****	200-500****
Magnesium	6,770	5,650	5,920	17,900	6,030	5,000	6,480	22,100	3,860	SB	100-5,000
Manganese	202	264	244	200	206	136	204	172	297	SB	50-5,000
Mercury	**0.11**	0.07	0.08	0.09	**0.32**	0.04	0.004	**0.46**	**0.50**	0.1	0.001-0.2
Nickel	**15.6**	**17.3**	**19.4**	12.2	**13.7**	9.22	**14.8**	**13.5**	**28.5**	13 or SB	0.5-25
Potassium	835	1,540	1,490	1,250	1,170	653	767	1,270	1,130	SB	8,500-43,000
Selenium	**3**	2.46U	2.42U	1.97U	1.97	1.67	2.10U	**2.77**	1.41	2 or SB	0.1-3.9
Silver	0.346U	0.369,	0.363U	0.296U	0.296	0.316U	0.316U	0.628	0.338	SB	N/A
Sodium	1,170	4,240	2,440	341	392	867	3,840	483	369	SB	6,000-8,000
Thallium	0.193U	0.251U	0.63	0.70	0.61	0.64	0.82	0.30	0.28	SB	N/A
Vanadium	17.7	22	19.5	23.3	21.8	10.4	27.8	27.4	12.1	150 or SB	1-300
Zinc	**104**	**75**	**80.6**	**92.8**	**106**	**51.0**	**57.1**	**185**	**29.1**	20 or SB	9.0-50

NOTES:
mg/kg - miligrams per kilogram
ppm - parts per million
mg/kg = ppm
SB - Site background
B - Analyte detected in the associated method blank
Detected concentrations above TAGM RSCOs are in **bold.**
Shading - Detected concentration exceeds TAGM RSCO and/or are above SB.
U - Analyte not detected at method detection level
**** - Average levels of lead in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm

Appendix D. Table 3
Summary of Metals in Subsurface Fill
WTC Investigation
New York, New York

Sample ID	104,S,F,33-35	105,S,F,8-10	106,S,F,5-6	107,S,F,14-14.5'	108,S,F,14-16	109,S,F,9-10	Technical and Administrative	Eastern USA Soil
Lab ID	0312-025-002	0312-024-003	0311-398-003	0311-353-006	0312-037-003	0312-023-006	Guidance Memorandun #4046	Background
Date Collected	11/29/03	11/28/03	11/22/03	11/20/03	12/1/03	11/26/03	(TAGM) Recommended	Concentrations
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil Clean Up Objectives	(ppm)
Sample Depth	33-35'	8-10'	5-6'	14-14.5'	14-16'	9-10'	(RSCOs)	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	(mg/kg)	
Aluminum	4,050	4,620	4,850	5,230	6,200	5,170	SB	33,000
Antimony	0.978	0.889	0.533U	0.790	0.977	1.08	SB	N/A
Arsenic	1.14	1.16	1.17	2.59	2.67	2.48	7.5 or SB	3-12
Barium	142	78.3	71.7	30.0	33.4	70.7	300 or SB	15-600
Beryllium	**0.330**	**0.354**	**0.420**	**0.301**	**0.563**	**0.364**	0.16 (HEAST) or SB	0-1.75
Cadmium	0.110U	0.111U	0.165	0.116U	0.117U	0.116U	1 or SB	0.1-1
Calcium	10,400	14,500	7,890	1,490	4,620	13,100	SB	130-35,000
Chromium	9.73	9.84	**13.2**	**11.5**	**16.6**	**12.6**	10 or SB	1.5-40
Cobalt	5.09	5.88	6.26	7.26	6.05	7.17	30 or SB	2.5-60
Copper	9.64	13.6	11.5	17.4	21.4	**34.7**	25 or SB	1.0-50
Iron	**8,860**	**10,500**	**11,300**	**10,300**	**13,600**	**11,600**	2,000 or SB	2,000-550,000
Lead	5.25	5.39	12.1	8.86	41.4	70.2	SB****	200-500****
Magnesium	4,560	6,010	6,650	2,930	3,620	5,050	SB	100-5,000
Manganese	329	350	310	132	422	782	SB	50-5,000
Mercury	0.04U	0.04U	0.04U	0.04	0.09	**0.49**	0.1	0.001-0.2
Nickel	**13.3**	**14.6**	**26.9**	**57.9**	**26.3**	**46.6**	13 or SB	0.5-25
Potassium	1,520	1,240	1,840	1,520	1,720	1,370	SB	8,500-43,000
Selenium	1.75	1.90	1.31	0.912	1.52	**2.20**	2 or SB	0.1-3.9
Silver	0.331U	0.332U	0.320U	0.349U	0.351U	0.348U	SB	N/A
Sodium	215	227	210	178	744	396	SB	6,000-8,000
Thallium	0.35	0.33	0.18	0.201U	0.234U	0.26	SB	N/A
Vanadium	11.0	11.7	13.2	13.8	18.6	13.3	150 or SB	1-300
Zinc	19.7	**25.6**	**26.0**	**32.4**	**38.8**	**32.5**	20 or SB	9.0-50

NOTES:
mg/kg - miligrams per kilogram
ppm - parts per million
mg/kg = ppm
SB - Site background
B - Analyte detected in the associated method blank
Detected concentrations above TAGM RSCOs are in **bold.**
Shading - Detected concentration exceeds TAGM RSCO and/or are above SB.
U - Analyte not detected at method detection level
**** - Average levels of lead in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm

Appendix D. Table 3
Summary of Metals in Native Soil
WTC Investigation
New York, New York

Sample ID	104,S,N,57-58	105,S,N,36-37	106,S,N,35-37	107,S,N,16-16.5	108,S,N,23-25	109,S,N,41-42	Technical and Administrative	Eastern USA Soil
Lab ID	0312-025-005	0312-024-006	0311-398-006	0311-353-009	0312-037-005	0312-023-009	Guidance Memorandun #4046	Background
Date Collected	11/29/03	11/28/03	11/22/03	11/20/03	12/1/03	11/26/03	(TAGM) Recommended	Concentrations
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil Clean Up Objectives	(ppm)
Sample Depth	57-58'	36-37'	35-37'	16-16.5'	14-16'	41-42'	(RSCOs)	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	mg/kg	(mg/kg)	
Aluminum	4,400	9,330	6,360	5,930	5,790	1,020	SB	33,000
Antimony	2.07	1.44	0.584U	0.744	1.57	0.513U	SB	N/A
Arsenic	4.19	2.16	2.06	3.00	2.99	0.821U	7.5 or SB	3-12
Barium	39	136	122	38.4	34.1	5.53	300 or SB	15-600
Beryllium	**0.211**	**0.724**	**0.404**	**0.388**	**0.394**	0.103U	0.16 (HEAST) or SB	0-1.75
Cadmium	0.115U	0.569	0.148	0.103U	0.139U	0.103U	1 or SB	0.1-1
Calcium	14,700	13,700	15,600	1,940	5,360	704	SB	130-35,000
Chromium	**45.3**	**19.7**	**14.3**	**15.5**	**16.8**	4.12	10 or SB	1.5-40
Cobalt	**52.2**	10.2	7.78	9.28	6.55	1.09	30 or SB	2.5-60
Copper	8.29	23.3	19.1	14.7	19.8	3.61	25 or SB	1.0-50
Iron	**26,600**	**18,600**	**14,400**	**12,200**	**13,400**	**2,290**	2,000 or SB	2,000-550,000
Lead	1.61	16.4	7.31	18.5	27.4	3.43	SB****	200-500****
Magnesium	123,000	8,550	7,040	2,590	2,970	818	SB	100-5,000
Manganese	496	425	404	245	384	27.9	SB	50-5,000
Mercury	0.04U	0.04U	0.04U	**0.13**	0.08	0.04	0.1	0.001-0.2
Nickel	**1,080**	**34.3**	**20.7**	**76.3**	**28.0**	5.38	13 or SB	0.5-25
Potassium	785	2,770	1,740	852	1,400	278	SB	8,500-43,000
Selenium	**2.15**	**2.00**	1.27	1.81	1.75	0.531	2 or SB	0.1-3.9
Silver	0.344U	0.341U	0.350U	0.308U	0.418U	0.308U	SB	N/A
Sodium	244	298	266	164	1,020	154U	SB	6,000-8,000
Thallium	0.58	0.40	0.57	0.221U	0.291U	0.23U	SB	N/A
Vanadium	22.1	20.7	17.0	14.5	20.8	2.96	150 or SB	1-300
Zinc	**26.0**	**110**	**35.8**	**26.4**	**43.3**	6.56	20 or SB	9.0-50

NOTES:
mg/kg - miligrams per kilogram
ppm - parts per million
mg/kg = ppm
SB - Site background
B - Analyte detected in the associated method blank
Detected concentrations above TAGM RSCOs are in **bold.**
Shading - Detected concentration exceeds TAGM RSCO and/or are above SB.
U - Analyte not detected at method detection level
**** - Average levels of lead in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm

Appendix D. Table 4

Summary of PCBs in Surficial and Former Grade Soil
WTC Investigation
New York, New York

Sample ID	101,S,S,0-3	102,S,S,0-3	112,S,S,0-3	103,S,S,0-3	104,S,S,0-3	105S,S,0-3"	106S,S,0-3"	107,S,S,4-5'	109,S,S,3-4	Technical and Administrative
Lab ID	0311-282-002	0311-282-005	0311-282-008	0311-305-002	0311-305-005	0311-305-008	0311-305-011	0311-353-002	0311-023-002	Guidance Memorandun #4046
Date Collected	11/17/03	11/17/03	11/17/03	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/22/03	(TAGM) Recommended
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil Clean Up Objectives (RSCOs)
Sample Depth	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	4-5'	3-4'	
Analyte	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	(ug/kg)
PCB 1016	200U	200U	210U	180U	180U	180U	190U	36U	37U	10,000
PCB 1221	400U	400U	420U	360U	360U	360U	390U	72U	75U	10,000
PCB 1232	200U	200U	210U	180U	180U	180U	190U	36U	37U	10,000
PCB 1242	200U	200U	210U	180U	180U	180U	190U	36U	37U	10,000
PCB 1248	200U	200U	210U	180U	180U	180U	190U	36U	37U	10,000
PCB 1254	200U	200U	210U	180U	180U	180U	190U	36U	37U	10,000
PCB 1260	200U	200U	210U	180U	180U	180U	190U	36U	37U	10,000

NOTES:
ug/kg - micrograms per kilogram
U - Analyte not detected at method detection level

Appendix D. Table 4
Summary of PCBs in Subsurface Fill
WTC Investigation
New York, New York

Sample ID	104,S,F,33-35	105,S,F,8-10	106,S,F,5-6	107,S,F,14-14.5	108,S,F,14-16	109,S,F,9-10	Technical and Administrative
Lab ID	0312-025-003	0312-024-002	0311-398-002	0311-353-005	0312-037-002	0312-023-005	Guidance Memorandun #4046
Date Collected	11/29/03	11/28/03	11/22/03	11/20/03	12/1/03	11/26/03	(TAGM) Recommended
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil Clean Up Objectives (RSCOs)
Sample Depth	33-35'	8-10'	5-6'	14-14.5'	14-16'	9-10'	
Analyte	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	(ug/kg)
PCB 1016	40U	41U	40U	37U	61U	38U	10,000
PCB 1221	81U	84U	81U	76U	120U	77U	10,000
PCB 1232	40U	41U	40U	37U	61U	38U	10,000
PCB 1242	40U	41U	40U	37U	61U	38U	10,000
PCB 1248	40U	41U	40U	37U	61U	38U	10,000
PCB 1254	40U	41U	40U	37U	61U	38U	10,000
PCB 1260	40U	41U	40U	37U	61U	38U	10,000

NOTES:
ug/kg - micrograms per kilogram
U - Analyte not detected at method detection level

Appendix D. Table 4
Summary of PCBs in Native Soil
WTC Investigation
New York, New York

Sample ID	104,S,N,57-58	105,S,N,36-37	106,S,N,35-37	107,S,N,16-16.5	108,S,N,23-25	109,S,N,41-42	Technical and Administrative
Lab ID	0312-025-006	0312-024-005	0311-398-005	0311-353-008	0312-037-005	0312-023-008	Guidance Memorandun #4046
Date Collected	11/29/03	11/28/03	11/22/03	11/20/03	12/1/03	11/26/03	(TAGM) Recommended
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil Clean Up Objectives (RSCOs)
Sample Depth	57-58'	36-37'	35-37'	16-16.5'	14-16'	41-42'	
Analyte	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	(ug/kg)
PCB 1016	39U	41U	41U	39U	52U	38U	10,000
PCB 1221	80U	84U	84U	79U	110U	76U	10,000
PCB 1232	39U	41U	41U	39U	52U	38U	10,000
PCB 1242	39U	41U	41U	39U	52U	38U	10,000
PCB 1248	39U	41U	41U	39U	52U	38U	10,000
PCB 1254	39U	41U	41U	39U	52U	38U	10,000
PCB 1260	39U	41U	41U	39U	52U	38U	10,000

NOTES:
ug/kg - micrograms per kilogram
U - Analyte not detected at method detection level

Appendix D. Table 5
Summary of TCLP SVOCs in Soil
WTC Investigation
New York, New York

Sample ID	101,S,S,0-3"	102,S,S,0-3"	112,S,S,0-3"	103,S,S,0-3"	104,S,S,0-3"	105,S,S,0-3"	106,S,S,0-3"	107,S,S,4'-4.5'	109,S,S,3'-4'	RCRA Standard for Toxicity Characteristic
Lab ID	0312-081-001	0312-081-002	0312-081-003	0312-081-004	0312-081-005	0312-081-006	0312-081-007	0312-081-008	0312-081-009	
Date Collected	11/17/03	11/17/03	11/17/03	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/26/03	
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
Analyte	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2-Methylphenol	50 U	50 U	50 U	50 U	50 U	50 U	Quantity	50 U	50 U	7,500
3 & 4-Methylphenol	100 U	100 U	100 U	100 U	100 U	100 U	not	100 U	100 U	130
2,4 Dinitrotoluene	50 U	50 U	50 U	50 U	50 U	50 U	Sufficient	50 U	50 U	400
Hexachlorobenzene	50 U	50 U	50 U	50 U	50 U	50 U		50 U	50 U	2,000
Hexachloro-1,3-butadiene	50 U	50 U	50 U	50 U	50 U	50 U		50 U	50 U	NS
Hexachloroethane	50 U	50 U	50 U	50 U	50 U	50 U		50 U	50 U	NS
Nitrobenzene	50 U	50 U	50 U	50 U	50 U	50 U		50 U	50 U	130
1,4 Dichlorobenzene	50 U	50 U	50 U	50 U	50 U	50 U		50 U	50 U	500
Pentachlorophenol	100 U	100 U	100 U	100 U	100 U	100 U		100 U	100 U	3,000
Pyridine	50 U	50 U	50 U	50 U	50 U	50 U		50 U	50 U	2,000
2,4,5 Trichlorophenol	50 U	50 U	50 U	50 U	50 U	50 U		50 U	50 U	100,000
2,4,6 Trichlorophenol	50 U	50 U	50 U	50 U	50 U	50 U		50 U	50 U	5,000

NOTES:
ug/L - micrograms per liter
MDL - Method Detection Limit
NS - No Standard
U - Parameter not detected at method detection level

Appendix D. Table 6
Summary of TCLP Pesticides in Soil
WTC Investigation
New York, New York

Sample ID	101,S,S,0-3"	102,S,S,0-3"	112,S,S,0-3"	103,S,S,0-3"	104,S,S,0-3"	105,S,S,0-3"	106,S,S,0-3"	107,S,S,4'-4.5'	109,S,S,3'-4'	Technical and Administrative Guidance Memorandun #4046 (TAGM) Recommended Soil Clean Up Objectives (RCSOs)
Lab ID	0312-081-001	0312-081-002	0312-081-003	0312-081-004	0312-081-005	0312-081-006	0312-081-007	0312-081-008	0312-081-009	
Date Collected	11/17/03	11/17/03	11/17/03	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/26/03	
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
Sample Depth	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	4'-4.5'	3'-4'	
Analyte	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	(ug/kg)
gamma-BHC (Lindane)	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	Quantity	0.3 U	0.3 U	60
Heptachlor	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	not	0.3 U	0.3 U	100
Heptachlor epoxide	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	Sufficient	0.3 U	0.3 U	20
Endrin	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	100
Methoxychlor	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	***
Chlordane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U		5.0 U	5.0 U	540
Toxaphene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U		5.0 U	5.0 U	NS

NOTES:
ug/kg - micrograms per kilogram
ug/L - micrograms per liter
ug/kg equal to ug/L
U - Analyte not detected at method detection level
*** - As per TAGM #4046, Total VOCs <10 ppm
NS - No Standard

Appendix D. Table 7
Summary of TCLP Herbicides in Soil
WTC Investigation
New York, New York

Sample ID	101,S,S,0-3"	102,S,S,0-3"	112,S,S,0-3"	103,S,S,0-3"	104,S,S,0-3"	105,S,S,0-3"	106,S,S,0-3"	107,S,S,4'-4.5'	109,S,S,3'-4'	RCRA Standard for Toxicity Characteristic
Lab ID	0312-081-001	0312-081-002	0312-081-003	0312-081-004	0312-081-005	0312-081-006	0312-081-007	0312-081-008	0312-081-009	
Date Collected	11/17/03	11/17/03	11/17/03	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/26/03	
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
Analyte	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	(ug/L)
2,4 D	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	Quantity not	5.0 U	5.0 U	100,000
2,4,5 TP	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	Sufficent	1.00 U	1.00 U	1,000

NOTES:
ug/L - micrograms per liter
U - Parameter not detected at method detection level

Appendix D. Table 8
Summary of TCLP Metals in Soil
WTC Investigation
New York, New York

Sample ID	101,S,S,0-3"	102,S,S,0-3"	112,S,S,0-3"	103,S,S,0-3"	104,S,S,0-3"	105,S,S,0-3"	106,S,S,0-3"	107,S,S,4'-4.5'	109,S,S,3'-4'	RCRA Standard for Toxicity Characteristic (mg/L)
Lab ID	0312-081-001	0312-081-002	0312-081-003	0312-081-004	0312-081-005	0312-081-006	0312-081-007	0312-081-008	0312-081-009	
Date Collected	11/17/03	11/17/03	11/17/03	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/26/03	
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
Analyte	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Barium	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	Quantity	10.0 U	10.0 U	100
Arsenic	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	not	1.00 U	1.00 U	5
Cadmium	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	Sufficient	0.100 U	0.100 U	1
Chromium	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U		0.500 U	0.500 U	5
Lead	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U		0.500 U	0.500 U	5
Mercury	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U		0.0200 U	0.0200 U	0.2
Silver	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U		0.100 U	0.100 U	5
Selenium	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U		1.00 U	1.00 U	1

NOTES:
ug/L- micrograms per liter
U - Parameter not detected at method detection level

Appendix D. Table 9
Summary of RCRA Characteristics of Hazardous Waste
WTC Investigation
New York, New York

Sample ID	**101,S,S,0-3"**	**102,S,S,0-3"**	**112,S,S,0-3"**	**103,S,S,0-3"**	**104,S,S,0-3"**	**105,S,S,0-3"**	**106,S,S,0-3"**	**107,S,S,4-5'**	**109,S,S,3-4**	**RCRA Standard for Characteristic Hazardous Waste**
Lab ID	0311-282-002	0311-282-005	0311-282-008	0311-305-003	0312-081-005	0311-305-008	0311-305-011	0311-353-002	0312-023-003	
Date Collected	11/17/03	11/17/03	11/17/03	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/26/03	
Matrix	soil	soil	soil	soil	soil	soil	soil	Soil	Soil	
Sample Depth	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	4-5'	3-4'	
Analyte										
Reactivity Characteristic										
Reactive Cyanide	0.03U	0.03U	0.03U	0.03U	0.03U	0.03U	0.03U	0.03U	ND	250 mg/kg**
Reactive Sulfide	0.494	0.744	0.503	0.67	2.70	2.26	0.25U	1.56	ND	500 mg/kg**
Corrosivity Characteristic										
pH	11.72	10.93	11.35	9.50	9.81	9.69	11.6	10.6	8.71	> 2 and < 12.5 pH Units**
Ignitability Characteristic										
Flash Point	>212	>212	>212	>212	>212	>212	>212	>212	>212	140 F**
Toxicity Characteristic										
Mercury	0.09	0.08	0.18	0.12	0.02	0.04U	0.06	0.69	0.50	200

NOTE:
ug/L - micrograms per Liter
U - Analyte not detected at method detection limit
* - flame extinguished at reported temperature. Per method, sample assumed not to be ignitable
F - Degrees Fahrenheit
mg/kg - milligrams per kilogram
** - Units for results are same those presented for the standard

Appendix D. Table 10

Summary of Asbestos in Surficial and Former Grade Soil
WTC Investigation
New York, New York

Sample ID	101, S, S, 0-3"	102, S, S, 0-3"	112, S, S, 0-3"	103, S, S, 0-3"	104, S, S, 0-3"	105, S, S, 0-3"	106, S, S, 0-3"	107, S, S, 4'-4.5'	109, S, S, 3'-4'
Lab ID	203112343-01	203112343-02	203112343-03	203112457-01	203112457-02	203112457-03	203112457-04	203112660-01	2031131144-01
Date Collected	11/17/03	11/17/03	11/17/2003	11/18/03	11/18/03	11/18/03	11/18/03	11/20/03	11/26/03
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	0-3"	4'-4.5'	3'-4'
Analyte	%	%	%	%	%	%	%	%	%
Asbestos	NAD	NAD	<1	NAD	<1	NAD	NAD	<1	NAD

NOTE:
NAD = No Asbestos Detected
Asbestos detected is trace Chrysolite
Asbestos percentage is based on fibers per cubic centimeter
Asbestos Analysis by EPA Method 600/M4-82-020 per 40 CFR 763 (NVLAP Lab #200546-0) and ELAP
PLM Bulk Analysis Protocol 198.1 for New York samples (NYSDOH ELAP Lab # 11480)

Appendix D. Table 11
Summary of VOCs in Groundwater
WTC Investigation
New York, New York

Sample ID	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Technical and Operational Guidance Series 1.1.1 (TOGS) Ambient Water Quality Standards and Guidance Values (ug/L)	NYCDEP Limitations for Effluent to Sanitary or Combined Sewers ug/L	NYCDEP Limitations for Effluent to Storm Sewers ug/L
Lab ID	0312-037-007	0312-025-007	0312-024-007	0311-398-007	0312-023-010			
Date Collected	12/1/03	11/29/03	11/28/03	11/22/03	11/26/03			
Matrix	Water	Water	Water	Water	Water			
Units	ug/L	ug/L	ug/L	ug/L	ug/L			
Analyte								
Chloromethane	10 U	10U	10U	10U	10U	5	NA	NA
Vinyl Chloride	10 U	10U	10U	10U	10U	2	NA	NA
Bromomethane	10 U	10U	10U	10U	10U	5	NA	NA
Chloroethane	10 U	10U	10U	10U	10U	5	NA	NA
Carbon Disulfide	10 U	10U	10U	10U	10U	60	NA	NA
Acetone	10 U	10U	10U	10U	10U	50	NA	NA
trans-1,2 Dichloroethene	10 U	10U	10U	10U	10U	5	NA	NA
Methylene Chloride	10 U	10U	10U	2JB	10U	5	NA	NA
1,1 Dichoroethane	10 U	10U	10U	10U	10U	5	NA	NA
cis-1,2 Dichloroethylene	10 U	10U	10U	10U	10U	5	NA	NA
2-Butanone	10 U	10U	10U	10U	10U	50	NA	NA
Chloroform	10 U	10U	10U	10U	10U	7	NA	NA
1,2 Dichloroethane	10 U	10U	10U	10U	10U	0.6	NA	NA
1,1,1-Trichloroethane	10 U	10U	10U	10U	10U	5	NA	NA
Carbon Tetrachloride	10 U	10U	10U	10U	10U	5	NA	NA
Benzene	10 U	10U	10U	10U	10U	1	134	134
1,1 Dichloroethelyene	10 U	10U	10U	10U	10U	5	NA	NA
Trichloroethylene	10 U	10U	10U	10U	10U	5	NA	NA
1,2 Dichloropropane	10 U	10U	10U	10U	10U	1	NA	NA
4-Methyl-2-pentanone	10 U	10U	10U	10U	10U	NS	NA	NA
cis-1,3-Dichloropropene	10 U	10U	10U	10U	10U	0.4	NA	NA
Toluene	10 U	10U	10U	10U	10U	5	74	74
trans-1,3-Dichloropropene	10 U	10U	10U	10U	10U	0.4	NA	NA
Bromodichloromethane	10 U	10U	10U	10U	10U	50	NA	NA
1,1,2 Trichloroethane	10 U	10U	10U	10U	10U	1	NA	NA
2-Hexanone	10 U	10U	10U	10U	10U	50	NA	NA
Tetrachloroethylene	10 U	10U	10U	2J	2J	5	20	20
Dibromochloromethane	10 U	10U	10U	10U	10U	50	NA	NA
Chlorobenzene	10 U	10U	10U	10U	10U	5	NA	NA
Ethylbenzene	10 U	10U	10U	10U	10U	5	142	380
O xylene	10 U	10U	10U	10U	10U	5	74	74
M&P xylene	10 U	10U	10U	10U	10U	5	74	74
Styrene	10 U	10U	10U	10U	10U	5	NA	NA
Bromoform	10 U	10U	10U	10U	10U	50	NA	NA
1,1,2,2,Tetrachloroethane	10 U	10U	10U	10U	10U	5	NA	NA

U- Parameter not detected at method detection level
NS- No Standard
ug/L- micrograms per liter
J- Analyte deteced below the quantitation limits
U- Parameter not detected at method detection level
NS- No Standard

Appendix D. Table 11
Summary of VOCs in Groundwater
WTC Investigation
New York, New York

Sample ID	104,GW	105,GW	106,GW	108,GW	109,GW	Technical and Operational Guidance Series 1.1.1 (TOGS) Ambient Water Quality Standards and Guidance Values (ug/L)	NYCDEP Limitations for Effluent to Sanitary or Combined Sewers ug/L	NYCDEP Limitations for Effluent to Storm Sewers ug/L
Lab ID	0312-025-008	0312-024-008	0311-398-008	0312-037-007	0312-023-011			
Date Collected	11/29/03	11/28/03	11/22/03	12/1/03	11/26/03			
Matrix	Water	Water	Water	Water	Water			
Units	ug/L	ug/L	ug/L	ug/L	ug/L			
Analyte								
Chloromethane	10U	10U	10U	10 U	10U	5	NA	NA
Vinyl Chloride	10U	10U	10U	10 U	10U	2	NA	NA
Bromomethane	10U	10U	10U	10 U	10U	5	NA	NA
Chloroethane	10U	10U	10U	10 U	10U	5	NA	NA
Carbon Disulfide	10U	10U	10U	10 U	10U	60	NA	NA
Acetone	10U	10U	10U	10 U	10U	50	NA	NA
trans-1,2 Dichloroethene	10U	10U	10U	10 U	10U	5	NA	NA
Methylene Chloride	10U	10U	2JB	10 U	10U	5	NA	NA
1,1 Dichoroethane	10U	10U	10U	10 U	10U	5	NA	NA
cis-1,2 Dichloroethylene	1J	10U	1J	10 U	10U	5	NA	NA
2-Butanone	10U	10U	10U	10 U	10U	50	NA	NA
Chloroform	19	10U	10U	10 U	18	7	NA	NA
1,2 Dichloroethane	10U	10U	10U	10 U	10U	0.6	NA	NA
1,1,1-Trichloroethane	10U	10U	10U	10 U	10U	5	NA	NA
Carbon Tetrachloride	10U	10U	10U	10 U	10U	5	NA	NA
Benzene	10U	10U	10U	10 U	2	1	134	134
1,1 Dichloroethelyene	10U	10U	10U	10 U	10U	5	NA	NA
Trichloroethylene	10U	10U	10U	10 U	10U	5	NA	NA
1,2 Dichloropropane	10U	10U	10U	10 U	10U	1	NA	NA
4-Methyl-2-pentanone	10U	10U	10U	10 U	10U	NS	NA	NA
cis-1,3-Dichloropropene	10U	10U	10U	10 U	10U	0.4	NA	NA
Toluene	10U	10U	1J	10 U	11	5	74	74
trans-1,3-Dichloropropene	10U	10U	10U	10 U	10U	0.4	NA	NA
Bromodichloromethane	2J	10U	10U	10 U	10U	50	NA	NA
1,1,2 Trichloroethane	10U	10U	10U	10 U	10U	1	NA	NA
2-Hexanone	10U	10U	10U	10 U	10U	50	NA	NA
Tetrachloroethylene	2J	2J	9J	10 U	10U	5	20	20
Dibromochloromethane	10U	10U	10U	10 U	10U	50	NA	NA
Chlorobenzene	10U	10U	10U	10 U	10U	5	NA	NA
Ethylbenzene	10U	10U	10U	10 U	10U	5	142	380
O xylene	10U	10U	10U	10 U	10U	5	74	74
M&P xylene	10U	10U	2J	10 U	10U	5	74	74
Styrene	10U	10U	10U	10 U	10U	5	NA	NA
Bromoform	10U	10U	10U	10 U	10U	50	NA	NA
1,1,2,2,Tetrachloroethane	10U	10U	10U	10 U	10U	5	NA	NA

U- Parameter not detected at method detection level
NS- No Standard
ug/L- micrograms per liter
J- Analyte deteced below the quantitation limits
U- Parameter not detected at method detection level
NS- No Standard

Appendix D. Table 12
Summary of SVOCs in Groundwater
WTC Investigation
New York, New York

Sample ID	104,GW	105, GW	106, GW	108,GW	109, GW	Technical and Operational Guidance Series 1.1.1 (TOGS) Ambient Water Quality Standards and Guidance Values (ug/L)	NYCDEP Limitations for Effluent to Sanitary or Combined Sewers ug/L	NYCDEP Limitations for Effluent to Storm Sewers ug/L
Lab ID	0312-037-011	0312-024-011	0311-398-009	0312-037-007	0312-023-012			
Date Collected	11/29/03	11/28/03	11/22/03	12/1/03	11/26/03			
Matrix	Water	Water	Water	Water	Water			
Units	ug/L	ug/L	ug/L	ug/L	ug/L			
Analyte								
bis(2-Chloroethyl) Ether	10 U	10 U	11 U	10 U	10 U	3	NS	NS
Phenol	10 U	10 U	11 U	10 U	10 U	5	NS	NS
2-Chlorophenol	10 U	10 U	11 U	10 U	10 U	3	NS	NS
1,3 Dichlorobenzene	10 U	10 U	11 U	10 U	10 U	3	NS	NS
1,4 Dichlorobenzene	10 U	10 U	11 U	10 U	10 U	5	NS	NS
1,2 Dichlorobenzene	10 U	10 U	11 U	10 U	10 U	5	NS	NS
2-Methylphenol	10 U	10 U	11 U	10 U	10 U	50	NS	NS
Hexachloroethane	10 U	10 U	11 U	10 U	10 U	10	NS	NS
N-Nitroso-di-n-propylamine	10 U	10 U	11 U	10 U	10 U	5	NS	NS
3&4-Methylphenol	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
Nitrobenzene	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
Isophorone	10 U	10 U	11 U	10 U	10 U	5	NS	NS
2-Nitrophenol	10 U	10 U	11 U	10 U	10 U	10	NS	NS
2,4 Dimethylphenol	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
bis (2-Chloroethoxy) Methane	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
2,4 Dichlorophenol	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
1,2,4 Trichlorobenzene	10 U	10 U	11 U	10 U	10 U	5	NS	NS
Naphthalene	10 U	10 U	11 U	10 U	10 U	2*	47	47
4-Chloroanaline	10 U	10 U	11 U	10 U	10 U	5	NS	NS
Hexachlorobutadiene	10 U	10 U	11 U	10 U	10 U	5	NS	NS
4-Chloro-3-Methylphenol	10 U	10 U	11 U	10 U	10 U	2*	NS	NS
2-Methyl Naphthalene	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
Hexachlorocyclopentadiene	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
2,4,6 Trichlorophenol	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
2,4,5 Trichlorophenol	25 U	25 U	27 U	25 U	25 U	5	NS	NS
2-Chloronaphthalene	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
2-Nitroaniline	25 U	25 U	27 U	25 U	25 U	NS	NS	NS
Acenaphthylene	10 U	10 U	11 U	10 U	10 U	5	NS	NS
Dimethyl Phthalate	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
2,6 Dinitrotoluene	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
Acenaphthene	10 U	10 U	11 U	10 U	10 U	20	NS	NS
3-Nitroaniline	25 U	25 U	27 U	25 U	25 U	5	NS	NS
2,4 Dinitrophenol	25 U	25 U	27 U	25 U	25 U	1.5	NS	NS
Dibenzofuran	10 U	10 U	11 U	10 U	10 U	3	NS	NS
2,4 Dinitrotoluene	10 U	10 U	11 U	10 U	10 U	5	NS	NS
4- Nitrophenol	25 U	25 U	27 U	25 U	25 U	2*	NS	NS
Fluorene	25 U	25 U	27 U	25 U	25 U	50	NS	NS
4-Chlorophenyl-phenyl Ether	25 U	25 U	27 U	25 U	25 U	NS	NS	NS
Diethyl Phthalate	10 U	10 U	11 U	10 U	10 U	50	NS	NS
4-Nitroaniline	10 U	10 U	11 U	10 U	10 U	5	NS	NS
2-Methyl 4,6-Dinitrophenol	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
N-Nitrosodiphenylamine (1)	10 U	10 U	11 U	10 U	10 U	50	NS	NS
4-Bromophenyl-phenyl Ether	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
Hexachlorobenzene	10 U	10 U	11 U	10 U	10 U	0.04	NS	NS
Pentachlorophenol	25 U	25 U	27 U	25 U	25 U	2*	NS	NS
Phenathrene	10 U	10 U	11 U	10 U	10 U	50	NS	NS
Anthracene	10 U	10 U	11 U	10 U	10 U	50	NS	NS
Di-n-butylphthalante	10 U	10 U	11 U	10 U	10 U	50	NS	NS
Fluoranthene	10 U	10 U	11 U	10 U	10 U	50	NS	NS
Pyrene	10 U	10 U	11 U	10 U	10 U	50	NS	NS
Butyl Benzyl Phthalate	10 U	10 U	11 U	10 U	10 U	50	NS	NS
3,3' Dichlorobenzidine	10 U	10 U	11 U	10 U	10 U	5	NS	NS
Benzo (a) anthracene	10 U	10 U	11 U	10 U	10 U	0.002	NS	NS
Chrysene	10 U	10 U	11 U	10 U	10 U	0.002	NS	NS
bis (2-Ethylhexyl)phthalate	10 U	10 U	11 U	10 U	2 J	5	NS	NS
Di-n-octylphthalate	10 U	10 U	11 U	10 U	10 U	50	NS	NS
Indeno (1,2,3-cd) pyrene	10 U	10 U	11 U	10 U	10 U	0.002	NS	NS
Benzo (b,k) fluoranthene	20 U	20 U	22 U	20 U	20 U	0.002	NS	NS
2,2' Oxybis(1-Chloropropane)	10 U	10 U	11 U	10 U	10 U	5	NS	NS
Carbazole	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
Benzo (a) pyrene	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
Dibenzo (a,h) anthracene	10 U	10 U	11 U	10 U	10 U	NS	NS	NS
Benzo (g,h,i) perylene	10 U	10 U	11 U	10 U	10 U	NS	NS	NS

NOTE:
ug/L- micrograms per liter
J- Analyte deteced below the quantitation limits
U- Parameter not detected at method detection level
NS- No Standard
ND- Not Detected
* Applies to the sum of these substances, total chlorinated and total unchlorinated phenols.

Appendix D. Table 13
Summary of Dissolved Metals in Groundwater
WTC Investigation
New York, New York

Sample ID	104,GW-Dissolved	105, GW-Dissolved	106, GW-Dissolved	108,GW-Dissolved	109, GW-Dissolved	Technical and Operational Guidance Series 1.1.1 (TOGS) Ambient Water Quality Standards and Guidance Values (mg/L)	NYCDEP Limitations for Effluent to Sanitary or Combined Sewers mg/L	NYCDEP Limitations for Effluent to Storm Sewers mg/L
Lab ID	0312-025-010	0312-024-010	0311-398-011	0312-037-012	0312-023-015			
Date Collected	11/29/03	11/28/2003	11/22/2003	12/1/03	11/28/2003			
Matrix	Water	Water	Water	Water	Water			
Units	mg/L	mg/L	mg/L	mg/L	mg/L			
Analyte								
Aluminum	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0754	0.10	NA	NA
Antimony	0.0050 U	0.0119	0.0050 U	0.0050 U	0.00831	0.0030	NA	NA
Arsenic	0.0080 U	0.0080 U	0.0080 U	0.0080 U	0.0132	0.0250	NA	NA
Barium	0.0308	0.0672	0.0173	0.1010	0.0249	1.00	NA	NA
Beryllium	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.003	NA	NA
Cadmium	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.01	2.00	2.00
Calcium	53.80	41.60	67.20	130.00	45.7	NS	NA	NA
Chromium	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.50	NA	NA
Cobalt	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	NS	NA	NA
Copper	0.01680	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.20	5.00	5.00
Iron	0.09 U	0.09 U	0.09 U	0.82	0.09 U	0.30	NA	NA
Magnesium	23.8	27.1	27.7	109.0	11.7	35.00	NA	NA
Manganese	0.1500	0.2660	0.0333	0.8810	0.00550	0.30	NA	NA
Mercury	0.00200 U	0.00200 U	0.00200 U	0.00218	0.0380	0.0007	0.05	0.05
Nickel	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.10	3.00	3.00
Potassium	5.24	5.81	6.39	49.90	21.0	NS	NA	NA
Selenium	0.01030 B	0.01260 B	0.0193	0.11000 B	0.00547 B	0.01	NA	NA
Silver	0.00300 U	0.00300 U	0.00300 U	0.03000 U	0.00300 U	0.05	NA	NA
Sodium	88.8	102.0	106.0	1,030.0	154	*	NA	NA
Thallium	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.0005	NA	NA
Vanadium	0.00928	0.00500 U	0.00515	0.01180	0.0528 U	NS	NA	NA
Zinc	0.0050 U	0.0184 U	0.00910	0.0056	0.00500 U	2.00	5.00	5.00

NOTE:
ug/L- micrograms per liter
U- Parameter not detected at method detection level
NS- No Standard
* Case by case evaluation
U- Parameter not detected at method detection level
B- indicates that the compound was also detected in the associated Method Blank
Shading - detected concentration exceeds TOGS Ambient Groundwater Standards and Guidance Values

Appendix D. Table 13
Summary of Total Metals in Groundwater
WTC Investigation
New York, New York

Sample ID	104,GW-Total	105,GW-Total	106, GW-Total	108,GW-Total	109, GW-Total	Technical and Operational Guidance Series 1.1.1 (TOGS) Ambient Water Quality Standards and Guidance Values (mg/L)	NYCDEP Limitations for Effluent to Sanitary or Combined Sewers mg/L	NYCDEP Limitations for Effluent to Storm Sewers mg/L
Lab ID	0312-025-009	0312-024-009	0311-398-012	0312-037-007	0312-023-014			
Date Collected	11/29/03	11/28/03	11/22/2003	12/1/03	11/26/2003			
Matrix	Water	Water	Water	Water	Water			
Units	mg/L	mg/L	mg/L	mg/L	mg/L			
Analyte								
Aluminum	16.3000	2.4700	78.1	22.8000	597	0.10	NA	NA
Antimony	0.0062	0.0050 U	0.00699	0.0114	0.0444	0.0030	NA	NA
Arsenic	0.0080 U	0.0080 U	0.0156	0.0190 U	0.358	0.0250	NA	NA
Barium	0.2330	0.1030	0.752	0.2150	5.99	1.00	NA	NA
Beryllium	0.00112	0.00100 U	0.00535	0.00169	0.0531	0.003	NA	NA
Cadmium	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.0188	0.01	2.00	2.00
Calcium	78.50	46.50	232	141.00	1610	NS	NA	NA
Chromium	0.04750	0.00641	0.169	0.05380	1.20	0.05	NA	NA
Cobalt	0.01890	0.00500 U	0.0829	0.01690	0.815	NS	NA	NA
Copper	0.04860	0.00864	0.161	0.14900	3.71	0.20	5.00	5.00
Iron	28.60	3.78	134	39.60	1430	0.30	NA	NA
Magnesium	40.7	30.1	120	119.0	510	35.00	NA	NA
Manganese	0.9420	0.3790	3.97	1.5200	65.6	0.30	NA	NA
Mercury	0.00200 U	0.00200 U	0.00200 U	0.00216	0.0232	0.0007	0.05	0.05
Nickel	0.1190	0.0139	0.432	0.0698	5.13	0.10	3.00	3.00
Potassium	10.90	6.68	27.3	53.00	120	NS	NA	NA
Selenium	0.00705 B	0.00854	0.0154	0.02140 B	0.00500 U	0.01	NA	NA
Silver	0.00300 U	0.00300 U	0.00300 U	0.00650	0.00300 U	0.05	NA	NA
Sodium	82.5	103.0	91.1	1,070.0	114	*	NA	NA
Thallium	0.00200 U	0.00200 U	0.00266	0.00279	0.00200 U	0.0005	NA	NA
Vanadium	0.04420	0.00641	0.170	0.06680	1.39	NS	NA	NA
Zinc	0.1070	0.0195	0.368	0.4490	4.21	2.00	5.00	5.00

NOTE:
ug/L- micrograms per liter
U- Parameter not detected at method detection level
NS- No Standard
* Case by case evaluation
U- Parameter not detected at method detection level
B- indicates that the compound was also detected in the associated Method Blank
Shading - detected concentration exceeds TOGS Ambient Groundwater Standards and Guidance Values

Appendix D. Table 14
Summary of PCBs in Groundwater
WTC Investigation
New York, New York

Sample ID	104,GW	105,GW	106,GW	108,GW	109,GW	Technical and Operational Guidance Series 1.1.1 (TOGS) Ambient Water Quality Standards and Guidance Values (ug/L)	NYCDEP Limitations for Effluent to Sanitary or Combined Sewers ug/L	NYCDEP Limitations for Effluent to Storm Sewers ug/L
Lab ID	0312-037-012	0312-024-012	0311-398-010	0312-037-007	0312-023-013			
Date Collected	11/29/03	11/28/03	11/22/03	12/1/03	11/26/03			
Matrix	Water	Water	Water	Water	Water			
Units	ug/L	ug/L	ug/L	ug/L	ug/L			
Analyte								
Aroclor-1016	1.0 U	1.0 U	1 U	1.0 U	1.4 U	0.09*	1*	1*
Aroclor-1221	2.0 U	2.0 U	2 U	2.0 U	2.9 U	0.09*	1*	1*
Aroclor-1232	1.0 U	1.0 U	1 U	1.0 U	1.4 U	0.09*	1*	1*
Aroclor-1242	1.0 U	1.0 U	1 U	1.0 U	1.4 U	0.09*	1*	1*
Aroclor-1248	1.0 U	1.0 U	1 U	1.0 U	1.4 U	0.09*	1*	1*
Aroclor-1254	1.0 U	1.0 U	1 U	1.0 U	1.4 U	0.09*	1*	1*
Aroclor-1260	1.0 U	1.0 U	1 U	1.0 U	1.4 U	0.09*	1*	1*

NOTE:
ug/L- micrograms per liter
U- Parameter not detected at method detection level
* - applies to sum of these substances

APPENDIX D. Table 16
Summary of VOCs in Depositional Residue
WTC Investigation
New York, New York

Analytes (ug/100cm2)	Sample Area #1	Sample Area #2	Sample Area #3	Sample Area #4	Sample Area #5	Sample Area #6	Sample Area #7	Sample Area #8	Sample Area #9	Sample Area #10U	Sample Area #11	Sample Area #12U	Sample Area #13	Sample Area #14	Sample Area #15	Sample Area #16	Acceptance Criteria
1,1,1,2-Tetrachloroethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,1-Dichloropropene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,2,3-Trichlorobenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,2,3-Trichloropropane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,2,4-Trichlorobenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,2,4-Trimethylbenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,2-Dibromo-3-chloropropane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,2-Dibromoethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,2-Dichlorobenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,3,5-Trimethylbenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,3-Dichlorobenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,3-Dichloropropane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,4-Dichlorobenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
2,2-Dichloropropane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
2-Chloroethyl vinyl ether	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	NS
2-Chlorotoluene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
4-Chlorotoluene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
4-Isopropyltoluene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Acrolein	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	NS
Acrylonitrile	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	62U	NS
Bromobenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Bromochloromethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Dichlorodifluoromethane	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
Hexachlorobutadiene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Iodomethane	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	NS
Isopropylbenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
m,p-Xylene	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
n-Butylbenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
n-Propylbenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Naphthalene	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
o-Xylene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
sec-Butylbenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
tert-Butylbenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Trichlorofluoromethane	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
Vinyl acetate	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
1,1,1-Trichloroethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,1,2,2-Tetrachloroethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,1,2-Trichloroethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,1-Dichloroethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,1-Dichloroethene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,2-Dichloroethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
1,2-Dichloroethene, Total	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	NS
1,2-Dichloropropane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
2-Butanone	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	NS
2-Hexanone	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
4-Methyl-2-pentanone	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	NS
Acetone	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	31U	NS
Benzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Bromodichloromethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Bromoform	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Bromomethane	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
Carbon disulfide	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Carbon tetrachloride	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Chlorobenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Chloroethane	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
Chloroform	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Chloromethane	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
cis-1,2-Dichloroethene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
cis-1,3-Dichloropropene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Dibromochloromethane	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Ethylbenzene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Methyl tert-butyl ether	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Methylene chloride	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
Styrene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Tetrachloroethene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Toluene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
trans-1,2-Dichloroethene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
trans-1,3-Dichloropropene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Trichloroethene	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	6.2U	NS
Vinyl chloride	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	12U	NS
Xylenes, Total	19U	19U	19U	19U	19U	19U	19U	19U	19U	19U	19U	19U	19U	19U	19U	19U	NS

NOTE:
U - Analyte not detected at method detection level
Shading - Detected concentration meets or exceeds standard
NS - No Standard

APPENDIX D. Table 17
Summary of SVOCs in Depositional Residue
WTC Investigation
New York, New York

Analytes (ug/100cm2)	Sample Area #1	Sample Area #2	Sample Area #3	Sample Area #4	Sample Area #5	Sample Area #6	Sample Area #7	Sample Area #8	Sample Area #9	Sample Area #10	Sample Area #11	Sample Area #12	Sample Area #13	Sample Area #14	Sample Area #15	Sample Area #16	Acceptance Criteria
1,2,4-Trichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
1,2-Diphenylhydrazine	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
1,3-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
1-Methylnaphthalene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2,3,4,6-Tetrachlorophenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2,3-Dichloroaniline	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2,4,5U-Trichlorophenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2,4,6-Trichlorophenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2,4-Dichlorophenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2,4-Dimethylphenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2,4-Dinitrophenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2,4-Dinitrotoluene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2,6-Dinitrotoluene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2-Chloronaphthalene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2-Chlorophenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2-Methylnaphthalene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2-Methylphenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2-Nitroaniline	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
2-Nitrophenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
3,3´-Dichlorobenzidine	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
3-Nitroaniline	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
4,6-Dinitro-2-methylphenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
4-Bromophenyl phenyl ether	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
4-Chloro-3-methylphenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
4-Chloroaniline	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
4-Chlorophenylphenylether	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
4-Methylphenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
4-Nitroaniline	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
4-Nitrophenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Acenaphthene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Acenaphthylene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Aniline	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Anthracene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Benzo(a)anthracene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Benzo(a)pyrene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Benzo(b)fluoranthene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Benzo(g,h,i)perylene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Benzo(k)fluoranthene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Benzoic acid	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Benzyl alcohol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Biphenyl	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Bis(2-chloroethoxy)methane	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Bis(2-chloroethyl)ether	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Bis(2-chloroisopropyl)ether	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Bis(2-ethylhexyl)phthalate	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Butyl benzyl phthalate	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Carbazole	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Chrysene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Di-n-butyl phthalate	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Di-n-octyl phthalate	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Dibenzo(a,h)anthracene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Dibenzofuran	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Diethyl phthalate	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Dimethyl phthalate	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Fluoranthene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Fluorene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Hexachlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Hexachlorobutadiene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Hexachlorocyclopentadiene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Hexachloroethane	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Indeno(1,2,3-cd)pyrene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Isophorone	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
N-Nitrosodi-n-propylamine	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
N-nitrosodimethylamine	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
N-Nitrosodiphenylamine	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Naphthalene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Nitrobenzene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Pentachlorophenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Phenanthrene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Phenol	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Pyrene	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS
Pyridine	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	NS

NOTE:
U - Analyte not detected at method detection level
Shading - Detected concentration meets or exceeds standard
NS - No Standard

APPENDIX D. Table 18
Summary of Metals in Depositional Residue
WTC Investigation
New York, New York

Analytes ($ug/100cm^2$) TAL Metals (list)	Sample Area #1	Sample Area #2	Sample Area #3	Sample Area #4	Sample Area #5	Sample Area #6	Sample Area #7	Sample Area #8	Sample Area #9	Sample Area #10	Sample Area #11	Sample Area #12	Sample Area #13	Sample Area #14	Sample Area #15	Sample Area #16	EPA Response to 9/11 Health-based Benchmarks (ug/100cm2)
Aluminum	1,440	1,140	2,910	523	717	560	178	2,610	94	887	106	299	522	71	105	5.00U	15,700.00
Antimony	0.702	1.03	1.11	0.949	0.684	1.12	0.962	0.944	0.816	0.96	0.604	1.64	3.32	0.939	0.852	0.668	6.27
Arsenic	1.98	2.19	2.27	1.8	1.82	2.5	1.93	2.22	1.75	2.05	13.8	2.36	6.25	2.15	1.84	1.52	3.87
Barium	35.6	14.7	35.2	9.62	8.04	19.4	8.19	166	7.37	12.5	4.21	12.4	536	11.4	72.4	1.01	1,097.00
Beryllium	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	0.100U	31.36
Cadmium	0.200U	0.200U	0.318	0.200U	0.200U	0.200U	0.200U	0.769	0.200U	0.200U	1.41	0.200U	0.228	0.200U	0.200U	0.200U	15.57
Calcium	8,460	10,600	16,400	5,290	7,130	5,830	1,370	15,200	545	4,490	854	9,900	36,700	6,070	6,390	100U	NS
Chromium	4.71	9.22	13.2	3.6	4.98	4.14	1.92	14.4	0.524	4.81	111	4.96	12.4	1.64	1.23	0.200U	47.04
Cobalt	6.34	1.26	3.07	0.589	1.78	0.274	0.200U	0.78	0.200U	0.486	3.99	0.501	0.529	0.200U	0.200U	0.200U	313.58
Copper	6.02	21.5	38.7	5.58	7.56	7.06	5.98	31.3	3.81	16.1	23.4	134	81.5	37	19.7	2.18	627.16
Iron	1,020	5,240	2,550	467	1,560	812	582	4,090	190	1,970	49,700	1,210	1,990	480	266	11	9,407.33
Lead	5.14	21.6	25.5	17.6	7.72	6.81	4.27	8.24	2.06	4.81	312	38.9	169	15.3	10.8	1.14	2.32
Magnesium	492	869	997	383	566	519	259	2450	223	599	213	600	1030	284	328	144	NS
Manganese	26.2	76.8	52.8	11.9	21.7	72.3	35	66	3.43	24.5	519	33.9	76	8.34	8.34	0.500U	313.58
Mercury	0.57	0.454	1.6	0.131	0.348	0.118	0.010U	0.074	0.044	0.042	0.029	0.232	4.44	0.308	0.062	0.010U	1.57
Molybdenum	0.504	1.83	1.07	0.69	0.808	1.43	0.852	0.824	0.500U	0.664	6.69	4.12	8.8	2.26	2.11	0.500U	NS
Nickel	1.65	5.09	3.35	1.11	1.23	1.81	1.25	2.54	0.829	7.23	40.4	2.67	1.98	0.512	0.932	0.500U	313.58
Selenium	4.77	4.15	4.62	4.98	4.09	5.16	6.24	5.41	5.72	53.19	3.67	6.08	5.84	5.5	5.54	5.56	78.39
Silver	0.500U	0.500U	0.958	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	78.39
Sodium	1,050	1,920	1,400	946	533	565	486	865	426	496	483	643	610	564	481	381	NS
Thallium	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	0.500U	1.10
Tin	9.33	9.13	9.81	10	8.51	10.4	10.5	9.75	10.2	9.56	11.5	11.5	11	9.66	9.37	9.91	NS
Titanium		42.1	116	14.6	26.4	16.8	3.9	89.3	1.3	40.5	4.93	9.92	13.2	0.200U	1.3	0.500U	NS
Vanadium	1.78	2.24	3.03	0.84	2.56	3.3	1.75	2.72	0.500U	2.07	13.1	1.87	3.87	4.56	2.08	0.500U	109.75
Zinc	76.5	434	190	43.5	156	42.2	31	485	22.1	44.6	42.8	111	1840	92.7	48.8	27.1	4,703.66

NOTE:
U - Analyte not detected at method detection level
Shading - Detected concentration meets or exceeds EPA Response to 9/11Health Based Benchmarks
NS - No Standard

APPENDIX D. Table 19
Summary of PCBs in Depositional Resiudue
WTC Investigation
New York, New York

Analytes ($ug/100cm^2$)	Sample Area #1	Sample Area #2	Sample Area #3	Sample Area #4	Sample Area #5	Sample Area #6	Sample Area #7	Sample Area #8	Sample Area #9	Sample Area #10	Sample Area #11	Sample Area #12	Sample Area #13	Sample Area #14	Sample Area #15	Sample Area #16	Acceptance Criteria*
Aroclor-1016	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	*
Aroclor-1221	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	*
Aroclor-1232	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	*
Aroclor-1242	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	*
Aroclor-1248	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	*
Aroclor-1254	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	*
Aroclor-1260	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	*

NOTE:
U - Analyte not detected at method detection level
Shading - Detected concentration meets or exceeds applicable standard
* the standard of <10 $ug/100cm^2$ total is referenced from 40 CFR, Parts 750 &761

APPENDIX D. Table 20
Summary of Pesticides in Depositional Residue
WTC Investigation
New York, New York

Analytes (ug/100cm2)	Sample Area #1	Sample Area #2	Sample Area #3	Sample Area #4	Sample Area #5	Sample Area #6	Sample Area #7	Sample Area #8	Sample Area #9	Sample Area #10	Sample Area #11	Sample Area #12U	Sample Area #13	Sample Area #14	Sample Area #15	Sample Area #16	Acceptance Criteria
4,4´-DDD	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
4,4´-DDE	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
4,4´-DDT	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Aldrin	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
alpha-BHC	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
alpha-Chlordane	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
beta-BHC	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Chlordane	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	NS
delta-BHC	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Dieldrin	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Endosulfan I	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Endosulfan II	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Endosulfan sulfate	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Endrin	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Endrin aldehyde	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Endrin ketone	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
gamma-BHC	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
gamma-Chlordane	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Heptachlor	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Heptachlor epoxide	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Methoxychlor	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Mirex	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	NS
Toxaphene	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	NS

NOTE:
U - Analyte not detected at method detection level
Shading - Detected concentration meets or exceeds standard
NS - No Standard

APPENDIX D. Table 21
Summary of Silica and Mineral Results in Depositional Residue
WTC Investigation
New York, New York

Analytes (ug/100cm^2)	Sample Area #1	Sample Area #2	Sample Area #3	Sample Area #4	Sample Area #5	Sample Area #6	Sample Area #7	Sample Area #8	Sample Area #9	Sample Area #10	Sample Area #11	Sample Area #12	Sample Area #13	Sample Area #14	Sample Area #15	Sample Area #16	aceptance criteria*
Total Particulate Matter	3,500	120,000	37,000	9,600	8,900	26,000	2,700	110,000	770	22,000	89,000	54,000	82,000	30,000	39,000	110	NS
Silica (Quartz Total)	73.0	9,400.0	4,100.0	130.0	480.0	900.0	68.0	14,000.0	40.0	530.0	760.0	1,400.0	1,900.0	190.0	630.0	<10.0	NS
Calcite	Present	9%	NR	Present	NR	1%	1%	66%	NR	62%	0%	70%	82%	5%	22%	NR	NS
Gypsum	0%	64%	NR	0%	NR	23%	10%	10%	NR	25%	2%	10%	9%	0%	0%	NR	NS
Mica	0%	0%	NR	0%	NR	0%	0%	0%	NR	8%	0%	1%	2%	0%	0%	NR	NS
Pumice	0%	0%	NR	0%	NR	0%	0%	0%	NR	0%	0%	2%	0%	42%	<1%	NR	NS

NOTE:
U - Analyte not detected at method detection level
Shading - Detected concentration meets or exceeds applicable standard
NS - No Standard
NR - Not Reprted
*- there are no standards, refer to the EPA Background Report for comparetive purposes

APPENDIX D. Table 22
Summary of Fibrous Glass in Depositional Residue
WTC Investigation
New York, New York

Analytes (ug/100cm^2)	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	aceptance
	Area #1	Area #2	Area #3	Area #4	Area #5	Area #6	Area #7	Area #8	Area #9	Area #10	Area #11	Area #12	Area #13	Area #14	Area #15	Area #16	criteria
Fibrous Glass	<1% Total	<1% Total	<1% Total	<1% Total	<1% Total	<1% Total	<1% Total	<1% Total	<1% Total	<1% Total	<1% Total	10.0%	<1% Total	<1% Total	<1% Total	<1% Total	NS*

NOTE:
U - Analyte not detected at method detection level
NS - No Standard
NR - Not Reprted
*- there are no standards, refer to the EPA Background Report for comparetive purposes

APPENDIX D. Table 23
Summary of Asbestos in Depositional Residue
WTC Investigation
New York, New Y ork

	Sample Area #1	Sample Area #2	Sample Area #3	Sample Area #4	Sample Area #5	Sample Area #6	Sample Area #7	Sample Area #8	Sample Area #9	Sample Area #10	Sample Area #11	Sample Area #12	Sample Area #13	Sample Area #14	Sample Area #15	Sample Area #16
(structures/cm^2)	18,190	34,240	18,190	27,641	10,700	2,675	891	55,640	535U	891U	2,140U	1,241,200	19,973	162,640	96,300	535U
Asbestos types	chrysotile	chrysotile	chrysotile	chrysotile	chrysotile	chrysotile	chrysotile	chrysotile	NSD	NSD	NSD	chrysotile	chrysotile	chrysotile	chrysotile	NSD
		amphibole														

Note:
U - Analyte not detected at method detection level
NSD - No (Asbestos) Structures Detected
Shading - Detected concentration meets or exceeds "slight" standard range

Industry Standard Range:
<1000 str/cm^2 = LDL (lower detection limit)
1,000 - 10,000 str/cm^2 = slight
10,000 - 100,000 str/cm^2 = moderate
100,000 - 1,000,000 str/cm^2 = heavy
>1,000,000 str/cm^2 = extreme

APPENDIX D. Table 24
Summary of Dioxin in Depositional Residue
WTC Investigation
New York, New York

		Method	Blank		R03110704	R03110704	R03110704	R03110704	R03110704	R03110704	R03110704	R03110704	R03110704	R03110704	R03110704	R03110704	R03110704	R03110704	R03110704
Sample ID		**Blank**	**Spike**		**DX-1**	**DX-2**	**DX-3**	**DX-4**	**DX-5**	**DX-6**	**DX-7**	**DX-8**	**DX-9**	**DX-10**	**DX-11**	**DX-12**	**DX-13**	**DX-14**	**DX-15**	**DX-16**
Laboratory ID		**073038 03**	**073038 03**	**%**	**073039 03**	**073040 03**	**073041 03**	**073042 03**	**073043 03**	**073044 03**	**073045 03**	**073046 03**	**073047 03**	**073048 03**	**073049 03**	**073050 03**	**073051 03**	**073052 03**	**073053 03**	**073054 03**
Date Sampled		**11/22/03**	**11/22/03**	**Recovery**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**	**11/22/03**
Component	**Units**																			
TEQ*	pg/100cm^2	-	-	-	**1.036**	**0.315**	**1.600**	**0.103**	**0.166**	**0.711**	**0.363**	**0.148**	**0.182**	**0.027**	**0.012**	**0.052**	**0.864**	**2.576**	**2.780**	**0.045**
Max TEQ		-	-	-	<6.812	<7.048	<10.43	<7.049	<6.652	<6.465	<6.264	10.058	<8.186	<10.325	<7.580	<6.751	<10.916	< 8.201	<7.510	< 6.477

Note:
***TEQ is compared to EPA Helath Based Benchmark of 20 picograms per 100cm^2**
Shading - Detected concentration meets or exceeds EPA Response to 9/11 Healthbased Benchmarks