NYC 9/11 Public Portal Document

CAPITAL
PROPERTIES

DAVID A. PARISIER
MANAGING DIRECTOR

BY FACSIMILE & MAIL

February 22, 2002

Mr. R. Radhakrishman, PE
Director
Asbestos Control Program
Department of Environmental Protection
59-17 Junction Boulevard
Corona, NY 11368-5107

RE: 111 Broadway, 2-10 Thames Street, 91-95 Trinity Place & 115 Broadway, New York, NY

Dear Mr. Radhakrishman:

Please find attached additional information pertaining to our submission of information on February 21, 2002 in response to your request for information of February 12, 2002 regarding the above referenced buildings.

Please find enclosed the following additional documentation:

1. The results of additional air quality monitoring performed by AKRF, Inc. at the subject properties.

We request that DEP treat all the information disclosed herein as exempt from public review under the the Freedom of Information Law (FOIL) because such information falls within the exemption enumerated in Public Officers Law Section 87(2) (d) in that the information is, "submitted to an agency by a commercial enterprise ... which if disclosed would cause substantial injury to the competitive position of the subject enterprise.

We and our consultants are available to answer any further questions that you may have regarding the enclosed.

Very truly yours,

TRINITY CENTER LLC
By: CAPITAL PROPERTIES NY LLC, as agent

By: _____
David A. Parisier

Capital Properties Associates, L.P.

527 Madison Avenue, New York, NY 10022 • Phone: 212.980.0090 • Fax: 212.980.5669

PP

NYC-WTC_000132576

NYC 9/11 Public Portal Document

111-115 Broadway
New York, New York

AKRF Project Number: 30284

AIR MONITORING REPORT

Prepared for:

Rosenman & Colin LLP
575 Madison Avenue
New York, New York 10022-2585

Prepared by:

AKRF, Inc.
117 East 29th Street
New York, NY 10016
(212)-696-0670

February 21, 2002

NYC-WTC_000132577

NYC 9/11 Public Portal Document

EXECUTIVE SUMMARY

AKRF, Inc. (AKRF) was retained by Rosenman & Colin LLP to perform Indoor Air Monitoring within 111-115 Broadway in New York City. The project site consists of two (2) twenty-one story buildings 115 Broadway is located north of 111 Broadway, and Thames Street runs between the two buildings. The buildings are approximately 98 years old and are mirror images of each other.

AKRF collected air samples for laboratory analysis at sixteen locations throughout the project site between November 26 and 30, 2001. The air samples were analyzed for the following constituents: Volatile Organic Compounds (VOCs); Polynuclear Aromatic Hydrocarbons (PAHs); metals (arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, nickel, manganese, silver, thallium and zinc); aldehydes; asbestos fibers; silica; respirable particulates; and dioxins. Temperature, Relative Humidity, Carbon Dioxide and Carbon Monoxide concentrations were measured throughout the buildings using a Metrosonics aq-5000 direct read meter.

Based upon the results of this indoor air quality investigation, AKRF presents the following findings:

- Levels of polynuclear aromatic hydrocarbons (PAHs), metals, asbestos, respirable particulate, silica, and volatile organic compounds (VOCs) were all observed to be below regulatory and recommended guidelines.
- Levels of formaldehyde were observed to be well below OSHA regulatory requirements. Eight samples were observed to be above the NIOSH recommended exposure level. All other levels of aldehydes were observed to be below regulatory and recommended guidelines.
- Levels of dioxins above the analytical detection level were identified within one sample. All other samples revealed no detectable levels of dioxins. No regulatory limit exists for occupational exposure to dioxins. NIOSH has recommended, absent other guidelines, that levels of dioxins be reduced to the lowest feasible concentration.
- Relative humidity, carbon dioxide and carbon monoxide levels were all observed to be within established ASHRAE guidelines. Some temperature readings throughout both buildings were observed to be above the ASHRAE guidelines for wintertime conditions. Because the sampling was conducted within unoccupied spaces, temperature variations may be due to the building's systems settings.

Based upon the conclusions of this indoor air quality investigation, no specific recommendations are presented at this time.

However, because of the continuing concerns of people occupying the downtown area along with the continuing press coverage, Rosenman & Colin LLP may wish to consider additional indoor air quality monitoring. Should this monitoring be performed, AKRF suggests that this monitoring include temperature, relative humidity, carbon dioxide, carbon monoxide, respirable dust and asbestos sampling. In addition, mercury should be sampled for in both the dust and fume forms.

To alleviate any possible concerns with formaldehyde, sampling in the affected spaces could be conducted with the ventilation system in operation, as it would be with full occupancy. Sampling

NYC-WTC_000132578

NYC 9/11 Public Portal Document

could also be conducted on occupied floors, representative of the building's spaces.

Similarly, additional dioxin sampling could be conducted to provide additional data in relation to the single air sample that revealed detectable levels of dioxins.

NYC-WTC_000132579

NYC 9/11 Public Portal Document

Table of Contents

EXECUTIVE SUMMARY 1
1.0 INTRODUCTION 1
2.0 TECHNICAL OVERVIEW 1
2.1 Polynuclear Aromatic Hydrocarbons 1
2.2 Metals 2
2.3 Aldehydes 2
2.4 Asbestos 3
2.5 Respirable Particulates and Silica 3
2.6 Volatile Organic Compounds 3
2.7 Dioxins 4
2.8 Temperature, Relative Humidity, Carbon Dioxide and Carbon Monoxide 4
3.0 CONCLUSIONS 6
4.0 RECOMMENDATIONS 6

NYC-WTC_000132580

NYC 9/11 Public Portal Document

1.0 INTRODUCTION

AKRF, Inc. (AKRF) was retained by Rosenman & Colin LLP to perform Indoor Air Monitoring within 111-115 Broadway in New York City. The project site consists of two (2) twenty-one story buildings; 115 Broadway is located north of 111 Broadway, and Thames Street runs between the two buildings. The buildings are approximately 98 years old and are mirror images of each other.

Two Heating, Ventilation and Air Conditioning (HVAC) rooms are located on each of the floors. The HVAC rooms are located on the south side of 115 Broadway and on the north side of 111 Broadway, both overlooking Thames Street. It is our understanding that the grills that allow the flow of fresh air into the HVAC rooms have been closed since the destruction of the World Trade Center on September 11, 2001. The windows are original to the buildings and are operable, but do not provide an airtight seal. It has been expected that outside air and particles could enter the buildings through closed windows. Various floors have installed new (and presumably air-tight) windows within the original windows.

AKRF collected air samples for laboratory analysis at sixteen locations throughout the project site between November 26 and 30, 2001. The air samples were analyzed for the following constituents: Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), metals, Aldehydes, asbestos fibers, silica, respirable particulates and dioxins. In addition, temperature, Relative Humidity, Carbon Dioxide and Carbon Monoxide concentrations were measured throughout the buildings using a Metrosonics aq-5000 direct read meter. The observed concentrations were compared to established occupational exposure values required by the United States Department of Labor, Occupational Health and Safety Administration (OSHA). OSHA has established permissible exposure levels (PELs); the values that an employer may expose an employee to for a normal eight-hour workday, 40-hour workweek, 50-week workyear, over a normal work lifetime. Other occupational exposure values are the National Institute for Occupational Safety and Health (NIOSH) recommended exposure levels (RELs) and the American Council of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs). Both the RELs and TLVs are intended to cover similar environments as the PELs. The American Society for Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) has developed guidelines and recommendations for providing acceptable indoor air quality. The ASHRAE guidelines are provided within various Standards providing for acceptable environmental conditions and ventilation.

2.0 TECHNICAL OVERVIEW

The following is a general profile of the air monitoring execution and results.

2.1 Polycyclic Aromatic Hydrocarbons

Polycyclic aromatic hydrocarbons (PAHs) are a class of compounds formed during incomplete combustion of oil, coal, gas, garbage and other organic substances. PAHs are found in petroleum and related products and are manufactured for use in dyes, insecticides, solvents and asphalt. PAHs were sampled and analyzed in accordance with NIOSH Method 5506. The sampling method requires air to be drawn through a 2 micrometer (μm) Teflon membrane filter and an XAD-2 sorbent tube containing collection resin utilizing a personal sampling pump. The sampling pump was calibrated, utilizing a rotometer, with a representative sampler in line prior to and after each sample collection. Immediately after sampling, the membrane filter was transferred to a culture tube and the sorbent tube was capped. The culture tube and sorbent tube

NYC-WTC_000132581

NYC 9/11 Public Portal Document

were wrapped in aluminum foil and refrigerated prior to and during transport to the laboratory. The samples were analyzed by Galson Laboratories (Galson) of East Syracuse, New York. Galson is an independent New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) and American Industrial Hygiene Association (AIHA) accredited laboratory.

Analytical results did not detect PAHs at concentrations greater than <0.0006 milligrams per cubic meter (mg/m^3). PAH levels detected at the project site were well below OSHA established exposure limits of 0.2 mg/m^3 for anthracene, benzo(a)pyrene, chrysene, phenanthrene and pyrene. Observed levels were also below the NIOSH RELs for those compounds that have established levels. Table I contains a summary of the laboratory results for PAHs. A complete copy of the laboratory analysis report is included in Appendix A.

2.2 Metals

Thirteen metals (arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, nickel, manganese, silver, thallium and zinc) were sampled and analyzed in accordance with NIOSH Method 7300. The sampling method requires air to be drawn through a 0.8 µm mixed cellulose ester membrane filter utilizing a personal sampling pump. The sampling pump was calibrated, utilizing a rotometer, with a representative sampler in line prior to and after each sample collection. A separate sample utilizing the same methodology was collected for lead at each sampling location. All samples were transported to, and analyzed by, Galson.

Analytical results revealed airborne levels of all metals well below OSHA, NIOSH and ACGIH exposure limits. Table II contains a summary of the laboratory results for metals. A complete copy of the laboratory analysis report is included in Appendix B.

2.3 Aldehydes

Aldehydes are organic compounds that occur in air as a result of incomplete combustion of hydrocarbons and sunlight-driven photo-oxidation processes. Formaldehyde is used in the production of paper, office furnishings and carpeting. Smog is a major source of formaldehyde. Formaldehyde is usually found in the air, and levels are usually higher indoors than outdoors. Formaldehyde in air breaks down easily. Providing ventilation and fresh air is generally recommended to lower indoor levels. Aldehydes were sampled and analyzed in accordance with NIOSH Method 2016.

The sampling method requires air to be drawn through a sorbent tube packed with two sections of silica gel utilizing a personal sampling pump. The sampling pump was calibrated, utilizing a rotometer, with a representative sampler in line prior to and after each sample collection. The sorbent tubes were capped and samples were refrigerated prior to and during shipment to the laboratory. All samples were transported to, and analyzed by, Galson.

Analytical results revealed airborne levels of aldehydes well below the OSHA and ACGIH exposure limits. Formaldehyde was determined to be present in levels exceeding NIOSH recommended levels in eight locations throughout the project site. The NIOSH recommended level of 0.016 parts per million (ppm) is well below the OSHA exposure limit of 0.75 ppm and the ACGIH exposure limit of 0.3 ppm (ceiling level). Five of the samples revealed a result of 0.02 ppm, two of the samples revealed 0.03 ppm and the remaining sample revealed 0.04 ppm. No specific source of formaldehyde was identified during the investigation. Because the areas sampled were unoccupied and as such the ventilation system was running in a reduced capacity and minimal disturbance of the space had occurred, it is possible that the low levels of observed formaldehyde may be present from office furnishings or carpeting. Table III contains a summary

NYC-WTC_000132582

NYC 9/11 Public Portal Document

of the laboratory results for aldehydes. A complete copy of the laboratory analysis report is included in Appendix B.

2.4 Asbestos

Air monitoring for asbestos fibers was performed and samples were analyzed in accordance with USEPA AHERA protocol. Samples were collected by drawing air through a 0.45 µm pore Mixed Cellulose Ester filter utilizing a high volume sampling pump. The sampling pump was calibrated, utilizing a rotometer, with a representative sampler in line prior to and after each sample collection. Samples were analyzed by Transmission Electron Microscopy (TEM). The samples were delivered to, and analyzed by, AMA Analytical Services, Inc. (AMA) of Lanham, Maryland. AMA is a certified ELAP, AIHA, and National Voluntary Laboratory Accreditation Program (NVLAP) laboratory.

Analytical results revealed airborne levels of asbestos fibers below the United State Environmental Protection Agency (USEPA) and New York State Department of Labor (NYSDOL) established clearance criteria for successful completion of an asbestos remediation procedure of 70 asbestos structures per square millimeter (s/mm^2). All of the asbestos samples were also below the AHERA re-occupancy level of 70 asbestos structures per square millimeter (s/mm^2). Table IV contains a summary of the laboratory results for asbestos. A complete copy of the laboratory analysis report is included in Appendix B.

2.5 Respirable Particulates and Silica

Respirable dust is an airborne material, which is capable of penetrating the respiratory tract into the gas-exchange, non-ciliated region of the lungs. Samples were additionally analyzed for dust, quartz, cristobalite and tridymite concentrations. Cristobalite and tridymite are composed of the same chemistry as quartz, but have a different structure.

Respirable particulates were sampled and analyzed in accordance with NIOSH Method 0600 and crystalline silica was analyzed in accordance with NIOSH Method 7500. The sampling method requires air to be drawn through a 5 µm polyvinyl chloride (PVC) pre-weighed filter in a cassette filter holder affixed to an aluminum cyclone, utilizing a personal sampling pump. The sampling pump was calibrated, utilizing a rotometer, with a representative sampler in line prior to and after each sample collection. All samples were transported to, and analyzed by, Galson.

All of the crystalline silica and respirable dust samples were determined to be below the OSHA, NIOSH and ACGIH exposure limits. Table V contains a summary of the laboratory results for respirable particulates and silica. A complete copy of the laboratory analysis report is included in Appendix A.

2.6 Volatile Organic Compounds

Volatile Organic Compounds (VOCs) are a group of substances containing carbon and other elements, including hydrogen, oxygen, fluorine, chlorine, bromine, sulfur and nitrogen. VOCs easily vaporize at room temperature and are commonly used in adhesives, solvents, degreasers, cleaning solutions, dry cleaning fluids, components of pesticides and plastics, and are among the by-products of combustion.

VOCs were sampled and analyzed in accordance with EPA Method TO-15. The sampling method requires the use of evacuated canisters. The canister uses its own vacuum to draw in the air sample, and the airflow is controlled by a regulator. All samples were transported to, and analyzed by, Galson.

NYC-WTC_000132583

NYC 9/11 Public Portal Document

Analytical results revealed levels of VOCs to be below the OSHA, NIOSH and ACGIH exposure limits. Table VI contains a summary of the laboratory results for volatile organic compounds. A complete copy of the laboratory analysis report is included in Appendix A. Dioxins

Dioxins are a family of 75 chemically related compounds commonly known as chlorinated dioxins. Dioxins are a class of complex hydrocarbon compounds containing chlorine and are closely related to PCBs. Dioxins exist as a trace contaminant in many commercially available products such as some herbicides and pesticides. Dioxins are also produced as a result of heating and combustion and are also formed in flue gases and fly ash. Dioxin (chemically known as tetraclorodibenzo-p-dioxin, "TCDD") is highly toxic and is not readily excreted. Dioxins can enter the body via inhalation of particles (dust/soot from combustion), ingestion, or absorption through the skin. Overexposure can result in severe acne (chloracne), elevated cholesterol, headaches, numbness in extremities, and gastrointestinal problems. One of the compounds is called 2,3,7,8-TCDD (the number refers to locations of chlorine atoms in the molecular structure). It is the most toxic of the dioxins and is the one most studied. The toxicity of the remaining compounds is compared to the 2,3,7,8-TCDD compound. Equivalency tables are developed based upon these ratios of toxicities. Typically, regulatory limits and values are expressed in TCDD equivalents, utilizing these equivalencies to generate an equivalent dioxin value.

Regulatory levels for dioxin exposure vary greatly. NIOSH recommends that the lowest feasible concentration be maintained. No other occupational exposure values exist. Numerous values exist for emission sources. These standards vary greatly (for example, Virginia's 24-hour standard is 3.00 $\mu g/m^3$, while Indiana's yearly standard is 3.0×10^{-8} $\mu g/m^3$) Only one sample from the study site revealed dioxin levels above the detection levels. All other samples either revealed no detectable levels or levels below the detector calibration levels. Table VII contains a summary of the laboratory results for volatile organic compounds. A complete copy of the laboratory analysis report is included in Appendix A.

2.7 Temperature, Relative Humidity, Carbon Dioxide and Carbon Monoxide

Temperature, Relative Humidity, Carbon Dioxide and Carbon Monoxide concentrations were measured throughout the buildings using a Metrosonics aq-5000 direct read meter. The meter was calibrated prior to initial sample collection. Table VIII contains a summary of the readings obtained for temperature, relative humidity, carbon dioxide and carbon monoxide.

Temperature and Relative Humidity

ASHRAE standard 55-1992 (*Thermal Environmental Conditions for Human Occupancy*) defines the environmental conditions that most (90 percent or more) sedentary occupants in indoor environments will find satisfactory. Performance criteria that are established in this standard include the following recommendations for operative temperatures in the occupied spaces: 69 to 76 (degrees Fahrenheit at 30 percent relative humidity) for wintertime conditions. AKRF considers the broad range of relative humidity from 30 to 60 percent as most acceptable for occupant comfort in office environments. Wintertime relative humidities in the 20 to 30 percent range are marginally acceptable but may cause discomfort to sensitive individuals. Humidities below 20 percent are unacceptable because of the effect of dry air on both the mucous membranes and the skin. Relative

NYC-WTC_000132584

NYC 9/11 Public Portal Document

humidity levels observed throughout the buildings were within the recommended levels. Temperature readings up to 79.4 degrees Fahrenheit were observed within the building. However, because temperature and the remaining environmental conditions are heavily dependent upon occupancy and the building systems' meeting of those occupancy loads, AKRF does not anticipate that this is an immediate area of concern.

Carbon Dioxide (CO_2)

Carbon dioxide is a normal constituent in the air. Exhaled breath from building occupants is the primary source of carbon dioxide indoors. Carbon dioxide has been widely used in the industrial hygiene community as a surrogate for various occupant-generated indoor contaminants, such as cigarette smoke and bioeffluents, that are known to cause annoyance, irritation, or discomfort among building occupants. For buildings or zones of buildings where air cleaning to remove smoke and bioeffluents is not provided, the performance criteria established in ASHRAE standard 62-1999 (*Ventilation for Acceptable Indoor Air Quality*), recommends that carbon dioxide concentrations be maintained below 700 ppm above the outside air level (equivalent to about 15 cubic feet per minute [cfm] outdoor air per occupant). Carbon dioxide levels throughout the buildings were observed to be less than 1,000 ppm (estimated from 700 ppm in addition to an outdoor level of 300 ppm).

Carbon Monoxide (CO)

Carbon monoxide is a by-product of combustion. ASHRAE Standard 62-1999 recommends that indoor airborne carbon monoxide concentrations do not exceed 9 ppm. The intent of the recommendation is to prevent annoyance and discomfort among a substantial number of occupants. AKRF compared indoor and outdoor carbon monoxide concentration levels for evaluation purposes. Indoor concentrations exceeding outdoor concentrations would suggest an indoor source of carbon monoxide, such as an improperly vented combustion appliance, which should be corrected. The OSHA PEL is 50 ppm, while the NIOSH REL is 35 ppm and the ACGIH TLV is 25 ppm. Carbon monoxide levels observed throughout the buildings were less than 2 ppm.

NYC-WTC_000132585

NYC 9/11 Public Portal Document

3.0 CONCLUSIONS

Based on the results of this indoor air quality investigation, AKRF presents the following conclusions:

- Levels of polynuclear aromatic hydrocarbons (PAHs), metals, asbestos, respirable particulate, silica, and volatile organic compounds (VOCs) were all observed to be below regulatory and recommended guidelines.
- Levels of formaldehyde were observed to be well below OSHA regulatory requirements. Eight samples were observed to be above the NIOSH recommended exposure level. All other levels of aldehydes were observed to be below regulatory and recommended guidelines.
- Levels of dioxins above the analytical detection level were identified within one sample. All other samples revealed no detectable levels of dioxins. No regulatory limit exists for occupational exposure to dioxins. NIOSH has recommended, absent other guidelines, that levels of dioxins be reduced to the lowest feasible concentration.
- Relative humidity, carbon dioxide and carbon monoxide levels were all observed to be within established ASHRAE guidelines. Some temperature readings throughout both buildings were observed to be above the ASHRAE guidelines for wintertime conditions. Because the sampling was conducted within unoccupied spaces, temperature variations may be due to the building's systems settings.

4.0 RECOMMENDATIONS

Based upon the conclusions of this indoor air quality investigation, no specific recommendations are presented at this time.

However, because of the continuing concerns of people occupying the downtown area along with the continuing press coverage, Rosenman & Colin LLP may wish to consider additional indoor air quality monitoring. Should this monitoring be performed, AKRF suggests that this monitoring include temperature, relative humidity, carbon dioxide, carbon monoxide, respirable dust and asbestos sampling. In addition, mercury should be sampled for in both the dust and fume forms.

To alleviate any possible concerns with formaldehyde, sampling in the affected spaces could be conducted with the ventilation system in operation, as it would be with full occupancy. Sampling could also be conducted on occupied floors, representative of the building's spaces.

Similarly, additional dioxin sampling could be conducted to provide additional data in relation to the single air sample that revealed detectable levels of dioxins.

NYC-WTC_000132586

NYC 9/11 Public Portal Document

Parameter			Acenaphtene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(e)pyrene
OSHA			none	none	0.2 mg/m^3	none	0.2 mg/m^3	none	none
NIOSH			none	none	0.2 mg/m^3	none	0.2 mg/m^3	none	0.2 mg/m^3
ACGIH			none	none	0.1 mg/m^3	none	0.1 mg/m^3	none	0.1 mg/m^3
Sample#	Location	Units							
PAH1	111-19	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH2	115-17	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH3	111-11	mg/m^3	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
PAH4	111-17	mg/m^3	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
PAH5	115-3	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH6	115-13	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH7	Blank	mg/m^3	ND	ND	ND	ND	ND	ND	ND
PAH8	115-15	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH9	115-13	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH10	111-15	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH11	111-3	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH12	111-20	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH13	115-11	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH14	115-5	mg/m^3	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
PAH15	115-6	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH16	115-7	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH17	111-19	mg/m^3	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
PAH18	115-9	mg/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
PAH19	Blank	mg/m^3	ND	ND	ND	ND	ND	ND	ND

NYC-WTC_0001132587

NYC 9/11 Public Portal Document

Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno-1,2,3-cd-Pyrene	Naphthalene	Phenanthrene	Pyrene
none	none	0.2 mg/m^3	none	none	none	none	52 mg/m^3	0.2 mg/m^3	0.2 mg/m^3
none	none	0.2 mg/m^3	none	none	none	none	52 mg/m^3	0.2 mg/m^3	0.2 mg/m^3
none	none	0.1 mg/m^3	none	none	none	none	52 mg/m^3	0.1 mg/m^3	0.1 mg/m^3
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NYC-WTC_0001132588

NYC-WTC_000132589

NYC 9/11 Public Portal Document

Table I
Polynuclear Aromatic Hydrocarbons (PAHs)

	Sample#	PAH1	PAH2	PAH3	PAH4	PAH5	PAH6	PAH7	PAH8	PAH9	PAH10	PAH11
	Location	111-19	115-17	111-11	111-17	115-3	115-13	Blank	115-15	115-13	111-15	111-3
Parameter	Units											
Acenaphtene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Acenaphthylene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Anthracene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Benzo(a)anthracene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Benzo(a)pyrene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Benzo(b)fluoranthene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Benzo(e)pyrene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Benzo(g,h,i)perylene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Benzo(k)fluoranthene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Chrysene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dibenzo(a,h)anthracene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Fluoranthene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Fluorene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Indeno-1,2,3-cd-Pyrene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Naphthalene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Pyrene	mg/m^3	< 0.0005	< 0.0005	< 0.0006	< 0.0006	< 0.0005	< 0.0005	ND	< 0.0005	< 0.0005	< 0.0005	< 0.0005

ND=Not Detected

NYC-WTC_000132590

NYC 9/11 Public Portal Document

Table I
Polynuclear Aromatic Hydrocarbons (PAHs)

	Sample#	PAH12	PAH13	PAH14	PAH15	PAH16	PAH17	PAH18	PAH19
	Location	111-20	115-11	115-5	115-6	115-7	111-19	115-9	Blank
Parameter	Units								
Acenaphtene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Acenaphthylene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Anthracene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Benzo(a)anthracene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Benzo(a)pyrene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Benzo(b)fluoranthene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Benzo(e)pyrene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Benzo(g,h,i)perylene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Benzo(k)fluoranthene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Chrysene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Dibenzo(a,h)anthracene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Fluoranthene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Fluorene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Indeno-1,2,3-cd-Pyrene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Naphthalene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Phenanthrene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND
Pyrene	mg/m^3	< 0.0005	< 0.0005	<0.0004	< 0.0005	< 0.0005	<0.0004	< 0.0005	ND

ND=Not Detected

NYC-WTC_000132591

NYC 9/11 Public Portal Document

Table II
Metals

Parameter		Silver	Arsenic	Beryllium	Cadmium	Cobalt	Chromium	Copper	Iron	Lead	Manganese
Units		mg/m3	µg/m^3	mg/m3	µg/m^3	mg/m3	mg/m3	mg/m3	mg/m3	µg/m^3	mg/m3
OSHA		0.01	none	0.002	100	0.1	0.1	0.1	10	50	5
NIOSH		0.01	2	0.0005	none	0.5	0.001	0.1	5	<100	10
ACGIH		0.01	10	0.002	2	0.5	0.05	1	5	50	10
Sample #	Location										
M1	111-19	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	0.0005	<0.007	<0.4	<0.0001
M2	115-17	<0.0005	<0.2	<0.0002	<0.2	<0.0005	<0.002	<0.0003	<0.009	<0.4	<0.0002
M3	111-11	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M4	111-17	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	0.0003	<0.006	<0.3	<0.0001
M5	115-3	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	0.0002	<0.006	<0.3	<0.0001
M6	115-13	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M7 (µg)	Blank	<0.45	<0.15	<0.15	<0.15	<0.45	<1.5	<0.30	<7.5	<0.38	<0.15
M8	115-15	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M9	115-13	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M10	111-15	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	0.0003
M11	111-3	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M12	111-20	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M13	115-11	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	0.0003	<0.006	<0.3	<0.0001
M14	115-5	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M15	115-6	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M16	115-7	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M17	111-19	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	<0.0002	<0.006	<0.3	<0.0001
M18	115-9	<0.0004	<0.1	<0.0001	<0.1	<0.0004	<0.001	0.0004	<0.006	<0.3	<0.0001
M19 (µg)	Blank	<0.45	<0.15	<0.15	<0.15	<0.45	<1.5	<0.30	<7.5	<0.38	<0.15

NYC 9/11 Public Portal Document

Table II
Metals

Parameter		Nickel	Thallium	Zinc
Units		mg/m3	mg/m3	mg/m3
OSHA		1	0.1	5
NIOSH		0.015	0.1	5
ACGIH		0.05	0.1	5
Sample #	Location			
M1	111-19	<0.0003	<0.0001	<0.001
M2	115-17	<0.0003	<0.0002	<0.002
M3	111-11	<0.0002	<0.0001	<0.001
M4	111-17	<0.0002	<0.0001	<0.001
M5	115-3	<0.0002	<0.0001	<0.001
M6	115-13	<0.0002	<0.0001	<0.001
M7 (µg)	Blank	<0.30	<0.15	<1.5
M8	115-15	<0.0002	<0.0001	<0.001
M9	115-13	<0.0002	<0.0001	<0.001
M10	111-15	<0.0002	<0.0001	<0.001
M11	111-3	<0.0002	<0.0001	<0.001
M12	111-20	<0.0002	<0.0001	<0.001
M13	115-11	<0.0002	<0.0001	<0.001
M14	115-5	<0.0002	<0.0001	<0.001
M15	115-6	<0.0002	<0.0001	<0.001
M16	115-7	<0.0002	<0.0001	<0.001
M17	111-19	<0.0002	<0.0001	<0.001
M18	115-9	<0.0002	<0.0001	<0.001
M19 (µg)	Blank	<0.30	<0.15	<1.5

NYC-WTC_0001132592

NYC-WTC_0001132593

NYC 9/11 Public Portal Document

Table III
Aldehydes

Parameter		Acetaldehyde	Benzaldehyde	Butyraldehyde	Crotonaldehyde	Formaldehyde	Propionaldehyde	Valeraldehyde
Units		ppm	ppm	ppm	ppm	ppm	ppm	ppm
OSHA		200	none	none	2	0.75	none	none
NIOSH		lowest feasible	none	none	2	0.016	none	none
ACGIH		25	none	none	2	0.03	none	none
Sample #	Location							
AL1	111-19	0.008	<0.003	<0.005	<0.005	0.02	<0.006	<0..004
AL2	115-17	<0.009	<0.004	<0.006	<0.006	0.02	<0.007	<0.005
AL3	111-11	<0.02	<0.01	<0.01	<0.01	<0.03	<0.02	<0.01
AL4	111-17	<0.009	<0.004	<0.006	<0.006	0.01	<0.007	<0.005
AL5	115-3	<0.01	<0.005	<0.008	<0.008	<0.02	<0.009	<0.006
AL6	115-13	<0.02	<0.006	<0.009	<0.01	<0.02	<0.01	<0.008
AL7 (µg)	Blank	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
AL8	115-15	<0.01	<0.004	<0.006	<0.006	<0.01	<0.007	<0.005
AL9	115-13	<0.009	<0.004	<0.006	<0.006	<0.01	<0.007	<0.005
AL10	111-15	<0.008	<0.003	<0.005	<0.005	0.02	<0.006	<0.004
AL11	111-3	<0.009	<0.004	<0.005	<0.006	<0.01	<0.007	<0.004
AL12	111-20	<0.002	<0.0008	<0.001	<0.001	<0.003	<0.001	<0.001
AL13	115-11	0.01	<0.006	<0.008	<0.009	0.03	<0.01	<0.007
AL14	115-5	<0.004	<0.002	<0.003	<0.003	<0.007	<0.003	<0.002
AL15	115-6	<0.008	<0.003	<0.005	<0.005	0.02	<0.006	<0.004
AL16	115-7	<0.008	<0.003	<0.005	<0.005	0.02	<0.006	<0.004
AL17	111-19	<0.01	<0.005	<0.007	<0.008	0.04	<0.009	<0.006
AL18	115-9	<0.01	<0.006	<0.008	<0.008	0.03	<0.01	<0.007
AL19 (µg)	Blank	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Table IV
Asbestos Fibers

Sample #	Location	Concentration (s/mm^2)
ACM1	111-19	<15
ACM2	115-17	<15
ACM3	111-11	<15
ACM4	111-17	<15
ACM5	115-3	<15
ACM6	115-13	15
ACM7	Blank	N/A
ACM8	Blank	N/A
ACM9	115-15	<15
ACM10	115-13	<15
ACM11	111-15	<15
ACM12	111-3	<15
ACM13	111-20	<15
ACM14	115-11	15
ACM15	115-5	<15
ACM16	115-6	<15
ACM17	115-7	<15
ACM18	111-19	<15
ACM19	115-9	<15
ACM20	Blank	N/A
ACM21	Blank	N/A

N/A=Sample not analyzed.

Table V
Respirable Paticulates and Silica

Parameter		Dust	Quartz	Cristobalite	Tridymite
Units		mg/m^3	mg/m^3	mg/m^3	mg/m^3
OSHA		5 mg/m^3	10 mg/m^3	5 mg/m^3	5 mg/m^3
NIOSH		none	0.05 mg/m^3	none	none
ACGIH		3 mg/m^3	0.1 mg/m^3	0.05 mg/m^3	0.05 mg/m^3
Sample#	Location				
S1	111-19	<0.09	<0.02	<0.02	<0.02
S2	115-17	<0.09	<0.02	<0.02	<0.02
S3	111-11	<0.08	<0.02	<0.02	<0.02
S4	111-17	0.14	0.026	<0.02	<0.02
S5	115-3	<0.09	<0.02	<0.02	<0.02
S6	115-13	<0.08	<0.02	<0.02	<0.02
S7 (mg)	Blank	<0.05	<0.01	<0.01	<0.01
8	115-15	<0.08	<0.02	<0.02	<0.02
9	115-13	<0.08	<0.02	<0.02	<0.02
10	111-15	0.22	0.017	<0.02	<0.02
11	111-3	<0.07	<0.01	<0.01	<0.01
12	111-20	<0.08	<0.02	<0.02	<0.02
13	115-11	<0.08	<0.02	<0.02	<0.02
14	115-5	<0.08	0.021	<0.02	<0.02
15	115-6	<0.08	<0.02	<0.02	<0.02
16	115-7	<0.08	<0.02	<0.02	<0.02
17	111-19	<0.08	<0.02	<0.02	<0.02
18	115-9	<0.08	<0.02	<0.02	<0.02
19 (mg)	Blank	<0.05	<0.01	<0.01	<0.01

NYC-WTC_0001132596

NYC 9/11 Public Portal Document

Table VIa
Volatile Organic Compounds

Parameter	ACGIH (ppm)	OSHA (ppm)	NIOSH (ppm)	Units	VOC1 111-19	VOC2 115-17	VOC3 111-11	VOC4 111-17	VOC5 115-3	VOC6 115-13	VOC7 115-15	VOC8 115-13	VOC9 111-15	VOC10 111-3	VOC11 111-20	VOC12 115-11	VOC13 115-5	VOC14 115-6	VOC15 115-7	VOC16 115-9
Propylene	200	none	none	ppbv	9	8	10	25	10	15	8	9	<5	<5	<5	9	<5	<5	<5	<5
Freon-12	1000	1000	1000	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloromethane	50	25	LF	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Freon-114	1000	1000	1000	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	1	1	none	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,3-Butadiene	2	1	LF	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromomethane	1	20	none	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroethane	100	1000	none	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Bromide	0.5	none	LF	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Freon-11	1000	1000	1000	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Isopropyl Alcohol	400	400	400	ppbv	121	157	131	476	112	56	26	78	73	34	128	29	32	<20	128	25
Acetone	500	1000	250	ppbv	513	592	278	208	88	236	92	154	67	70	70	50	96	45	104	36
1,1-Dichloroethene	5	none	LF	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methylene Chloride	50	25	LF	ppbv	30	5	<5	22	<5	6	8	8	<5	<5	<5	<5	<5	<5	<5	<5
Freon-113	1000	1000	1000	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5
Allyl Chloride	1	1	1	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Disulfide	10	20	1	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trans-1,2-Dichloroethene	200	200	200	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methyl Tert-Butyl Ether	40	none	none	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	100	100	100	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Acetate	10	none	4	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methyl Ethyl Ketone	200	200	200	ppbv	6	14	7	8	9	24	12	10	<5	<5	<5	9	6	10	<5	15
cis-1,2-Dichloroethylene	200	200	200	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Hexane	50	500	50	ppbv	6	11	8	5	7	20	6	12	<5	<5	<5	<5	<5	5	11	9
Ethyl Acetate	400	400	400	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	7
Chloroform	10	50	2	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Tetrahydrofuran	200	200	200	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	10	50	1	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane	350	350	350	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cyclohexane	300	300	300	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Tetrachloride	5	10	2	ppbv	<5	<5	<5	<5	<5	7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzene	0.5	1	0.5	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,4-Dioxane	20	100	1	ppbv	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
2,2,4-Trimethylpentane	none	none	none	ppbv	<5	<5	<5	<20	<20	<20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Heptane	400	500	85	ppbv	<5	<5	<5	<20	<20	<20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	75	75	LF	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethylene	50	100	none	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromodichloromethane	none	none	none	ppbv	<5	<5	<5	<5	<5	<5	8	8	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	1	none	1	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
trans-1,3-Dichloropropene	1		1	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	10	10	10	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene	50	200	100	ppbv	26	18	17	18	7	24	21	20	17	7	10	14	11	12	30	22
Dibromochloromethane	none	none	none	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methyl Isobutyl Ketone	50	100	50	ppbv	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Methyl Butyl Ketone	5	100	1	ppbv	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
1,2-Dibromoethane		20	0.045	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethylene	2.5	100	LF	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	10	75	none	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	100	100	100	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromoform	0.5	0.5	0.5	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
m & p-xylene	100	100	100	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Styrene	20	100	50	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
o-Xylene	100	100	100	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	1	5	1	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Ethyltoluene	none	none	none	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,3,5-Trimethylbenzene	25	none	25	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2,4-Trimethylbenzene	25	none	25	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,3-Dichlorobenzene	none	none	none	ppbv	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzyl Chloride																				

Table VIb
Volitile Organic Compounds
Tentatively Identified Compounds

Sample	Location	Tentatively Identified Compounds	Estimated Concentration (ppmv)	ACGIH (ppm)	OSHA (ppm)	NIOSH (ppm)
VOC1	111-19	Ethane, 1,1-difluoro	0.0057			
		Isobutane	0.0055			800
		Butane, 2-methyl-	0.022	600		
		Unknown C2H3N	0.016			
		Octane	0.072	300	500	75
		Decane	0.063			
		Heptane, 2,2,4,6,6-pentame	0.0081			
		Dodecane	0.018			
VOC2	115-17	Ethanol	0.0052	1,000		
		Butane, 2-methyl-	0.017	600	1,000	120
		Octane	0.08	300	500	75
		Nonane, 3-methyl-	0.013			
		Decane	0.069			
		Decane, 2,2-dimethyl-	0.0057			
		Dodecane	0.02			
VOC3	111-11	Norflurane	0.026			
		Ethane, 1,1-difluoro-	0.03			
		Isobutane	0.011			800
		Butane, 2-methyl-	0.064	600	1,000	120
		Unknown C2H3N	0.1			
		Cyclopentane	0.016	600		600
		Octane	0.0087	300	500	75
		Decane	0.037			
		Dodecane	0.026			
VOC4	111-17	Norflurane	0.0061			
		Dimethyl ether	0.014			
		Isobutane	0.0084			800
		Butane	0.016	800		800
		Ethanol	0.0084	1,000	1,000	100
		Butane, 2-methyl-	0.03	600	1,000	120
		Acetonitrile	0.018	40	40	20
		Cyclopentane	0.0082	600		600
		Decane	0.016			
		Dodecane	0.015			
VOC5	115-3	Butane, 2-methyl-	0.0082	600	1,000	120
		Unknown C2H3N	0.0058			
		Pentane, 2-methyl-	0.0073	500		100
		Decane	0.018			
		Dodecane	0.015			
VOC6	115-13	Isobutane	0.0088			800
		Butane, 2-methyl-	0.055	600	1,000	120
		Unknown C2H3N	0.013			
		Butane, 2,3-dimethyl-	0.021	500		100
		Pentane, 3-methyl-	0.0083	500		100
		Cyclopentane, methyl-	0.012			
		Octane	0.0099	300	500	75
		Decane	0.012			
		Dodecane	0.0082			
VOC7	115-15	No Volatiles Found	0.001			
VOC8	115-13	Dodecane	0.01			
VOC9	111-15	Norflurane	0.0066			
		Methane, chlorodifluoro-	0.0073	1,000		1,000
VOC10	111-3	Methane, chlorodifluoro-	0.006	1,000		1,000
		Decane	0.01			
		Octanal	0.0059			
		Dodecane	0.0081			

Table VIb
Volitile Organic Compounds
Tentatively Identified Compounds

Sample	Location	Tentatively Identified Compounds	Estimated Concentration	ACGIH	OSHA	NIOSH
			(ppmv)	(ppm)	(ppm)	(ppm)
VOC11	111-20	Methane, chlorodifluoro-	0.01	1,000		1,000
VOC12	115-11	No Volatiles Found	0.001			
VOC13	115-5	Methane, chlorodifluoro-	0.011	1,000		1,000
VOC14	115-6	Methane, chlorodifluoro-	0.006	1,000		1,000
VOC15	115-7	Methane, chlorodifluoro-	0.013	1,000		1,000
		Ethanol	0.0059	1,000	1,000	1,000
		Acetic acid, butyl ester	0.0052	150	150	150
		Decane	0.0076			
VOC16	115-9	Methane, chlorodifluoro-	0.013	1,000		1,000
		Pentane, 2-methyl-	0.0066	500		100
		Cyclopentane, methyl-	0.006			

NYC-WTC_0001132599

NYC 9/11 Public Portal Document

Parameter			TCDD	PeCDD	HxCdd	HxCdd	HxCdd	HpCdd	OCDD	TCDF
Units			pg	pg	pg	pg	pg	pg	pg	pg
Sample Date	Sample#	Location								
11/26/2001	1	111-19	1.2	0.8	1.1	1.2	1.1	*2.8*	*10.2*	*4.3*
11/26/2001	2	115-17	*5*	*8.4*	*10.6*	*10.7*	17.9	*13.9*	*32.9*	*8.5*
11/27/2001	3	111-11	*3.4*	*11.3*	*14.9*	*14.6*	37.5	**120**	*161*	*10.3*
11/27/2001	4	111-17	*1.8*	1.2	1.7	1.8	1.7	2.3	*4.9*	*5.1*
11/27/2001	5	115-3	1.4	*1.9*	1.4	*1.8*	3.8	*4.4*	*11.9*	*7.1*
11/27/2001	6	115-13	1.7	1.2	1.7	1.7	1.7	2.3	*6.4*	*2.7*
N/A	7	Blank	2.2	1.6	2.3	2.3	2.3	3	*6.4*	2
11/28/2001	8	111-15	3.5	3.2	5.2	5.4	5.3	7.8	*29*	*10.6*
11/28/2001	9	115-13	1.8	1.5	2	2.1	2	2.7	*11*	1.5
11/28/2001	10	111-15	1.5	1.2	1.6	1.6	1.5	2.1	*11.1*	*5.7*
11/29/2001	11	111-3	1.5	1.2	1.7	*1.7*	2.8	2.2	*6.6*	1.3
11/29/2001	12	111-20	8.6	8.4	12.4	12.9	12.2	21.3	40.9	6.1
11/29/2001	13	115-11	3.5	3.1	4.3	4.4	4.2	*4.5*	*23.4*	*8.3*
11/29/2001	14	115-5	2.3	1.9	2.3	2.4	2.3	3.8	*11.8*	1.7
11/30/2001	15	115-6	3.5	3.2	4.3	4.5	4.1	6.5	*12.6*	*10.1*
11/30/2001	16	115-7	*2.6*	2	2.5	2.6	2.4	*1.7*	*15.8*	*5*
11/30/2001	17	115-9	3.9	3.6	4.2	4.3	4.1	7	*22.2*	*6.9*
N/A	18	Blank	4.2	3.8	4.7	4.8	4.6	7.4	12.3	3

italics is an estimated result. Result is less than the reporting limit

bold represents an identifed value.

NYC 9/11 Public Portal Document

PeCDF	PeCDF	HxCDF	HxCDF	HxCDF	HxCDF	HpCDF	HpCDF	OCDF
pg	pg	pg	pg	pg	pg	pg	pg	pg
0.8	0.8	2.7	1.2	1.1	0.9	0.9	1.1	2.6
9.7	6.8	11.5	9.9	9.7	18.3	12.3	16.5	26.3
7.5	8.7	29	17.1	17.6	3.4	17.2	10.4	30.6
1.1	1.1	3.4	1.2	1.1	1.4	1.4	1.8	3
2.2	2.1	4	2	1.2	1.8	1.2	1.5	4.4
1.2	1.1	2.8	1.1	1.1	1.3	1.5	1.8	3
1.6	1.5	2	1.5	1.4	1.7	1.9	2.3	3.9
3	2.9	3.2	3.2	3.1	3.9	4.5	5.5	9.8
1.4	1.3	1.3	1.3	1.2	1.5	1.7	2.1	2.6
1.1	1.1	2.6	1	1	1.3	1.4	1.7	4.7
1.1	1.1	1.6	1.1	1.1	1.4	1.5	1.9	2.2
7.5	7.1	7.8	8.1	7.7	9.4	12.4	14.1	30.4
2.9	2.7	3.7	3	2.9	3.5	3.7	4.2	6.2
1.8	1.7	2	1.7	1.6	1.9	2.2	2.5	4.3
2.9	2.7	4.3	2.8	2.7	3.2	4	4.5	5.9
2	1.9	2.9	1.7	1.6	1.9	2.3	2.6	5
3.2	3	3	3.1	3	3.6	4.4	4.9	9.1
3.3	3.1	3.1	3.2	3.1	3.7	4.1	4.6	9.2

NYC-WTC_0001326 00

Table VIII
Carbon Dioxide, Relative Humidity, Temperature and Carbon Monoxide

Location	Time	Date	Carbon Dioxide	RH	Temperature	Carbon Monoxide
111-3	1:18	11/29/2001	640	43.8	75	0
111-3	2:55	11/29/2001	670	50	71.9	0
111-3	9:00	11/29/2001	649	46	73.2	0
111-3	9:35	11/29/2001	635	46.2	73.3	0
111-3	4:30	11/28/2002	886	48.8	75.5	0
111-6	5:03	11/28/2002	698	50	74.8	0
111-7	4:58	11/28/2002	738	51.2	75.4	0
111-9	4:45	11/28/2002	595	48.1	74.8	0
111-11	2:40	11/28/2002	983	45.3	77.3	0
111-15	1:00	11/29/2001	616	40.2	78.2	0
111-15	2:30	11/28/2002	649	47.3	79.4	0
111-17	2:15	11/28/2002	519	50.1	78.3	0
111-20	3:12	11/29/2001	710	49.8	72.3	0
111-20	10:12	11/29/2001	610	40.8	74.5	0
111-20	10:45	11/29/2001	597	42.7	73.4	0
111-20	11:02	11/29/2001	785	45.5	77.8	0
111-20	12:05	11/28/2002	862	50.7	74.7	0
115-3	1:32	11/28/2002	517	52.2	77.1	0
115-5	3:40	11/29/2001	654	49.2	71.8	0
115-5	1:20	11/28/2002	552	47	76.7	0
115-6	1:39	11/30/2001	516	48.2	78.5	0
115-6	8:10	11/30/2001	505	51.4	74.8	0
115-7	1:25	11/30/2001	720	50	79	0
115-7	8:22	11/30/2001	475	49.9	76.1	0
115-7	1:45	11/28/2002	539	55	75.5	0
115-9	1:35	11/30/2001	502	47.4	78.5	0
115-9	8:50	11/30/2001	645	51.2	71.5	0
115-9	10:35	11/30/2001	513	44.6	76.1	0
115-9	1:56	11/28/2002	546	53.4	77.7	0
115-9	12:56	11/28/2002	648	55.3	76.9	0
115-11	3:35	11/29/2001	820	49.7	72.2	0
115-11	11:27	11/29/2001	650	41.8	78.1	0
115-11	12:40	11/28/2002	746	53.5	74.1	0
115-13	11:00	11/30/2001	561	47.5	79.3	0
115-13	12:20	11/28/2002	803	49.7	74.8	0
115-13	12:30	11/28/2002	641	53.4	73.2	0
115-15	10:50	11/30/2001	609	49.3	79.3	0
115-15	1:10	11/28/2002	841	49.7	79.1	0
115-17	12:10	11/28/2002	704	50.7	74.7	0