Second Avenue Subway Project

Attachments to Technical Appendix

Air Quality Monitoring Study of Construction Activities between 69th and 87th Street on Second Avenue

Prepared for:

MTA Capital Construction

Prepared by:

Parsons Brinckerhoff

January 17, 2012

Attachments

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Attachment A

MSDS for Emulex and Red-D Prime

MATERIAL SAFETY DATA SHEET

EMULEX SERIES

SECTION I — Issued by the Safety and Compliance Dept.

AUSTIN POWDER COMPANY
25800 SCIENCE PARK DRIVE
CLEVELAND, OHIO 44122
EMERGENCY PHONE
DAY 216-464-2400
NIGHT 216-464-2407

TRADE NAME AND SYNONYMS

Seismex MH
Emulex 500, 700 & 900 Series
AXE 100 to 499
Primegel
Coalmex (Permissible Emulsion)
Red-D Prime
Enviroseis Emulsions
Emuline and Emuline 33
Red-D Lite-E

Emuline and Emuline 33 are Emulex Products that incorporate a continuous length of Detonating Cord. See MSDS. Primegel contains a Cast Booster. See MSDS. Enviroseis products are packaged in threaded plastic tubes.

SECTION II HAZARDOUS INGREDIENTS

Ammonium Nitrate: NH_4NO_3,	CAS No. 6484-52-2,	(60 - 90%)
Sodium Nitrate, $NaNO_3$,	CAS No. 7631-99-4,	(0 - 17%)
Petroleum Hydrocarbons,	CAS No. 68476-30-2	(3 to 9%)
Aluminum, Al,	CAS No. 7429-90-5,	(0 to 10%)

An emulsified water in oil mixture of ammonium nitrate, mineral oil, and emulsifiers.

SECTION III PHYSICAL DATA

BOILING POINT N/A
SPECIFIC GRAVITY (H_2O = 1) 1.14 to 1.35
PERCENT VOLATILE BY VOL. (%) N/A
VAPOR PRESSURE (mm Hg) N/A
VAPOR DENSITY (Air=1) N/A
EVAPORATION RATE: N/A

SOLUBILITY IN WATER: Although in excess of 80% of the materials are readily soluble in water, the products have excellent water resistance.

APPEARANCE AND ODOR: Viscous emulsion. If aluminum is present, gray metal particles will be visible. Slight odor of oil.

SECTION IV FIRE AND EXPLOSION DATA

FLASH POINT: Oil 114°C (PMCC)
FLAMMABLE LIMITS: Not available
EXTINGUISHING MEDIA: See below.
SPECIAL FIRE FIGHTING PROCEDURES: Do not fight fires. Withdraw personnel immediately. Allow fire to burn itself out.
UNUSUAL FIRE AND EXPLOSION HAZARDS: May explode when subjected to fire or shock, especially when confined and in large quantities.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: ACGIH: Oil Mist, mineral, 5 MG/M³, Aluminum metal dust, 10 MG/M³
OSHA: Oil Mist, mineral, 5 MG/M³, Aluminum metal dust, 15 MG/M³
EFFECTS OF OVEREXPOSURE: Acute: Ingestion of large amounts may cause cyanosis, nausea, collapse, vomiting, abdominal pain, rapid heartbeat and breathing, coma, convulsions, and death may occur.
EMERGENCY AND FIRST AID PROCEDURES:
Eyes: Slight irritant. Flush with large amounts of water for at least 15 minutes and consult a physician.
Skin: Slight irritant. Wash with mild soap and water.

MATERIAL SAFETY DATA SHEET

EMULEX SERIES

SECTION VI REACTIVITY DATA Issued by the Safety and Compliance Dept.

STABILITY: Stable under normal conditions. May explode when subjected to fire or shock, especially when confined and in large quantities. Avoid temperatures above 212°F, (100°C).

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid all contamination, especially peroxides and chlorates. Alkaline contamination may liberate ammonia fumes.

HAZARDOUS DECOMPOSITION PRODUCTS: Gaseous nitrogen oxides and carbon oxides: Toxic decomposition products including carbon monoxide (CO) may migrate to off blast-site areas.

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Pick up and dispose of all spilled material immediately. Do not permit smoking or open flames near spill site.

WASTE DISPOSAL METHOD: Uncontaminated material may be placed in large diameter boreholes and detonated so that the explosive energy is utilized as originally intended. Dispose of under direct supervision of a qualified person according to local, state and federal regulations. Call Austin Powder for recommendations and assistance.

TRANSPORTATION EMERGENCIES involving spills, leaks, fires or exposures in the United States: CALL CHEMTREC for emergencies only: 1-800-424-9300. For calls originating outside the U. S. dial the U. S. access number followed by: 1-703-527-3887. All calls are recorded.

SECTION VIII SPECIAL PROTECTION INFORMATION:

RESPIRATORY PROTECTION:	Not required under normal conditions.
VENTILATION:	Not required under normal conditions.
PROTECTIVE GLOVES:	Slight skin irritant.
EYE PROTECTION:	Slight eye irritant.

SECTION IX SPECIAL PRECAUTIONS

COMPLY WITH THE SAFETY LIBRARY PUBLICATION NO. 4 "WARNINGS AND INSTRUCTIONS" AS ADOPTED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES.
TRANSPORTATION, STORAGE AND USE MUST COMPLY WITH OSHA SAFETY AND HEALTH STANDARDS 29CFR1910.109, APPLICABLE MSHA REGULATIONS, THE DOT AND HAZARDOUS MATERIALS REGULATIONS, BATF REQUIREMENTS AND STATE AND LOCAL TRANSPORTATION, STORAGE AND USE REGULATIONS AND ORDINANCES.

DOT or IMDG proper shipping description: Explosives, Blasting, Type E, 1.1D, UN0241, PG II.

Coalmex is approved for use as a Permissible Explosive by the USDL and MSHA when used in conformance with the requirements of 30 CFR 15.

This material may become a hazardous waste under certain conditions and must be collected, labeled and disposed of per state and federal hazardous waste regulations.

None of the components are listed in the 1987 IARC Monographs, Group 1, 2A or 2B as known, probable, or possible carcinogens, nor are they listed in the NTP annual report on carcinogens.

Attachment B

The Number of Observations and Percent Recovery for Each Monitoring Location

Second Avenue Subway (SAS)– Construction Phase Air Monitoring Study

Period September 11-October 8, 2011

Monitoring Station		CO 1-hr Data	NO 1-hr Data	NO_2 1-hr Data	NH_3 1-hr Data	SO_2 1-hr Data	H_2S 1-hr Data	VOC 15-min Data	PM_{10} 1-hr Data	$PM_{2.5}$ 1-hr Data	PM_{10} Daily Data	$PM_{2.5}$ Daily Data
1	Valid Count	632	638	638	639	344	106	2301		439		18
	Count from Instruments	667	668	668	668	368	116	2478		657		28
	Theoretical Count	672	672	672	672	432	116	2688		672		28
	% of Valid Count	94.75%	95.51%	95.51%	95.66%	93.48%	91.38%	92.86%		66.82%		64.29%
	% of total theoretical Count	94.05%	94.94%	94.94%	95.09%	79.63%	91.38%	85.60%		65.33%		64.29%
2	Valid Count	592	592	593	594			1789	479		18	
	Count from Instruments	647	649	649	649			1848	531		25	
	Theoretical Count	672	672	672	672			2688	672		28	
	% of Valid Count	91.50%	91.22%	91.37%	91.53%			96.81%	90.21%		72.00%	
	% of total theoretical Count	88.10%	88.10%	88.24%	88.39%			66.56%	71.28%		64.29%	
3	Valid Count	569	581	578	580	418	128	2602	455		18	
	Count from Instruments	602	596	596	596	443	131	2677	605		26	
	Theoretical Count	672	672	672	672	528	131	2688	672		28	
	% of Valid Count	94.52%	97.48%	96.98%	97.32%	94.36%	97.71%	97.20%	75.21%		69.23%	
	% of total theoretical Count	84.67%	86.46%	86.01%	86.31%	79.17%	97.71%	96.80%	67.71%		64.29%	
4	Valid Count	569	592	592	593	307	128	2569	651		27	
	Count from Instruments	597	620	620	620	519	135	2679	672		28	
	Theoretical Count	672	672	672	672	552	135	2688	672		28	
	% of Valid Count	95.31%	95.48%	95.48%	95.65%	59.15%	94.81%	95.89%	96.88%		96.43%	
	% of total theoretical Count	84.67%	88.10%	88.10%	88.24%	55.62%	94.81%	95.57%	96.88%		96.43%	
5	Valid Count	604	602	603	603			2435		550		22
	Count from Instruments	630	630	630	630			2500		632		28
	Theoretical Count	672	672	672	672			2688		672		28
	% of Valid Count	95.87%	95.56%	95.71%	95.71%			97.40%		87.03%		78.57%
	% of total theoretical Count	89.88%	89.58%	89.73%	89.73%			90.59%		81.85%		78.57%
6	Valid Count	416	531	532	530	275	131	2478	393		14	
	Count from Instruments	457	572	572	572	297	137	2543	545		25	
	Theoretical Count	672	672	672	672	360	137	2688	672		28	
	% of Valid Count	91.03%	92.83%	93.01%	92.66%	92.59%	95.62%	97.44%	72.11%		56.00%	
	% of total theoretical Count	61.90%	79.02%	79.17%	78.87%	76.39%	95.62%	92.19%	58.48%		50.00%	
7	Valid Count	515	470	433	469			2615	551		20	
	Count from Instruments	556	513	513	513			2675	652		28	
	Theoretical Count	672	672	672	672			2688	672		28	
	% of Valid Count	92.63%	91.62%	84.41%	91.42%			97.76%	84.51%		71.43%	
	% of total theoretical Count	76.64%	69.94%	64.43%	69.79%			97.28%	81.99%		71.43%	
8	Valid Count	599	561	560	560			2557		623		26
	Count from Instruments	668	620	620	620			2610		669		28
	Theoretical Count	672	672	672	672			2688		672		28
	% of Valid Count	89.67%	90.48%	90.32%	90.32%			97.97%		93.12%		92.86%
	% of total theoretical Count	89.14%	83.48%	83.33%	83.33%			95.13%		92.71%		92.86%
9	Valid Count	646	545	497	545			2602	510		21	
	Count from Instruments	672	558	558	558			2669	672		28	
	Theoretical Count	672	672	672	672			2688	672		28	
	% of Valid Count	96.13%	97.67%	89.07%	97.67%			97.49%	75.89%		75.00%	
	% of total theoretical Count	96.13%	81.10%	73.96%	81.10%			96.80%	75.89%		75.00%	
10	Valid Count	530	551	551	551			2220	507		19	
	Count from Instruments	561	586	586	586			2289	527		24	
	Theoretical Count	672	672	672	672			2688	672		28	
	% of Valid Count	94.47%	94.03%	94.03%	94.03%			96.99%	96.20%		79.17%	
	% of total theoretical Count	78.87%	81.99%	81.99%	81.99%			82.59%	75.45%		67.86%	
ALL Average	% of Valid Count	93.59%	94.19%	92.59%	94.20%	84.89%	94.88%	96.78%	84.43%	82.32%	74.18%	78.57%
	% of total theoretical Count	84.40%	84.27%	82.99%	84.29%	72.70%	94.88%	89.91%	75.38%	79.96%	69.90%	78.57%

Attachment C

Monitoring Quality Assurance Project Program (QAPP)

MTA

Second Avenue Subway

Health Monitoring Program

MONITORING AND QUALITY ASSURANCE PROGRAM

September, 2011

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Organization and Roles

MTA – supervision and control
EPA Region 2 – supervision and consulting
Second Avenue Subway Construction Management Team – support
PB consulting team – monitoring, calibration and maintenance, data collection and processing, data analysis for criteria pollutants
TRC consulting team – odor analysis and health risk assessment, subcontractor to PB

Introduction

The month-long monitoring study of the air quality impacts of the blasting operations at the Second Avenue Subway (SAS) construction project, contracts C4B and C5A, was initiated by the MTA to address the concerns of the residents that live near the heavy construction areas along the SAS corridor.

The objectives of this air monitoring study commissioned by MTA Capital Construction can be summarized as follows:

1. To determine the air quality, dust and odor effects of the underground blasting (and other construction related activities) on the adjacent abutters and affected public.
2. To evaluate, based on the results of this short term monitoring, the public health and nuisance effects that the current construction activities could have in the adjacent public and abutters.
3. To verify the adequacy of the ongoing Community Air Monitoring Plan (CAMP) implemented by the contractor, and provide recommendations for improving its efficacy.
4. To evaluate the ongoing mitigation program, and identify which additional mitigation measures can be recommended for implementation in revised contract documents.

1. Quality Objectives and Criteria for Measurement of Data

Precision, Accuracy, Detectability: The precision level of measurement for each pollutant was selected to match the required precision of the criteria established in the National Ambient Air Quality Standards (NAAQS), or other regulatory or industry standard guideline. Each monitored pollutant level for carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), respirable silica, sulfur dioxide (SO_2), ammonia (NH_3), and hydrogen sulfide (H_2S) was compared to these regulatory pollutant levels. NO_2 concentrations are the only exception in this air monitoring study. The 1-hour NAAQS for NO_2 is 100 ppb. The precision of Multi VRAE monitor is also 100 ppb (0.1 PPM). Since the NO_2 monitoring is not critical for this study and was undertaken only as a complimentary task, the monitored NO_2 concentrations were not compared to the NAAQS. The VOC and PM_{10} 15-minute average concentrations were compared to the limits established in the CAMP program. See Table 1 for details on the time periods for which each pollutant was monitored, the criteria against which the monitored concentrations were compared and the detection limits of the monitoring instrumentation.

The accuracy of the monitored concentrations was assured by the calibration of the monitoring instruments:

Routine daily calibrations, bump testing or zeroing of monitoring instrumentation is performed on each piece of equipment according the specific manufacturer's instructions. Where required, calibration gases were used as appropriate.

Representativeness, Completeness, Comparability: Ten air monitoring station (AMS) locations were selected to cover the 4 shaft locations. The shafts are located between 69th and 70th Streets, between 72nd and 73rd Streets, 83rd and 84th Street and between 86th and 87th Streets. AMS locations and pollutants monitored at each location are presented in Table 2. Each AMS was equipped with up to six monitoring instruments depending on the pollutants measured at the respective location. Some stations were located at the ground level from 5 to 10 feet above grade and some AMSs were at third floor elevation in order to cover the variety of sensitive land uses open to the public, from pedestrians to residents. These diverse locations and elevations as well as the number of monitors employed and pollutants monitored are believed to serve the purpose of the study.

The number of monitoring instruments and AMSs also serve to compare the collected data and to ensure the coverage in cases of monitoring instrument malfunction. Additionally, the collected data for each AMS could be compared with the contractor's CAMP data.

Table 1: Monitored Pollutants, Criteria and Detection Limits

Monitored Pollutants	Time Period	Criteria	Unit	Monitoring Instrument	Resolution	Monitoring Range
CO	1 Hour	35	ppm	VRAE	1 ppm	0-500 ppm
	8 Hour	9	ppm			
PM_{10}	15 Minute	150	$\mu g/m^3$	MIE DR-4000	1 $\mu g/m^3$	Min detection limit: 0.1 $\mu g/m^3$
	24 Hour	150	$\mu g/m^3$			
$PM_{2.5}$	24 Hour	35	$\mu g/m^3$			
Respirable Silica	24 Hour	10	$\mu g/m^3$	Buck Libra L-5	5 $\mu g/m^3$	
NO_2	1 Hour	100	ppb	VRAE	100 ppb	0 – 20 ppm
NO				VRAE	1 ppm	0-250 ppm
SO_2	1 Hour	75	ppb	RKI Eagle-2	0.01 ppm	0-6 ppm
	1 Hour	75	ppb	VRAE	0.1 ppm	0-20 ppm
NH_3	1 Hour	3.4	ppm	VRAE	1 ppm	0-50 ppm
H_2S	1 Hour	0.51	ppm	Jerome 631X	0.03 ppm	0-0.99 ppm
	1 Hour	0.51	ppm	VRAE	1 ppm	0-100 ppm
VOC	15 Minute	5	ppm	MiniRAE 2000	0.1 ppm	0-99 ppm

2. Documents and Records

The monitoring instrumentation at the AMSs will collect real time measurements of PM_{10}, $PM_{2.5}$, VOC, NO, NO_2, NH_3, SO_2, H_2S and CO continuously for one month from September 11th through October 8th. The monitoring instrumentation is configured to collect data and transmit the collected data via wireless modem to an off-site data center. Data from the monitoring equipment that required manual downloads, will be downloaded on a daily basis. Downloading of data was not conducted on weekends. In addition, the 37mm three-piece PVC filter cassettes (cassettes), associated with in the two week silica monitoring program, were collected every weekday afternoon.

Table 2: Air Monitoring Station (AMS) Locations and Pollutants

Station No (Contract)	Location	Pollutant					
		CO, NO, NO_2, NH_3, SO_2	VOC	H_2S	PM_{10}	$PM_{2.5}$	Silica
1(C4B)	69th Street, SE corner, inside gate on top of blue conex container	X	x	x		x	
2(C4B)	69th Street, NW corner, Ancillary 1, third floor fire escape of the	X	x	x	x		
3(C4B)	70th Street, NE corner, upper level of Hoghouse deck	X	x	x	x		x
4(C4B)	72nd Street, SE corner, inside fence in lay-down area	X	x	x	x		x
5(C4B)	72nd Street, SE corner, third floor fire escape above pizzeria	X	x	x		x	
6(C4B)	73rd Street, NE corner, directly inside fence, mounted to unistrut channels	X	x	x	x		
7(C5A/B)	83rd Street, SE corner, directly inside fence, mounted to unistrut channels	X	x	x	x		x
8(C5A/B)	83rd Street, NW corner, third floor fire escape of the former Gothic Cabinet Building	X	x	x		x	
9(C5A/B)	86th Street, NE corner, directly inside fence, mounted to unistrut channels	X	x	x	x		
10(C5A/B)	87th Street, SE corner, directly inside fence, mounted to unistrut channels	X	x	x	x		

Note: Silica monitoring extended for 2 week period to cover at least 10 blasting events.

The data were stored in a database created for this program. The database was created by the PB team. The analyzed data was then included in the final air monitoring study report. The data was analyzed by compiling the minute readings into the time periods that correspond to the NAAQS or other limits appropriate for each pollutant – see Table 1. The summary of the data was presented to the MTA. The draft report with data summaries and findings (based on the results of the four weeks of data collected) is to be submitted within six weeks of the finalization of the monitoring program. Any findings from the preliminary presentations to MTA-CC, the community board, or other entities will be incorporated into

the draft report. The report will be reviewed and finalized by PB utilizing comments provided by the MTA and the USEPA.

3. Measurement and Data Acquisition

Sample process design: The AMS locations were selected in accordance with the monitoring objectives as described in Section 1 and in consultation with Region 2 USEPA representatives. The selected AMSs are presented in Table 2. The reasons for selection and representativeness of the selected AMSs are in subsection "Representativeness, Completeness, Comparability".

Sampling methods: All monitoring instrumentation was placed in the field at approved designated locations. Prior to installation all monitoring instrumentation was calibrated and programmed to collect data at one minute intervals. The instrumentation was monitored on a daily basis (except weekends) by competent professional personnel. The monitoring instrumentation was calibrated, bump-tested or zeroed according the specific manufacturer's instructions. Silica bulk sampling was performed in the vicinity of the 72nd Street and 83rd Street – Shaft Areas to determine the silica characteristics of the rock material with the vicinity of the respective work areas. Upon completion of the sampling, the bulk samples were delivered to the laboratory. This was necessary to determine the three main components of silica rock: α-Quartz, Cristobalite and Tridymite. Silica air sampling was performed using Buck Libra L-4 sampling pumps, 37mm three-piece PVC filter cassettes and aluminum cyclones.

Data handling and custody chain: The VRAE, DR and MiniRAE instruments were set to data log 24 hours/day and 7-days/week. In addition, this monitoring instrumentation was configured to collect data and transmit the collected data via wireless modem to an off-site data center. From that point, the data center will transmit collected data to Environet, which is a fully-hosted, web-based application that enables end users to perform real-time monitoring and review historical analysis of captured data. At this point, all data is downloaded and saved by a PB team member. The Environet web site will be supported by the monitoring instrumentation rental company.

The data from the other instruments (RKI Eagle-2 and Jerome 631X) was downloaded manually on a daily basis. The data collected from these units will be saved and transferred to a network file that can be accessed by the PB team.

The silica air monitoring cassettes collected from silica monitor pump (Buck Libra L-5) were hand delivered to the laboratory (EMSL Analytical, Inc.). Prior to delivering the silica air samples to the laboratory, the chain-of-custody form was completed and signed by the PB team member responsible for this task. The cassettes were retained by the laboratory for 30 days. Silica bulk samples were retained for 60 days.

Analytical methods (silica): The cassettes will be manually collected from the AMS where silica monitoring is conducted. NIOSH Method 7500 – Silica, Crystalline by x-ray diffraction (XRD), was utilized to determine the concentrations of silica (α -Quartz, Cristobalite and Tridymite) in the air samples.

Quality control requirements: Prior to installing the monitoring instrumentation at their respective AMSs, the instrumentation ID numbers or serial numbers associated with each instrument were

recorded. In order to determine that the instruments are functioning properly during the one month long air monitoring study, all instrumentation was inspected on a daily basis. Items such as cable connections, modem communication to the Environet website, and functionality of the DR-4000 heaters were checked daily (except weekends). The monitoring instrumentation was calibrated, bump tested or zeroed as per the manufacturer's recommendations and guidelines. In addition, back-up instruments and parts (cables, filters, AC adapters, heaters, etc), provided by the rental company, were stored on site for a replacement as needed. If an instrument malfunctioned, the troubleshooting was performed in order to fix the problem. If the problem could not be fixed, the equipment was replaced by the working unit provided by the rental company.

Calibration procedures: The VRAE and Mini-RAE instruments were calibrated by Pine Environmental Services, Inc. according to the manufactures specification prior to being delivered to the site. These instruments were fresh air calibrated and span gas calibrated daily by PB.

The DR-4000 instruments were calibrated and certified by Advanced Labs, Inc, a department within Pine Environmental Services, Inc. (Pine), in accordance with the manufacturer's specifications prior to being delivered to the site. DR-4000 instruments were zeroed daily by PB.

The Jerome X-631 instruments were calibrated by the manufacture on an annual basis. The Jerome X631 instruments underwent a regeneration process and were zeroed daily prior to use by PB.

The Eagle instruments were calibrated by Pine per the manufacture's manual prior to being delivered to the site. The Eagle 2 instruments were fresh air calibrated; span gas calibrated, or bump tested on a daily basis using the Eagle 2 – Data Logger for Windows software program by PB.

Silica Buck Libra L-4 sampling pumps were calibrated using a low flow rotameter to flow rate of 2.5 liters per minute. Aluminum cyclones were used to separate out large dust particles so that only the smaller particles are collected on the sampling filter. These smaller particles, measuring 4 microns or less, are referred to as "respirable" particles.

4. Data Validation and Usability

Data review, validation and verification: the collected data must specify the requirements of this quality assurance plan as defined in this document.

The data qualifications process are the following: the collected data and the notes by the maintenance team are reviewed to reveal the periods of instrument malfunction, functioning out of calibration or any other unusual behavior. The data were validated only for the periods when the instruments were functioning properly and with the valid calibration.

Data verification process is in two phases. First phase is to average the data for comparison with the appropriate thresholds, standards and other limits. The averaged data is rounded in accordance with each instrument resolution.

Verification of the data also includes comparison of the monitored levels against the data collected at the nearby monitors that collect the same or similar parameters (PM_{10} and $PM_{2.5}$), against the concentrations monitored at the collocated CAMP monitors and to the other pollutants that is collected at the same or nearby location that may indicate the same trend in the concentrations.

Attachment D

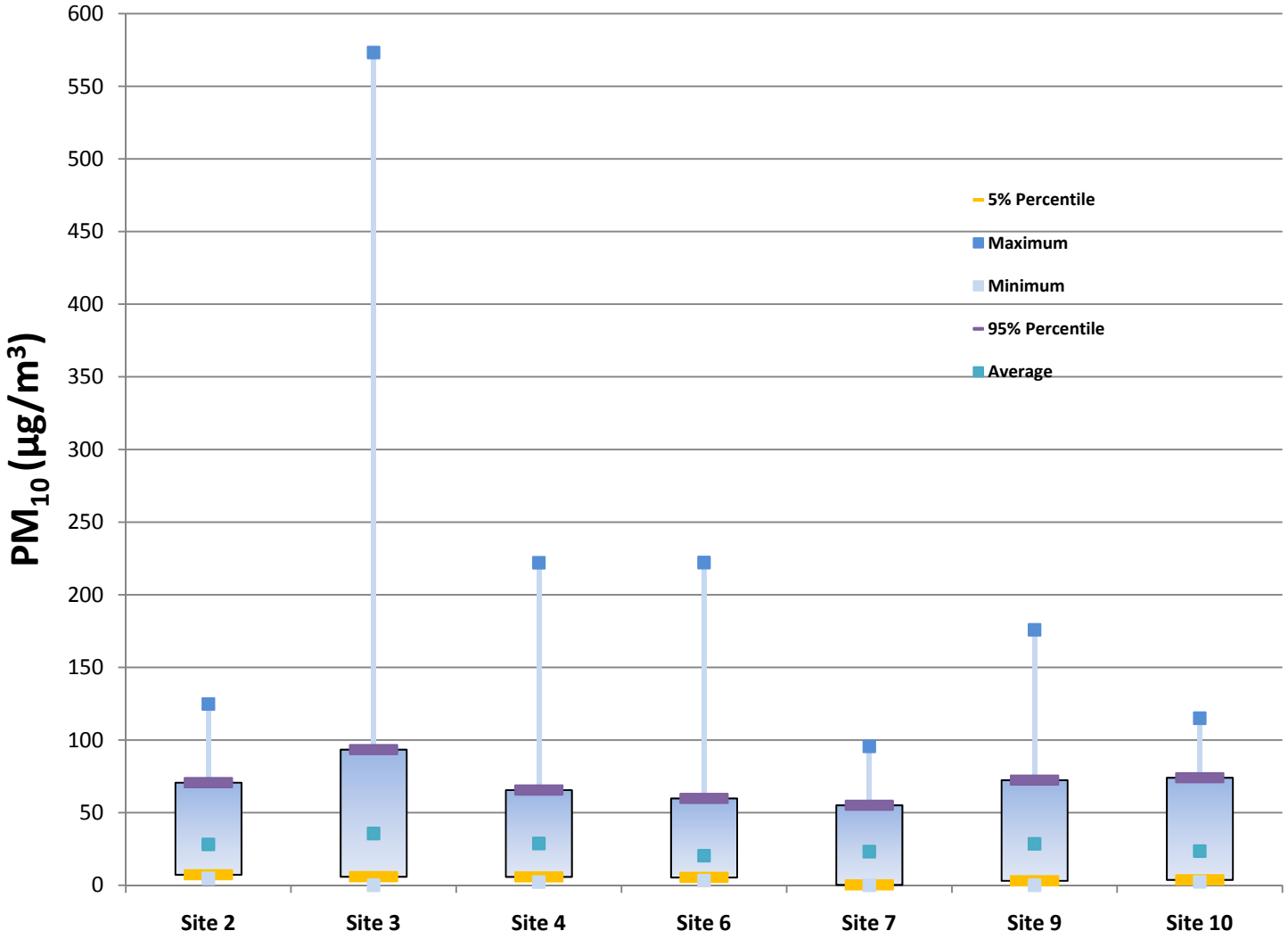
Data used in the Graphs and Plots for PM_{10} and $PM_{2.5}$

PM_{10} Weekday Hourly Levels for All Monitoring Sites					
September 11 - October 8, 2011					
	5% Percentile	Maximum	Minimum	95% Percentile	Average
Site 2	7.3	124.8	4.7	70.7	28.1
Site 3	5.9	573.2	0.0	93.4	35.7
Site 4	5.8	222.0	2.2	65.6	28.8
Site 6	5.4	222.2	3.3	59.8	20.4
Site 7	0.3	95.7	0.0	55.1	23.2
Site 9	3.1	175.9	0.0	72.4	28.5
Site 10	3.8	115.0	2.3	74.1	23.5

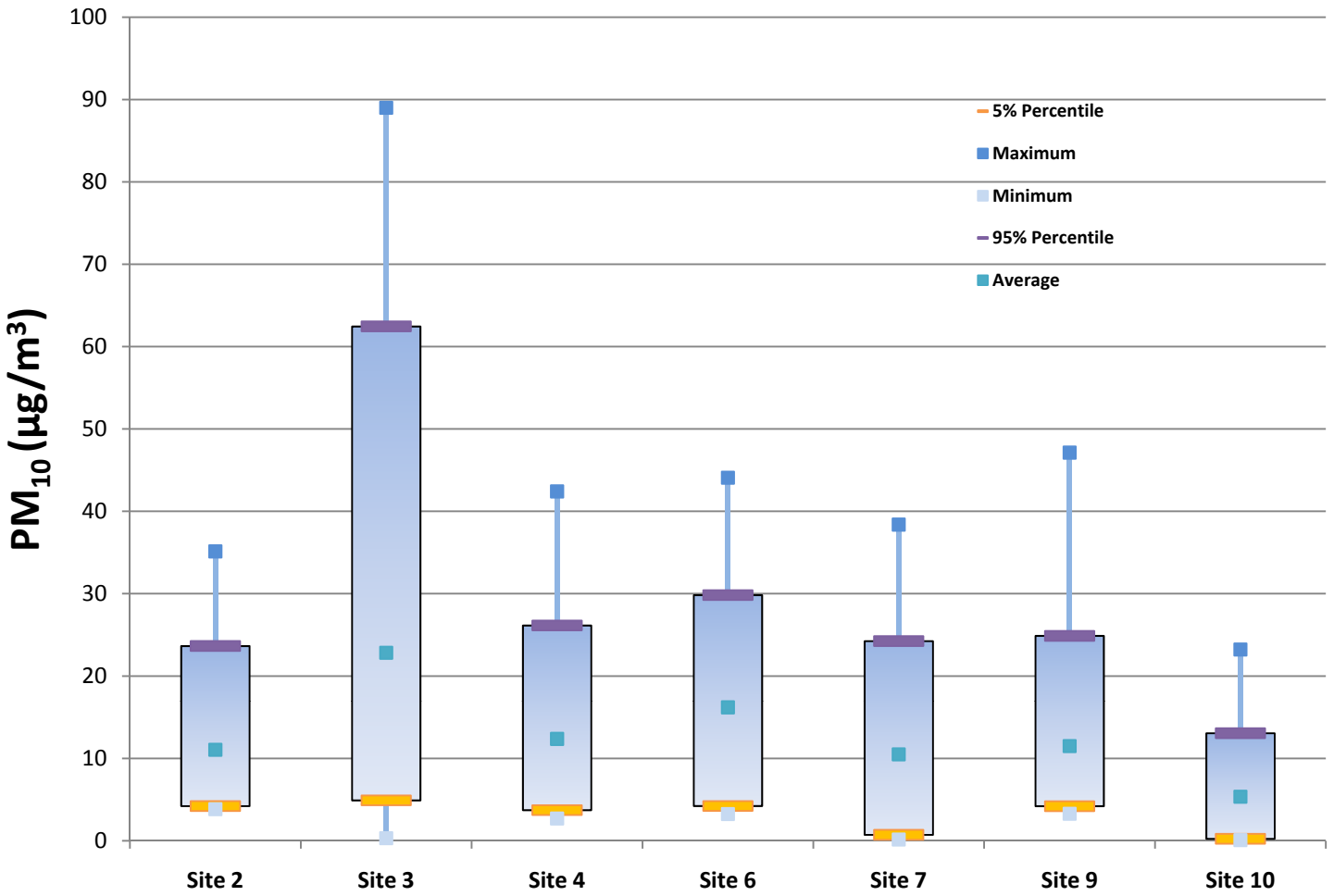
PM_{10} Weekend Hourly Levels for All Monitoring Sites					
September 11 - October 8, 2011					
	5% Percentile	Maximum	Minimum	95% Percentile	Average
Site 2	4.2	35.1	3.8	23.6	11.0
Site 3	4.9	89.0	0.3	62.5	22.8
Site 4	3.7	42.4	2.7	26.1	12.4
Site 6	4.2	44.1	3.2	29.8	16.2
Site 7	0.7	38.4	0.2	24.2	10.5
Site 9	4.2	47.1	3.3	24.9	11.5
Site 10	0.2	23.2	0.1	13.1	5.3

An analysis of the hourly data at all seven monitors for weekdays in the figure, indicate a large variability of PM_{10} levels. As observed in the figure, peak hourly levels varied from 100 $\mu g/m^3$ (Site 7) to 573 $\mu g/m^3$ (Site 3), while the average hourly levels varied from 20 to 36 $\mu g/m^3$, with 95 percent of all measurements below 95 $\mu g/m^3$.

PM_{10} Weekday Hourly Levels for All Monitoring Sites
September 11 - October 8, 2011



PM_{10} Weekend Hourly Levels for All Monitoring Sites
September 11 - October 8, 2011



	PM_{10} Weekday Hourly Levels for All Monitoring Sites							
	September 11 - October 8, 2011							
Average		Site 2	Site 3	Site 4	Site 6	Site 7	Site 9	Site 10
	0:00	20.4	17.8	20.5	14.2	17.1	21.8	16.8
	1:00	20.9	15.5	20.6	13.0	16.6	22.7	17.3
	2:00	22.1	17.4	20.9	13.6	16.4	23.0	17.6
	3:00	23.3	19.5	23.0	16.4	15.3	23.7	19.0
	4:00	26.1	18.8	24.4	15.6	17.7	26.2	20.4
	5:00	28.1	18.3	25.9	16.0	18.7	28.4	21.3
	6:00	30.4	25.2	30.4	18.9	21.8	32.7	24.3
	7:00	34.4	28.7	35.4	21.1	30.7	39.5	32.0
	8:00	44.1	30.4	38.4	25.2	33.1	47.6	34.5
	9:00	45.3	35.3	37.7	26.1	27.2	40.2	34.8
	10:00	46.6	47.5	36.5	28.4	34.2	33.9	31.1
	11:00	35.6	53.5	34.5	27.3	29.0	36.0	28.7
	12:00	32.2	38.4	33.5	21.3	28.3	28.6	25.5
	13:00	28.3	39.0	30.5	19.4	33.6	34.9	30.4
	14:00	22.0	30.1	27.3	20.7	34.0	28.0	33.3
	15:00	27.9	59.8	30.0	24.9	25.5	29.1	28.1
	16:00	26.2	89.9	46.2	40.0	19.8	25.0	19.3
	17:00	19.9	36.0	36.7	21.4	18.3	22.3	16.3
	18:00	26.0	61.1	29.0	21.4	18.8	23.8	20.6
	19:00	21.9	60.2	26.4	18.6	21.1	25.4	19.8
	20:00	21.3	29.1	23.3	18.0	21.1	24.1	20.0
	21:00	21.1	29.3	21.6	14.9	19.3	21.9	18.8
	22:00	21.4	27.4	19.8	14.4	19.0	22.4	17.5
	23:00	19.8	19.4	18.4	14.6	17.2	23.6	16.7
Max		Site 2	Site 3	Site 4	Site 6	Site 7	Site 9	Site 10
	0:00	50.9	38.6	50.9	41.6	41.0	61.7	52.9
	1:00	62.5	38.8	63.5	41.1	37.8	72.6	62.6
	2:00	61.6	43.2	65.7	43.4	40.6	77.8	67.1
	3:00	68.0	56.3	70.7	59.8	43.8	85.1	72.6
	4:00	65.4	47.4	77.2	52.5	50.5	90.9	77.5
	5:00	70.7	42.0	79.2	46.6	48.3	92.5	79.8
	6:00	69.1	53.1	78.0	60.4	68.8	95.6	82.8
	7:00	86.3	63.9	83.0	63.1	89.1	104.6	84.2
	8:00	109.5	85.8	87.9	89.6	95.7	113.3	90.6
	9:00	116.9	92.2	96.9	96.7	62.5	115.4	109.6
	10:00	124.8	109.4	82.7	82.9	81.6	101.6	94.2
	11:00	114.3	103.8	83.2	78.7	62.0	175.9	81.9
	12:00	102.3	82.4	101.4	72.6	88.5	121.6	73.8
	13:00	89.0	82.9	64.1	64.7	83.3	169.6	115.0
	14:00	36.7	89.6	60.1	65.0	88.1	83.3	108.1
	15:00	63.0	192.5	78.5	124.3	62.3	76.9	105.7
	16:00	42.7	573.2	169.6	222.2	40.0	49.3	55.5
	17:00	34.2	115.7	222.0	53.2	37.9	49.8	41.1
	18:00	77.2	206.6	78.3	77.5	40.1	51.0	60.3
	19:00	42.1	273.8	53.4	37.2	49.5	49.7	45.6
	20:00	46.2	74.3	48.2	43.1	48.8	50.2	46.9
	21:00	51.5	128.7	45.9	44.2	42.6	45.5	47.5
	22:00	58.8	77.9	41.3	45.2	38.7	40.7	46.9
	23:00	48.7	60.7	41.0	41.8	37.7	73.3	45.5

	PM_{10} Weekend Hourly Levels for All Monitoring Sites							
	September 11 - October 8, 2011							
Average		Site 2	Site 3	Site 4	Site 6	Site 7	Site 9	Site 10
	0:00	9.2	36.0	12.6	17.6	9.9	10.3	5.2
	1:00	8.7	22.8	12.1	16.4	8.3	8.9	4.0
	2:00	8.6	21.0	11.1	16.0	8.4	8.9	3.8
	3:00	8.5	17.0	10.4	14.7	8.1	8.9	3.6
	4:00	8.2	15.5	10.6	14.5	8.0	8.6	3.9
	5:00	8.2	13.8	9.6	14.2	7.5	8.2	4.0
	6:00	11.3	21.4	11.0	14.5	11.3	8.3	4.5
	7:00	11.8	17.4	10.7	14.5	11.3	8.8	4.9
	8:00	11.1	15.8	10.6	13.7	9.6	10.0	5.3
	9:00	10.2	27.1	11.9	14.4	8.9	9.0	4.5
	10:00	9.9	28.1	11.0	14.0	8.9	9.2	4.5
	11:00	10.3	28.0	11.4	14.7	8.9	9.8	4.8
	12:00	10.1	27.9	11.6	15.1	9.0	9.4	4.4
	13:00	10.8	29.1	11.5	15.0	10.4	9.9	4.6
	14:00	10.5	30.7	11.6	15.7	9.6	9.1	3.7
	15:00	11.9	24.0	12.5	18.5	10.1	9.5	3.7
	16:00	12.2	26.8	13.0	17.7	10.8	10.5	3.9
	17:00	11.7	22.1	13.7	19.0	13.1	12.3	5.2
	18:00	13.1	18.8	13.2	16.8	11.9	14.1	6.1
	19:00	12.5	16.7	12.4	17.1	13.2	16.1	7.2
	20:00	13.7	20.1	13.7	18.0	15.1	17.4	8.4
	21:00	13.6	20.9	15.2	17.9	15.3	18.9	8.7
	22:00	13.3	22.2	16.9	18.2	13.0	19.9	8.9
	23:00	12.9	22.5	17.5	19.8	13.0	20.0	9.1
Max		Site 2	Site 3	Site 4	Site 6	Site 7	Site 9	Site 10
	0:00	14.5	89.0	24.5	24.7	16.3	15.8	10.6
	1:00	15.0	41.2	25.0	27.0	17.5	17.2	6.2
	2:00	15.2	36.1	23.8	26.3	18.2	17.7	6.4
	3:00	15.7	43.7	25.9	27.4	16.6	17.9	5.7
	4:00	12.2	37.7	22.6	24.8	14.8	14.6	6.6
	5:00	12.8	31.9	22.9	26.3	12.5	13.3	7.3
	6:00	21.7	43.0	21.1	23.6	26.2	11.7	10.8
	7:00	22.3	29.8	18.1	19.2	25.0	13.2	11.9
	8:00	22.2	43.7	16.5	17.8	19.7	15.2	12.1
	9:00	19.4	59.1	29.1	22.3	17.5	13.0	10.8
	10:00	19.5	57.4	25.3	24.7	15.0	13.6	11.4
	11:00	19.8	61.7	24.8	27.7	16.3	14.4	12.5
	12:00	18.6	62.7	26.2	26.2	14.6	14.5	10.6
	13:00	19.9	58.1	25.8	27.0	15.9	16.5	11.9
	14:00	19.9	70.5	25.3	28.3	14.9	13.2	8.0
	15:00	26.7	53.6	25.1	32.8	18.7	14.8	7.1
	16:00	23.6	51.5	24.4	29.5	19.2	18.0	8.0
	17:00	18.4	43.3	25.9	29.9	23.3	20.7	12.2
	18:00	24.0	36.6	24.3	25.1	23.0	24.0	13.6
	19:00	28.3	36.3	25.8	26.6	25.0	27.7	12.9
	20:00	33.5	47.5	26.3	30.9	27.0	29.9	15.4
	21:00	35.1	46.4	32.9	33.2	35.1	38.3	17.8
	22:00	33.7	45.8	36.4	31.2	38.4	46.1	22.0
	23:00	32.4	48.4	42.4	44.1	37.7	47.1	23.2

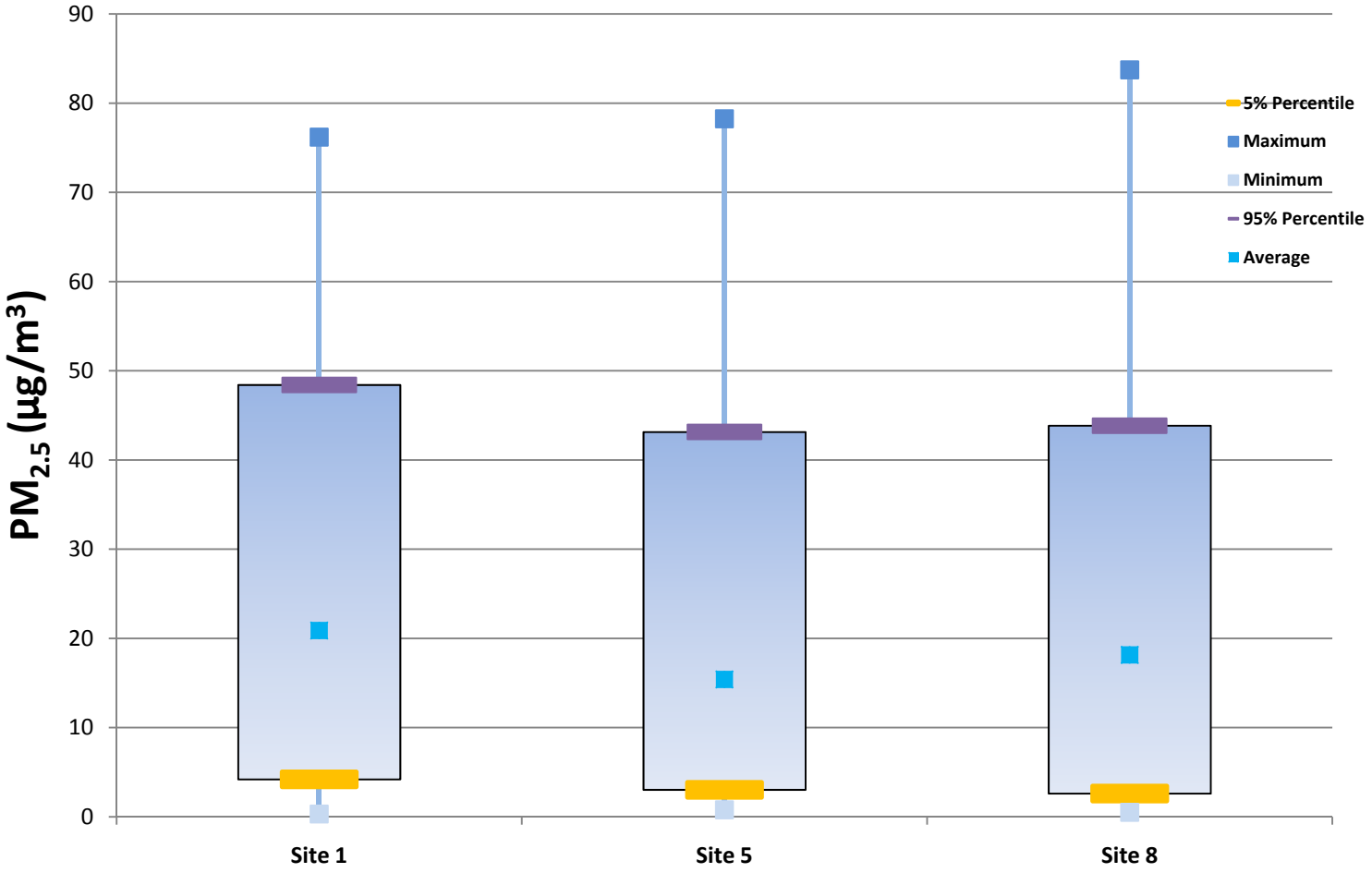
Second Avenue Subway (SAS)– Construction Phase Air Monitoring Study							
PM_{10} Daily Average 9/11/2011-10/8/2011							
Row Labels	**Station 2A**	**Station 3A**	**Station 4A**	**Station 6A**	**Station 7A**	**Station 9A**	**Station 10A**
9/11 Sunday	16.8		17.2		18.7	19.8	4.2
9/12 Monday			38.7		34.1	37.5	
9/13 Tuesday		37.3	41.0		37.1	36.2	
9/14 Wednesday		33.2	44.1	10.5	43.5	41.5	
9/15 Thursday		26.6	35.4		33.0	32.6	29.6
9/16 Friday		8.5	10.7			4.5	5.6
9/17 Saturday	5.1		5.5		6.9	5.7	5.0
9/18 Sunday	5.2		4.8		6.8	6.6	5.3
9/19 Monday	8.4		11.3		13.3	14.4	7.9
9/20 Tuesday	26.8		26.9			26.1	26.4
9/21 Wednesday	45.8		50.5			56.0	50.8
9/22 Thursday	33.8		38.9		34.1	38.5	
9/23 Friday			32.1				
9/24 Saturday		42.6	20.9	23.2			
9/25 Sunday		35.6	19.4	19.8			
9/26 Monday		51.5	32.9	38.5			
9/27 Tuesday	60.6	55.4	47.4	52.7	23.9	44.9	52.8
9/28 Wednesday	23.9	61.7	18.4	20.0	28.0	35.7	24.1
9/29 Thursday	29.9	25.1	24.5		27.3	34.4	32.0
9/30 Friday						27.5	
10/1 Saturday	16.3	12.7	12.7	15.1	12.6		4.0
10/2 Sunday	7.3	6.7	5.5	6.6	2.5		2.7
10/3 Monday	15.2	22.0	13.6	13.8	9.7		7.7
10/4 Tuesday	18.2	35.8	26.9	10.5	11.8	13.2	9.8
10/5 Wednesday	17.7	23.0	18.0	7.0	8.8	7.7	6.8
10/6 Thursday	19.8	39.0	22.3	9.6	9.6	13.0	9.5
10/7 Friday	14.9	18.5	14.9	12.7	12.0	13.5	8.1
10/8 Saturday	16.7	14.0	13.6	16.2	14.8	13.9	10.5

$PM_{2.5}$ Weekday Hourly Levels for All Monitoring Sites					
September 11 - October 8, 2011					
	5% Percentile	Maximum	Minimum	95% Percentile	Average
Site 1	4.2	76.2	0.3	48.4	20.9
Site 5	3.0	78.2	0.8	43.1	15.4
Site 8	2.6	83.7	0.5	43.8	18.1

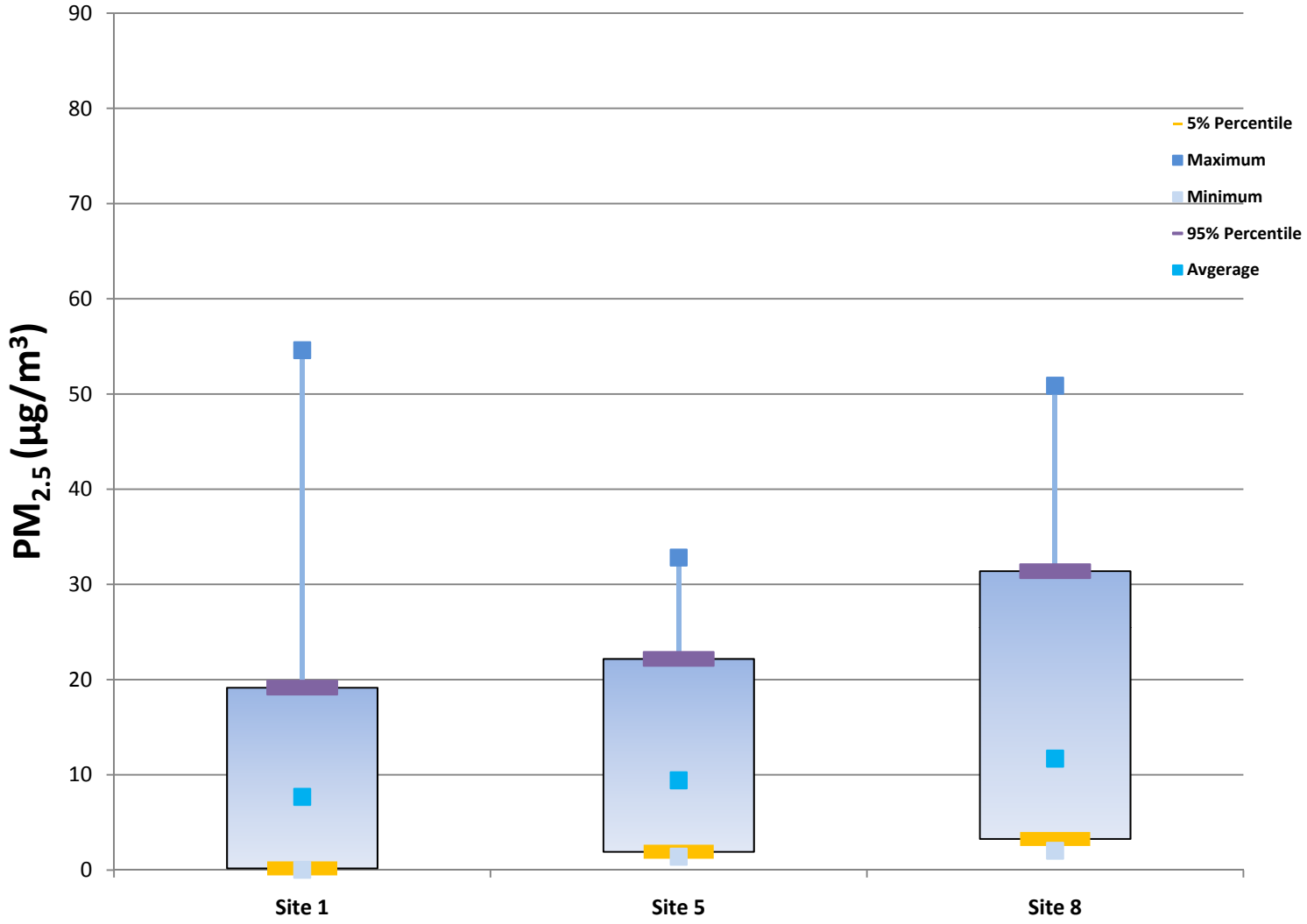
$PM_{2.5}$ Weekend Hourly Levels for All Monitoring Sites					
September 11 - October 8, 2011					
	5% Percentile	Maximum	Minimum	95% Percentile	Average
Site 1	3.5	40823.0	2.4	40814.4	2469.5
Site 5	4.3	40823.0	2.4	56.3	1990.0
Site 8	5.1	36.9	4.3	20.7	10.9

An analysis of the $PM_{2.5}$ hourly data for the weekdays in the figure indicates less variability than observed in PM_{10} levels. The maximum weekday recorded hourly levels were between 76 and 83 $\mu g/m^3$, and the average levels between 18 and 21 $\mu g/m^3$.

$PM_{2.5}$ Weekday Hourly Levels for All Monitoring Sites
September 11 - October 8, 2011

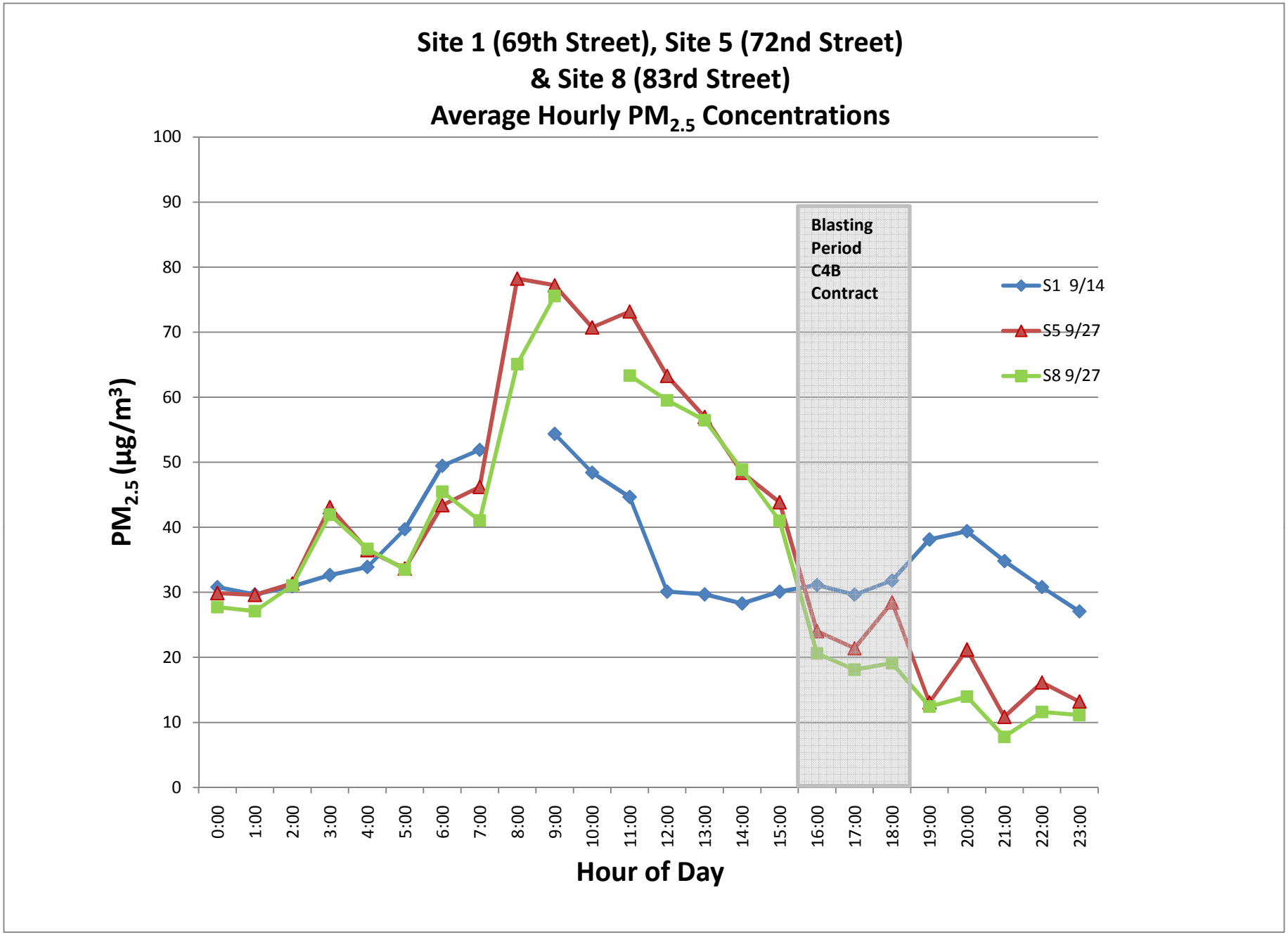


$PM_{2.5}$ Weekend Hourly Levels for All Monitoring Sites
September 11 - October 8, 2011



	$PM_{2.5}$ Weekday Hourly Levels for All Monitoring Sites					
	September 11 - October 8, 2011					
Average		Site 1	Site 5	Site 8	71st St Motor Vehicle Emission	83rd St Motor Vehicle Emission
	0:00	15.9	10.1	16.0	16.8	14.2
	1:00	14.9	9.5	15.7	19.5	17.3
	2:00	14.7	9.8	16.2	20.2	16.9
	3:00	16.3	11.1	17.8	19.7	17.0
	4:00	17.8	11.6	18.7	21.6	15.6
	5:00	17.2	12.5	19.7	12.9	12.2
	6:00	22.2	15.7	24.0	10.2	8.1
	7:00	25.2	18.2	26.5	13.3	10.9
	8:00	24.8	21.6	30.1	14.0	13.0
	9:00	25.7	20.5	27.2	13.4	13.0
	10:00	27.5	19.6	20.6	18.0	16.4
	11:00	25.6	19.8	16.9	16.4	15.9
	12:00	21.6	19.1	16.0	16.9	15.8
	13:00	22.3	16.6	19.1	17.7	16.2
	14:00	18.1	14.7	15.6	16.0	14.4
	15:00	22.7	16.2	17.1	16.2	14.1
	16:00	31.8	24.4	13.9	14.8	13.9
	17:00	18.3	17.5	13.2	13.6	13.6
	18:00	24.2	16.1	14.1	14.3	14.1
	19:00	21.6	14.8	15.3	15.9	14.6
	20:00	20.8	14.4	16.1	16.7	14.8
	21:00	21.8	12.9	15.7	15.5	14.5
	22:00	18.9	11.6	15.2	15.1	12.7
	23:00	15.2	11.4	14.6	13.9	11.3
Max		Site 1	Site 5	Site 8		
	0:00	30.8	29.9	36.5		
	1:00	33.5	29.6	33.8		
	2:00	35.9	31.4	36.8		
	3:00	44.3	43.1	55.0		
	4:00	49.1	36.5	48.6		
	5:00	39.7	33.6	43.1		
	6:00	49.4	43.4	70.3		
	7:00	57.4	58.5	83.0		
	8:00	64.6	78.2	83.7		
	9:00	54.4	77.2	75.6		
	10:00	57.0	70.7	42.6		
	11:00	47.9	73.2	63.3		
	12:00	41.1	63.3	59.5		
	13:00	45.3	57.0	56.5		
	14:00	38.2	48.4	48.9		
	15:00	61.0	43.9	41.0		
	16:00	70.0	58.0	27.9		
	17:00	36.5	49.5	28.5		
	18:00	76.2	28.5	30.8		
	19:00	56.2	30.9	35.0		
	20:00	39.4	39.3	35.8		
	21:00	39.1	35.5	33.0		
	22:00	31.6	31.2	31.8		
	23:00	36.0	30.1	31.9		

$PM_{2.5}$ Weekend Hourly Levels for All Monitoring Sites				
September 11 - October 8, 2011				
Average		Site 1	Site 5	Site 8
	0:00	5.3	10.1	11.5
	1:00	4.8	9.8	10.8
	2:00	4.2	8.9	11.8
	3:00	4.2	8.8	11.8
	4:00	7.3	8.5	11.6
	5:00	6.7	7.9	10.5
	6:00	14.3	8.5	11.2
	7:00	13.7	8.6	11.6
	8:00	11.1	8.5	11.7
	9:00	9.3	8.9	12.0
	10:00	8.5	9.5	9.2
	11:00	7.9	9.4	9.8
	12:00	6.6	9.4	10.3
	13:00	6.1	9.5	10.6
	14:00	5.4	9.5	10.1
	15:00	6.7	10.3	10.2
	16:00	6.4	11.3	10.9
	17:00	5.8	10.8	10.6
	18:00	7.3	11.1	11.2
	19:00	6.4	7.6	11.9
	20:00	8.2	9.0	13.0
	21:00	8.3	9.1	14.1
	22:00	8.7	10.0	15.9
	23:00	9.0	10.9	18.2
Max		Site 1	Site 5	Site 8
	0:00	7.6	27.5	29.0
	1:00	7.8	28.2	30.3
	2:00	6.2	25.2	32.6
	3:00	6.9	23.6	31.4
	4:00	17.4	19.4	36.8
	5:00	16.6	17.3	34.2
	6:00	54.6	17.8	32.0
	7:00	51.0	18.8	31.4
	8:00	40.0	18.8	31.1
	9:00	33.8	22.1	26.8
	10:00	27.7	22.2	19.9
	11:00	19.7	19.9	22.2
	12:00	14.7	20.4	20.9
	13:00	14.2	20.3	22.9
	14:00	14.7	20.2	20.4
	15:00	20.3	21.8	19.2
	16:00	17.2	27.5	18.6
	17:00	12.7	26.2	18.2
	18:00	13.3	32.1	19.1
	19:00	10.1	15.7	21.4
	20:00	11.4	19.3	24.0
	21:00	16.1	21.2	32.1
	22:00	19.0	24.1	34.5
	23:00	19.1	32.8	50.9


Site 1 (69th Street), Site 5 (72nd Street)
& Site 8 (83rd Street)
Average Hourly PM2.5 Concentrations
PM2.5 (µg/m3)
100
90
80
70
60
50
40
30
20
10
0
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
Hour of Day
Blasting Period C4B Contract
S1 9/14
S5 9/27
S8 9/27

Average Hourly $PM_{2.5}$ Concentrations			
	S1 9/14	S5 9/27	S8 9/27
0:00	30.8	29.9	27.7
1:00	29.7	29.6	27.1
2:00	30.9	31.4	31.1
3:00	32.7	43.1	42.0
4:00	33.9	36.5	36.7
5:00	39.7	33.6	33.5
6:00	49.4	43.4	45.5
7:00	51.9	46.2	41.1
8:00		78.2	65.1
9:00	54.4	77.2	75.6
10:00	48.4	70.7	
11:00	44.7	73.2	63.3
12:00	30.1	63.3	59.5
13:00	29.7	57.0	56.5
14:00	28.3	48.4	48.9
15:00	30.1	43.9	41.0
16:00	31.1	24.0	20.6
17:00	29.6	21.4	18.1
18:00	31.8	28.5	19.1
19:00	38.1	13.1	12.4
20:00	39.4	21.2	14.0
21:00	34.8	10.8	7.8
22:00	30.8	16.1	11.6
23:00	27.1	13.2	11.1

Second Avenue Subway (SAS)– Construction Phase Air Monitoring Study			
$PM_{2.5}$ Daily Average 9/11/2011-10/8/2011			
	Site 1	Site 5	Site 8
Row Labels	Average of Station 1A.PM25	Average of Station 5A.PM25	Average of Station 8A.PM25
9/11 Sunday	3.4	22.5	15.7
9/12 Monday	24.5		30.7
9/13 Tuesday	33.8		30.2
9/14 Wednesday	36.3		31.2
9/15 Thursday	29.4		16.1
9/16 Friday	6.5	4.2	2.5
9/17 Saturday	4.1	2.9	4.5
9/18 Sunday	3.8	2.6	4.8
9/19 Monday	7.3	6.0	8.2
9/20 Tuesday	23.6	15.2	19.1
9/21 Wednesday			
9/22 Thursday		24.1	28.3
9/23 Friday		23.6	30.4
9/24 Saturday		13.9	17.3
9/25 Sunday		14.2	24.5
9/26 Monday		25.5	33.6
9/27 Tuesday		39.8	35.2
9/28 Wednesday		13.8	13.8
9/29 Thursday		15.8	15.7
9/30 Friday			
10/1 Saturday	20.5	8.7	11.5
10/2 Sunday	6.8	4.6	5.6
10/3 Monday	12.2	10.5	8.1
10/4 Tuesday	25.4	10.6	7.6
10/5 Wednesday	18.3	7.0	6.6
10/6 Thursday	21.5	9.6	7.6
10/7 Friday	13.2	8.5	8.5
10/8 Saturday	10.8	8.5	9.6

Attachment E

Traffic Data

Attachment E

Second Avenue Traffic Patterns and Motor Vehicle Emissions

Prior studies in selected New York City neighborhoods have documented that higher concentrations of specific pollutants are associated with nearby traffic (Kinney et al., 2000; Lena et al., 2002; Maciejczyk et al, 2004). These studies helped raise awareness about exposure to emissions from neighborhood traffic, especially from trucks and buses, as a public health concern and to spur tighter regulations and emission reductions from city buses and other city vehicle fleets. Today almost all diesel powered motor vehicles are required to use ultra-low sulfur diesel (ULSD). In addition, all New York City Transit buses have either been retrofitted with diesel particulate filters and use ULSD, or are hybrid diesel/electric and use ULSD, or powered by compressed Natural Gas (CGN).

Since motor vehicles are a known source of $PM_{2.5}$ emissions; a traffic count was performed to evaluate the hourly volumes and vehicle classification along the Second Avenue corridor. The average weekday hourly traffic data and vehicle classification was used to determine hourly distribution of motor vehicle emissions, to evaluate hourly average weekday variations of 2nd Avenue motor vehicle emissions compare to the hourly PM2.5 concentrations measured along the project area.

A traffic count was performed to evaluate the hourly volumes and vehicle classification along the Second Avenue corridor. The data collection effort included 24-hr Automatic Traffic Recorder (ATR) counts over a seven day period, and classification counts to be performed over a 24-hour period for one weekday.

The ATR counters were installed at two locations:

- Second Avenue between 71st and 72nd Streets
- Second Avenue between 83rd and 84th Streets

The vehicle classification was performed during one weekday (over a 24-hour period at 15-minute intervals) at the same sections of Second Avenue where the ATRs were installed. The classification counts recorded four classes of vehicles:

- Passenger Cars (includes all vehicles with four tires including pickup trucks, vans, SUVs, etc.)
- Buses (includes all large buses such as transit buses, school buses, intercity buses, articulated buses, etc.)
- Light Duty Trucks (includes all vehicles with two axles, and six tires such as single unit trucks large and small, panel vans, not including buses, etc.)
- Heavy Duty Trucks (includes all vehicles with more than two axles and more than six tires)

The hourly traffic data (total volumes) and percentage of vehicle classes was averaged for the weekday and weekend. Figures 1 and 2 provide average hourly volumes during the weekday and weekend at both locations (71st and 83rd Streets). As it can be observed in these figures, the total volumes during the weekdays are only slightly higher than during the weekends, and experience an earlier morning peak during the weekdays.

Figure -1: Average Hourly Traffic Volume (Second Avenue @ 71st Street)

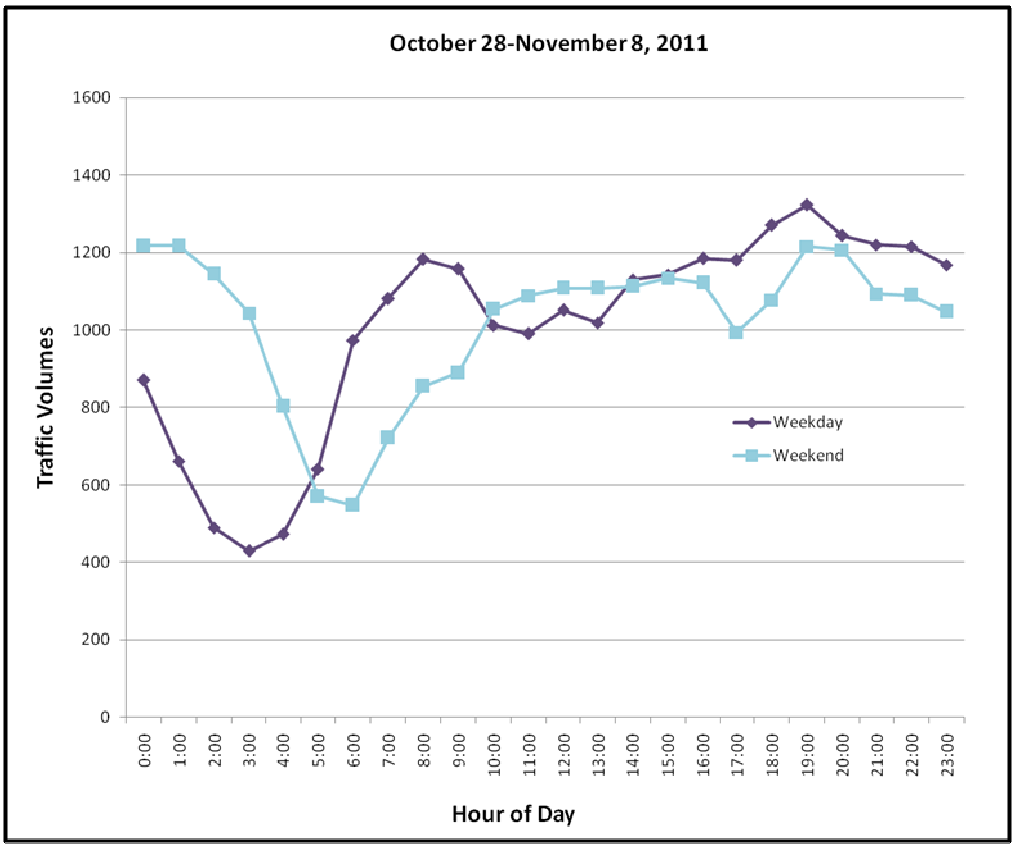
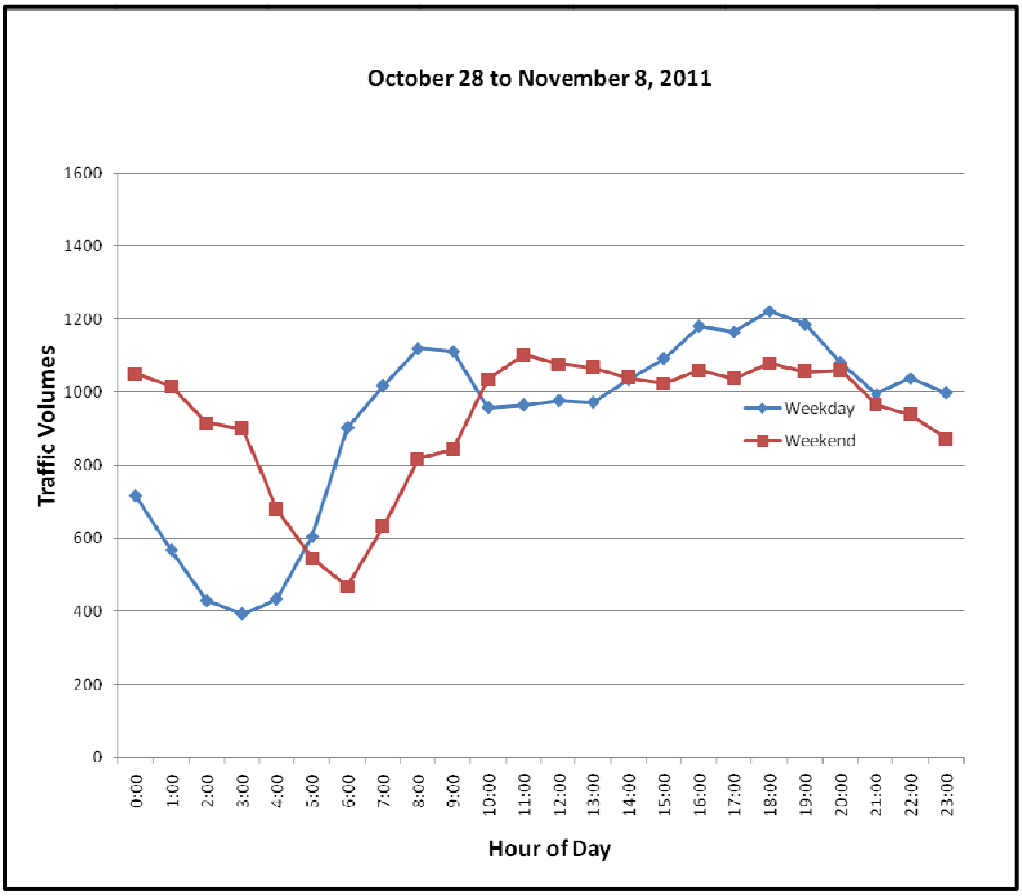


Figure-2: Average Hourly Traffic Volume (Second Avenue @ 83rd Street)



The total traffic volumes presented in Figures 1 and 2 represent a combination of the different vehicle classes (autos to heavy duty trucks). Different type of vehicles emit different amount of fine particles $PM_{2.5}$. Current estimates indicate that on average a heavy duty diesel truck emits approximately ten times more $PM_{2.5}$ than a passenger car. An average New York City bus (considering all the emission controls implemented during the last decade) emits approximately three times a passenger car.

An estimate of $PM_{2.5}$ hourly motor vehicle emissions was performed using the EPA MOBILE 6.2 Emission Factor Model for New York City current conditions, with adjustments for New York City clean buses based on MTA bus emission data. Hourly emissions for each hour of the day were calculated combining the hourly weekday vehicle volumes and the average $PM_{2.5}$ emission factors for each vehicle class. A summary of the estimated motor vehicle emissions is provided in Appendix B.

Figures 3 and 4 compare the average weekday hourly traffic volumes (left scale) to the equivalent motor vehicle emissions (right scale) for the Second Avenue fleet during the average weekday. As observed in these figures, the higher percentage of heavy duty vehicles during the morning hours results in higher $PM_{2.5}$ emissions during the morning hours, despite a higher vehicle volume during the late afternoon hours.

Figure -3: Traffic Volumes versus Emissions during the Weekday (Second Avenue at 71st Street)

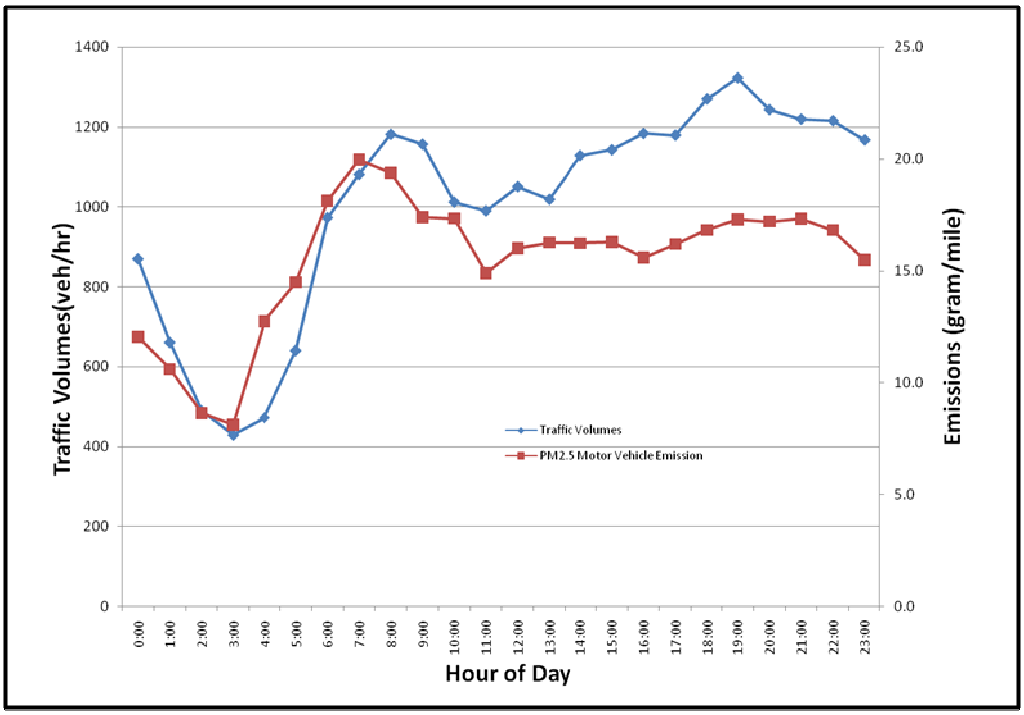
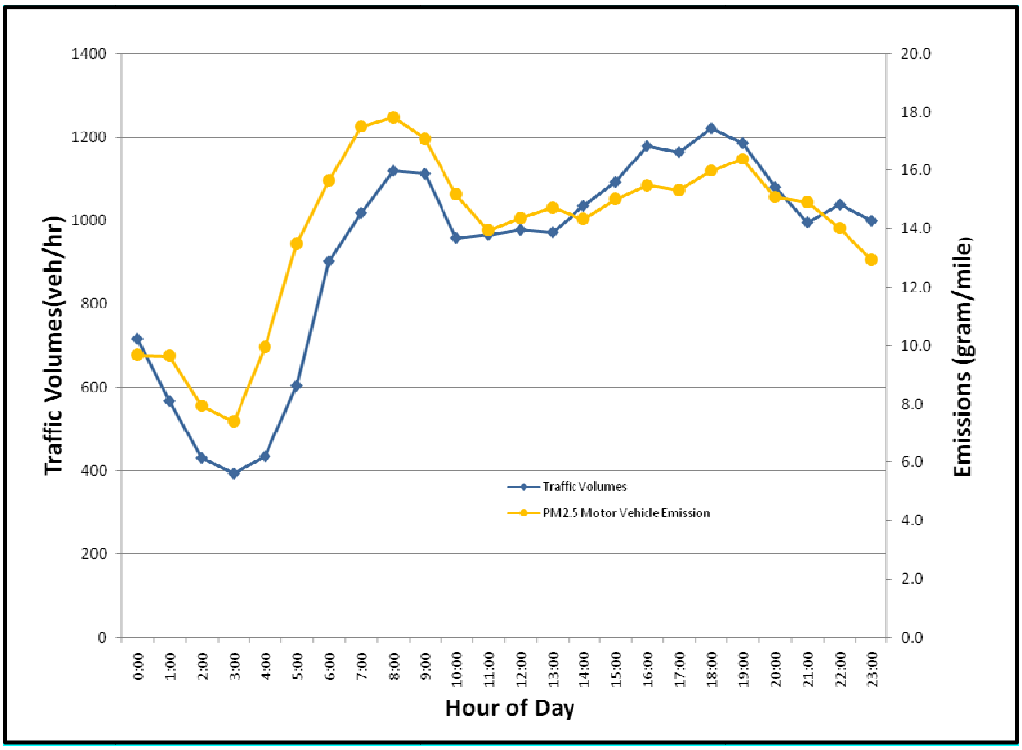


Figure -4: Traffic Volumes versus Emissions during the Weekday (Second Avenue at 83rd Street)



Second Avenue Subway (SAS)– Construction Phase Air Monitoring Study
Traffic Study 10/28/2011-11/8/2011

Hour	Average Hourly Volume		Weekday Percentage				Weekday Volume			
	Weekday	Weekend	Passenger Cars	Buses	Light Trucks	Heavy Trucks	Passenger Cars	Buses	Light Trucks	Heavy Trucks
12:00 AM	870	1217	96.52%	0.48%	0.84%	2.16%	840	4	7	19
1:00 AM	661	1217	92.46%	0.66%	2.62%	4.26%	611	4	17	28
2:00 AM	490	1144	87.58%	0.67%	5.99%	5.76%	429	3	29	28
3:00 AM	429	1044	83.60%	0.54%	8.87%	6.99%	359	2	38	30
4:00 AM	473	803	73.95%	1.14%	10.27%	14.64%	350	5	49	69
5:00 AM	641	571	70.39%	1.68%	17.60%	10.34%	451	11	113	66
6:00 AM	974	547	77.37%	3.37%	13.05%	6.21%	753	33	127	60
7:00 AM	1082	722	74.15%	5.76%	14.44%	5.66%	802	62	156	61
8:00 AM	1182	855	81.98%	3.11%	10.80%	4.12%	969	37	128	49
9:00 AM	1158	889	83.18%	2.30%	11.58%	2.94%	963	27	134	34
10:00 AM	1013	1054	80.31%	2.51%	12.25%	4.92%	813	25	124	50
11:00 AM	991	1089	83.72%	2.33%	11.02%	2.93%	829	23	109	29
12:00 PM	1051	1108	82.25%	3.34%	11.45%	2.96%	865	35	120	31
1:00 PM	1019	1108	81.40%	2.30%	12.47%	3.83%	830	23	127	39
2:00 PM	1129	1113	83.23%	3.35%	11.28%	2.13%	940	38	127	24
3:00 PM	1143	1134	84.49%	5.43%	8.40%	1.68%	966	62	96	19
4:00 PM	1184	1122	88.59%	4.23%	6.34%	0.85%	1049	50	75	10
5:00 PM	1180	994	88.43%	4.32%	5.88%	1.38%	1043	51	69	16
6:00 PM	1271	1077	91.90%	2.34%	4.51%	1.25%	1168	30	57	16
7:00 PM	1323	1216	94.13%	1.55%	3.10%	1.22%	1246	21	41	16
8:00 PM	1244	1207	93.06%	1.76%	3.25%	1.93%	1158	22	40	24
9:00 PM	1220	1093	93.28%	0.87%	3.40%	2.44%	1138	11	42	30
10:00 PM	1216	1090	94.58%	0.79%	2.53%	2.10%	1150	10	31	26
11:00 PM	1168	1047	97.03%	0.38%	0.96%	1.63%	1133	4	11	19

$PM_{2.5}$ Average Weekday Monitoring Values vs Traffic Emissions

Traffic Volumes vs Emissions during Weekday
at 71st Street 2nd Avenue

	Weekday	
		Emissions
	Traffic Volumes	$PM_{2.5}$ Motor Vehicle Emission
0:00	870	12.0
1:00	661	10.6
2:00	490	8.6
3:00	429	8.1
4:00	473	12.7
5:00	641	14.5
6:00	974	18.1
7:00	1082	20.0
8:00	1182	19.4
9:00	1158	17.4
10:00	1013	17.3
11:00	991	14.9
12:00	1051	16.0
13:00	1019	16.3
14:00	1129	16.2
15:00	1143	16.3
16:00	1184	15.6
17:00	1180	16.2
18:00	1271	16.8
19:00	1323	17.3
20:00	1244	17.2
21:00	1220	17.3
22:00	1216	16.8
23:00	1168	15.5

Traffic Volumes vs Emissions during Weekday
at 83rd Street 2nd Avenue

	Weekday	
		Emissions
	Traffic Volumes	$PM_{2.5}$ Motor Vehicle Emission
0:00	717	9.7
1:00	568	9.7
2:00	430	7.9
3:00	392	7.4
4:00	434	10.0
5:00	605	13.5
6:00	902	15.6
7:00	1018	17.5
8:00	1119	17.8
9:00	1112	17.1
10:00	958	15.2
11:00	965	13.9
12:00	977	14.4
13:00	972	14.7
14:00	1035	14.3
15:00	1092	15.0
16:00	1180	15.5
17:00	1165	15.3
18:00	1222	16.0
19:00	1187	16.4
20:00	1080	15.1
21:00	995	14.9
22:00	1038	14.0
23:00	999	12.9

Attachment F

The Lab Results for Silica

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Industrial Hygiene
Chain of Custody

EMSL Order Number (Lab Use Only): 041124676

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Report To Contact Name: Mike Johnston	Bill To Company:	Sampled By (Signature): Mutulle Ecobedo
Company Name: Parsons Brinckerhoff	Attention To:	Number of Samples in Shipment: 6
Address 1: One Penn Plaza FL 2	Address 1: Same	Date of Shipment: 9/14/11
Address 2: New York, NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 2126313705 Fax: 2126313770	Phone: Fax:	Purchase Order:
Email Results To: johnstonm@pbworld.com	Project Name: 51212B	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.							Media Type:
2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)	Manufacturer/Part #:
☐	☐	☐	☒	☐	☐	☐	Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-3C-4	AIR	NIOSH 7500-Silica	3432L	9-13 to 9-14	AMS# 3C	
AMS-3C-5	↓	Blank				
AMS-3C-6		Blank				
AMS-4C-4		NIOSH 7500 Silica	3528L	9-13 to 9-14	AMS#4C	
AMS-4C-5		Blank				
AMS-4C-6		Blank				

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Mutulle Ecobedo	9/14/11		

EMSL MANHATTAN-LAB RECEIVED 2011 SEP 14 PM 6:21

Comments:
AMS-3C-4 Start: 3:10 PM on 9/13/11 - 2.5 flow End 3:00 PM on 9/14/11 - 2.3 Flow
AMS-4C-4 Start 3:30 PM on 9/13/11 - 2.5 flow End 3:30 PM on 9/14/11 - 2.4 Flow

041124676

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/14/2011 9:45:00PM
EMSL Order ID: 041124676
EMSL Project ID:
Date Analyzed: 9/19/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-3C-4		AMS# 3C	3432	0.108	0.031	α-Quartz	0.001	0.012	0.003	11.1
041124676-0001						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
AMS-3C-5		FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124676-0002						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
AMS3C-6		FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124676-0003						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
AMS-4C-4		AMS #4C	3528	0.195	0.055	α-Quartz	0.006	<0.020	<0.006	N/A
041124676-0004						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
Comment: Quartz secondary peak used due to suspected interference with quartz primary peak.										
AMS-4C-5		FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124676-0005						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
AMS-4C-6		FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124676-0006						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										

Field Blank submitted with sample set. Results are not blank corrected.

Initial report from: 09/19/2011 16:29:23

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. This report only relate to the samples submitted. The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-Laboratory Personnel. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument. Samples received in good condition unless otherwise noted.

In the absence of a bulk dust sample, neither the specific forms of crystalline silica nor the interfering species can be fully determined. Hence, the amount for each phase, if anticipated, will be analyzed based on primary, secondary, and/or tertiary peak data with comparison to calibration curves of known standards. It should be noted that air samples are meant for only qualifying silica (or quantifying phase) which must first be identified from a bulk dust sample.

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/14/2011 9:45:00PM
EMSL Order ID: 041124676
EMSL Project ID:
Date Analyzed: 9/19/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q110919-002

	Collected Date	Location	Volume	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Method Blank				N/A	N/A	α-Quartz	N/A	<0.005		N/A
						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.256		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.020		N/A

Initial report from: 09/19/2011 16:29:23

Analyst(s)

Jian Hu

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Stephen Siegel, CIH, Laboratory Manager
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Chain of Custody

EMSL Order Number (Lab Use Only): 041124678

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Report To Contact Name: Mike Johnston	Bill To Company:	Sampled By (Signature): Mutulle Estrada
Company Name: Parsons Brinckerhoff	Attention To:	Number of Samples in Shipment: 6
Address 1: One Penn Plaza	Address 1: Same	Date of Shipment: 9/13/11
Address 2: Fl 2, New York, NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 2126313705 Fax: 917 831-3770	Phone: Fax:	Purchase Order:
Email Results To: johnstonm@pbworld.com	Project Name: 5121B	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.							Media Type:
2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)	Manufacturer/Part #:
☐	☐	☐	☒	☐	☐	☐	Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-3C-1	Air	NIOSH 7500 - Silica	3384 L	9/12 - 9/13	AMS #3C	9/12 3:10pm to 9/13 3:10pm
AMS-3C-2		Blank				
AMS-3C-3		Blank				
AMS-4C-1		NIOSH 7500 - Silica	3456 L	9/12 - 9/13	AMS #4C	9/12 3:30pm to 9/13 3:30pm
AMS-4C-2		Blank				
AMS-4C-3	↓	Blank				

EMSL MANHATTAN LAB
RECEIVED
2011 SEP 13 PM 5:03

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Mutulle Estrada	9/13/11		

Comments:
AMS = Air Monitoring Station
AMS-3C-1 Start 9/12 @ 3:10pm - 2.5 flowrate End 9/13 @ 3:10pm - 2.2 flowrate
AMS-4C-1 Start 9/12 @ 3:30pm - 2.5 flowrate End 9/13 @ 3:30pm - 2.3 flowrate

041124678

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Attn: Mike Johnson
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One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/14/2011 9:45:00PM
EMSL Order ID: 041124678
EMSL Project ID:
Date Analyzed: 9/19/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-3C-1		AMS #3C	3384	0.162	0.048	α-Quartz	0.001	0.021	0.006	13.0
041124678-0001						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
AMS-3C-2		FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124678-0002						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
AMS-3C-3		FIELE BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124678-0003						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
AMS-4C-1		AMS #4C	3456	0.149	0.043	α-Quartz	0.001	0.022	0.006	14.8
041124678-0004						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
AMS-4C-2		FIELD BLANK	N/A	0.073	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124678-0005						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
AMS-4C-3		FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124678-0006						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										

Field Blank submitted with sample set. Results are not blank corrected.

Initial report from: 09/19/2011 16:51:10

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/14/2011 9:45:00PM
EMSL Order ID: 041124678
EMSL Project ID:
Date Analyzed: 9/19/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q110919-004

	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Duplicate AMS-3C-1		AMS #3C	3384	0.162	0.048	α-Quartz	0.001	0.020	0.006	12.3
041124678-0001						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
Method Blank				N/A	N/A	α-Quartz	N/A	<0.005		N/A
						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.256		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.020		N/A

Initial report from: 09/19/2011 16:51:10

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. This report only relate to the samples submitted. The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-Laboratory Personnel. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument. Samples received in good condition unless otherwise noted.

In the absence of a bulk dust sample, neither the specific forms of crystalline silica nor the interfering species can be fully determined. Hence, the amount for each phase, if anticipated, will be analyzed based on primary, secondary, and/or tertiary peak data with comparison to calibration curves of known standards. It should be noted that air samples are meant for only qualifying silica (or quantifying a phase) which must first be identified from a bulk dust sample.

041124869

041124869

EMSL Relinquish Form
Revision 3
July 31, 2009

EMSL Analytical, Inc.
Relinquish Form

Initial Lab:	EMSL- Manhattan	Phone Number:	212-290-0051
		Fax Number:	212-290-0058
Relinquished to:	EMSL- Cinnamonson	Phone Number:	800-220-6375
		Fax Number:	856-858-4960/ 856-427-1608
Does new Lab hold equivalent or additional accreditation*		☒ Yes	☐ No

EMSL Customer ID #:	PARS50
Client Name:	PB Americas, Inc.
Client Project:	51212B
Date Received:	9/15/2011
Date Relinquished:	9/16/2011
Date Due:	24 Hours
Special Instructions:	See C.O.C.

Relinquished by (Signature): Katy Cyr	Date: 9/16/11	Received by (Signature)	Date: 09-16-11 17:15
Relinquished by (Signature):	Date: 09-16-11 21:20	Received by (Signature) BLW Courier	Date: 9-16-11 9:15PM

RECEIVED EMSL CINNAMINSON SEP 16 PM 9:19

Client Notification- Please sign this form and fax to the original laboratory. By signing below you agree to allow the above named laboratory to relinquish the samples to a new laboratory with equivalent or additional certification.

Name (please Print)	Signature	Agent of:	Date:

If this is a reoccurring project or sample type that will require samples to be relinquished on a regular basis please sign below and the laboratory will keep this form on file.

Name (please Print)	Signature	Agent of:	Date:

- All accreditation information and certificates can be found at www.emsl.com.

Revision Notes

041124869

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Industrial Hygiene Chain of Custody

EMSL Order Number (Lab Use Only): 041124869

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Report To Contact Name: Mike Johnston	Bill To Company:	Sampled By (Signature): Michelle Escobedo
Company Name: Parsons Brinckerhoff	Attention To:	Number of Samples in Shipment: 6
Address 1: One Penn Plaza Fl 2	Address 1:	Date of Shipment: 9/15/11
Address 2: New York, NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 2126313705 Fax: 2126313770	Phone: Fax:	Purchase Order:
Email Results To: johnstenm@pbworld.com	Project Name: 5121B	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.							Media Type:
2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)	Manufacturer/Part #:
☐	☐	☐	☐	☐	☒	☐	Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-3C-7	AIR	NIOSH 7500 - Silica	3575L	9-14 to 9-15	AMS#3C	
AMS-3C-8		Blank				
AMS-3C-9		Blank				
AMS-4C-7		NIOSH 7500 Silica	3659.25L	9-14-9-15	AMS#4C	
AMS-4C-8		Blank				
AMS-4C-9		Blank				

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Michelle Escobedo	9/15/11	[signature] 9/15 0540	

EMSL MANHATTAN LAB RECEIVED 2011 SEP 15 PM 5:44

Comments:
AMS-3C-7 Start 3:10pm 9/14 end 9/15@3:00pm - Flowstart 2.5, Flow end 2.5
AMS-4C-7 Start 3:30pm 9/14 End 9/15@3:25pm - Flowstart 2.5, Flow end 2.6

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/16/2011 9:15:00PM
EMSL Order ID: 041124869
EMSL Project ID:
Date Analyzed: 9/20/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-3C-7	9/14/2011	AMS3C	3575	0.179	0.050	α-Quartz	0.001	0.016	0.004	8.9
041124869-0001						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
AMS-3C-8	9/14/2011	BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124869-0002						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
AMS-3C-9	9/14/2011	BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124869-0003						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
AMS-4C-7	9/14/2011	AMS4C	3659.25	0.188	0.051	α-Quartz	0.001	0.019	0.005	10.1
041124869-0004						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
AMS-4C-8	9/14/2011	BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124869-0005						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
AMS-4C-9	9/14/2011	BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041124869-0006						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A

Initial report from: 09/20/2011 11:51:15

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. This report only relate to the samples submitted. The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-Laboratory Personnel. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument. Samples received in good condition unless otherwise noted.

In the absence of a bulk dust sample, neither the specific forms of crystalline silica nor the interfering species can be fully determined. Hence, the amount for each phase, if anticipated, will be analyzed based on primary, secondary, and/or tertiary peak data with comparison to calibration curves of known standards. It should be noted that air samples are meant for only qualifying (or quantifying) which must first be identified from a bulk dust sample.

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/16/2011 9:15:00PM
EMSL Order ID: 041124869
EMSL Project ID:
Date Analyzed: 9/20/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q110920-001

	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Duplicate AMS-3C-7	9/14/2011	AMS3C	3575	0.179	0.050	α-Quartz	0.001	0.016	0.004	8.9
041124869-0001						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
				<0.050	N/A	α-Quartz	N/A	<0.005		N/A
Method Blank						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.259		N/A
α-Quartz (0.005 mg)	N/A	0.004		N/A
Cristobalite (0.020 mg)	N/A	0.020		N/A

Initial report from: 09/20/2011 11:51:15

Analyst(s)
Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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EMSL ANALYTICAL, INC.
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Industrial Hygiene
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EMSL Order Number (Lab Use Only): 041125296

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Report To Contact Name: John Faeth	Bill To Company:	Sampled By (Signature): Michelle Goebel
Company Name: Parsons Brinckerhoff	Attention To:	Number of Samples in Shipment: 3
Address 1: One Penn Plaza FL 2	Address 1: Same	Date of Shipment: 9/20/11
Address 2: New York, NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 2124655411 Fax: 2126313770	Phone: Fax:	Purchase Order:
Email Results To: FaethE@pbworld.com	Project Name: 51212B	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.							Media Type:
2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)	Manufacturer/Part #:
☒	☐	☐	☐	☐	☒	☐	Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-7C-1	AIR	NIOSH 7500 Silica	1116 L	9/15 - 9/16	AMS #7C	
AMS-7C-2	↓					
AMS-7C-3						

EMSL MANHATTAN LAB RECEIVED 2011 SEP 20 PM 6:07

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Michelle Goebel	9/20/11	S. MORENO	9/20 6:07pm

Comments:
AMS-7C-1 Start 9/15@11am 2.5 Flow. End 9/16 @3:10pm 2.4 flow

041125296

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/22/2011 7:00:00PM
EMSL Order ID: 041125296
EMSL Project ID:
Date Analyzed: 9/23/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-7C-1	9/15/2011	AMS #7C	4116	<0.050	<0.012	α-Quartz	0.001	0.012	0.003	24.0
041125296-0001						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
AMS-7C-2	9/15/2011	BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041125296-0002						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
AMS-7C-3	9/15/2011	BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041125296-0003						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A

Initial report from: 09/23/2011 12:01:11

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/22/2011 7:00:00PM
EMSL Order ID: 041125296
EMSL Project ID:
Date Analyzed: 9/23/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q110923-001

	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Duplicate AMS-7C-1	9/15/2011	AMS #7C	4116	<0.050	<0.012	α-Quartz	0.001	0.011	0.003	22.0
041125296-0001						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
				<0.050	N/A	α-Quartz	N/A	<0.005		N/A
Method Blank						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.269		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.020		N/A

Initial report from: 09/23/2011 12:01:11

Analyst(s)
Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: SAS CONTACT 4B-51212B

Customer ID: PRSB25
Customer PO:
Date Received: 8/24/2011 10:00:00PM
EMSL Order ID: 041123039
EMSL Project ID:
Date Analyzed:

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-4C-1	8/23/2011	AMS #4C	3278.25	0.091	0.028	α-Quartz	0.002	0.013	0.004	14.3
041123039-0001						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
AMS-4C-2	8/23/2011	FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041123039-0002						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
AMS-4C-3	8/23/2011	FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041123039-0003						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										

Field Blank submitted with sample set. Results are not blank corrected.

Initial report from: 08/26/2011 10:33:44

Analyst(s)

Samples analyzed by EMSL Analytical, Inc. Cinnan

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. This report only relate to the samples submitted. The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-Laboratory Personnel. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument. Samples received in good condition unless otherwise noted.

A bulk dust sample sample was submitted for this project.

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: SAS CONTACT 4B-51212B

Customer ID: PRSB25
Customer PO:
Date Received: 8/24/2011 10:00:00PM
EMSL Order ID: 041123039
EMSL Project ID:
Date Analyzed:

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q110826-004

	Collected Date	Location	Volume	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Method Blank				<0.050	N/A	α-Quartz	N/A	<0.005		N/A
						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.257		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.019		N/A

Initial report from: 08/26/2011 10:33:44

Analyst(s)

Samples analyzed by EMSL Analytical, Inc. Cinnan

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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A bulk dust sample sample was submitted for this project.

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Industrial Hygiene
Chain of Custody

EMSL Order Number (Lab Use Only): 041123039

Report To Contact Name: Mike Johnson	Bill To Company:	Sampled By (Signature): Michelle Escobedo
Company Name: Parsons Brinkerhoff	Attention To:	Number of Samples in Shipment: 3
Address 1: One Penn Plaza Fl. 2	Address 1: Same	Date of Shipment: 8/24/11
Address 2: New York, NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 917-855-1504 Fax: 212-631-3770	Phone: Fax:	Purchase Order: [redacted]
Email Results To: johnstonm@pbworld.com	Project Name: SAS Contract 4B-512128	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.							Media Type:
2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)	Manufacturer/Part #:
☐	☐	☐	☐	☐	☒	☐	Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-4C-1	Air	NIOSH 7500 – Silica	3278.25	8-23 to 8-24	AMS #4C	8-23 15:15 pm / 8-24 15:30 pm
AMS-4C-2		BLANK				
AMS-4C-3		BLANK				

EMSL MANHATTAN LAB RECEIVED 2011 AUG 24 PM 3:57

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Michelle Escobedo	8/24/11	[illegible]	8/24

Comments: AMS – AIR MONITORING STATION

041123039

Asbestos • Lead • Environmental • Materials & Indoor Air Analysis

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: S1212B

Customer ID: PRSB25
Customer PO:
Date Received: 8/25/2011 9:00:00PM
EMSL Order ID: 041123182
EMSL Project ID:
Date Analyzed: 8/30/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
AMS-4C-4	8/24/2011	AMS #4C	3744	0.104	0.028	α-Quartz	0.001	0.012	0.003	11.5
041123182-0001						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
Comment: Customer										
AMS-4C-5	8/24/2011	BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041123182-0002						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
AMS-4C-6	8/24/2011	BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041123182-0003						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										

Field Blank submitted with sample set. Results are not blank corrected.

Initial report from: 08/30/2011 13:32:52

Analyst(s)
Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnan

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. This report only relate to the samples submitted. The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-Laboratory Personnel. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument. Samples received in good condition unless otherwise noted.

In the absence of a bulk dust sample, neither the specific forms of crystalline silica nor the interfering species can be fully determined. Hence, the amount for each phase, if anticipated, will be analyzed based on primary, secondary, and/or tertiary peak data with comparison to calibration curves of known standards. It should be noted that air samples are meant for only quantifying silica (or a mineral phase) which must first be identified from a bulk dust sample.

Asbestos • Lead • Environmental • Materials & Indoor Air Analysis

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Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: S1212B

Customer ID: PRSB25
Customer PO:
Date Received: 8/25/2011 9:00:00PM
EMSL Order ID: 041123182
EMSL Project ID:
Date Analyzed: 8/30/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q110830-003

	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
Duplicate AMS-4C-4	8/24/2011	AMS #4C	3744	0.104	0.028	α-Quartz	0.001	0.013	0.003	12.5
041123182-0001						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
Comment: Customer										
				<0.050	N/A	α-Quartz	N/A	<0.005		N/A
Method Blank						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.264		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.018		N/A

Initial report from: 08/30/2011 13:32:52

Analyst(s)
Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnan

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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Industrial Hygiene
Chain of Custody

EMSL ANALYTICAL, INC.

EMSL Order Number (Lab Use Only): 041123182

Report To Contact Name: Mike Johnston	Bill To Company:	Sampled By (Signature): Michelle Sanders
Company Name: Parsons Brinckerhoff	Attention To:	Number of Samples in Shipment: 1
Address 1: One Penn Plaza E12	Address 1: Same	Date of Shipment: 8/25/11
Address 2: New York NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 2126313795 Fax: 2126313770	Phone: Fax:	Purchase Order:
Email Results To: johnstonm@pbworld.com	Project Name: S12128	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.

2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)
☐	☐	☐	☒	☐	☐	☐

Media Type:
Manufacturer/Part #:
Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments 8-24 / 8-25
AMS-4C-4	AIR	NIOSH 7500 - Silica	374L	8-24 to 8-25	AMS #4C	14:50 to 14:50
AMS-4C-5	↓	Blank				
AMS-4C-6	↓	Blank				

EMSL MANHATTAN LAB RECEIVED 2011 AUG 25 PM 4:45

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Michelle Sanders	8/25/11		8/25/11

Comments: AMS - Air Monitoring Station

1 of 1 pages

Asbestos • Lead • Environmental • Materials & Indoor Air Analysis

EMSL Analytical, Inc.
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Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 8/26/2011 10:00:00PM
EMSL Order ID: 041123300
EMSL Project ID:
Date Analyzed: 8/30/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
AMS-4C-7	8/25/2011	AMS #4C	3528	0.091	0.026	α-Quartz	0.001	0.007	0.002	7.7
041123300-0001						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
Comment: Customer										
AMS-4C-8	8/25/2011	FIELD BLANK 1	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041123300-0002						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
AMS-4C-9	8/25/2011	FIELD BLANK 1	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041123300-0003						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Customer										

Field Blank submitted with sample set. Results are not blank corrected.

Initial report from: 08/30/2011 13:53:23

Analyst(s)
Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnan

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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Asbestos • Lead • Environmental • Materials & Indoor Air Analysis

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200 Route 130 North Cinnaminson, NJ 08077
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Attn: Mike Johnson
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 8/26/2011 10:00:00PM
EMSL Order ID: 041123300
EMSL Project ID:
Date Analyzed: 8/30/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q110830-006

	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Duplicate AMS-4C-7	8/25/2011	AMS #4C	3528	0.091	0.026	α-Quartz	0.001	0.007	0.002	7.7
041123300-0001						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
Comment: Customer										
				<0.050	N/A	α-Quartz	N/A	<0.005		N/A
Method Blank						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.263		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.020		N/A

Initial report from: 08/30/2011 13:53:23

Analyst(s)
Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnan

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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EMSL ANALYTICAL, INC

Industrial Hygiene Chain of Custody

EMSL Order Number (Lab Use Only): 041123320

Report To Contact Name: Mike Johnston	Bill To Company:	Sampled By (Signature): Mychelle Evelado
Company Name: Parsons Brinckerhoff	Attention To:	Number of Samples in Shipment: 1
Address 1: One Penn Plaza FL 2	Address 1: Same	Date of Shipment: 8/26/11
Address 2: New York, NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 212 631 3705 Fax: 212 631 3720	Phone: Fax:	Purchase Order:
Email Results To: johnstonm@pbworld.com	Project Name: S12.12B	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.							Media Type:
2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)	Manufacturer/Part #:
☐	☐	☐	☒	☐	☐	☐	Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-4C-7	AIR	Niosh 7500 - Silica	3528L	8-25 to 8-26	AMS #4C	8-25-11 2:50pm to 8-26-11
AMS-4C-8	↓	Blank				
AMS-4C-9	↓	Blank				

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates

Released By	Date	Received By	Date
Mychelle Evelado	8/26/11		

EMSL MANHATTAN RECEIVED 2011 AUG 25 PM 5:58

Comments: AMS - Air Monitoring Station

1 of 1 page

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Industrial Hygiene Chain of Custody

EMSL Order Number (Lab Use Only): 041125303

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

041125303

Report To Contact Name: John Faeth	Bill To Company:	Sampled By (Signature): Michelle Escheto
Company Name: Parsons Brinckerhoff	Attention To: Same	Number of Samples in Shipment: 7
Address 1: One Penn Plaza FL 2	Address 1:	Date of Shipment: 9/20/11
Address 2: New York NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 2124655411 Fax: 212631 3770	Phone: Fax:	Purchase Order:
Email Results To: FaetheE pbworld.com	Project Name: 51212B	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.

2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)
☒	☒	☐	☐	☐	☐	☐

Media Type:
Manufacturer/Part #:
Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-3C-10	AIR	NIOSH 7500-Silica	3822 L	9/15 - 9/16	AMS #3C	
AMS-4C-10			3825 L	9/15 - 9/16	AMS #4C	
AMS-3C-13			3829.5L	9/19 - 9/20	AMS #3C	
AMS-4C-13			4194.4L	9/19 - 9/20	AMS #4C	
AMS-7C-4			4716.25L	9/19 - 9/20	AMS #7C	Start 9/19 @ 945 2.5 Flow End 9/20 @ 16:30 2.4 Flow
AMS-4C-11		Blank				
AMS-3C-11		Blank				

EMSL MANHATTAN LAB RECEIVED 2011 SEP 20 PM 6:07

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Michelle Escheto	9/20/11	S. Moreno	9/20 6:07pm

Comments:
AMS-3C-10 start 9/15 @ 3:30 2.5 Flow, End 9/16 @ 5pm 2.5 Flow AMS-4C-13 Start 9/19 @ 9:15am 2.5 / End 9/20 @ 13:00 - 2.4 Flow
AMS-3C-10 Start 9/15 @ 3:00pm 2.5 Flow, End 9/16 @ 5:05pm 2.4 flow AMS 3C-13 Start @ 9/19 9:00am 2.5 Flow End 9/20 @ 12:45 2.1 flow

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 5122B

Customer ID: PRSB25
Customer PO:
Date Received: 9/21/2011 7:55:00PM
EMSL Order ID: 041125303
EMSL Project ID:
Date Analyzed: 9/30/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-3C-10	9/15/2011	AMS #3C	3822	0.073	0.019	α-Quartz	0.001	0.012	0.003	16.4
041125303-0001						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
Comment: Customer										
AMS-4C-10	9/15/2011	AMS #4C	3825	0.066	0.017	α-Quartz	0.001	0.012	0.003	18.2
041125303-0002						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
Comment: Customer										
AMS-3C-13	9/19/2011	AMS #3C	3829.5	0.079	0.021	α-Quartz	0.001	0.013	0.003	16.5
041125303-0003						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
Comment: Customer										
AMS-4C-13	9/19/2011	AMS #4C	4194.4	0.111	0.026	α-Quartz	0.005	<0.020	<0.005	N/A
041125303-0004						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
Comment: Customer										
Quartz: Quartz secondary peak used due to suspected interference with quartz primary peak.										
AMS-7C-4	9/19/2011	AMS #7C	4716.25	0.19	0.040	α-Quartz	0.004	0.032	0.007	16.8
041125303-0005						Cristobalite	0.004	<0.020	<0.004	N/A
						Tridymite	0.004	<0.020	<0.004	N/A
Comment: Customer										
Quartz: Quartz secondary peak used due to suspected interference with quartz primary peak.										
AMS-4C-11	9/19/2011	FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041125303-0006						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										

Initial report from: 10/03/2011 13:13:39

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 5122B

Customer ID: PRSB25
Customer PO:
Date Received: 9/21/2011 7:55:00PM
EMSL Order ID: 041125303
EMSL Project ID:
Date Analyzed: 9/30/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-3C-11	9/19/2011	FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041125303-0007						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A

Comment: Field Blank

Field Blank submitted with sample set. Results are not blank corrected.

Initial report from: 10/03/2011 13:13:39

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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Phone: 212-465-5000
Fax: 212-465-5096

Proj: 5122B

Customer ID: PRSB25
Customer PO:
Date Received: 9/21/2011 7:55:00PM
EMSL Order ID: 041125303
EMSL Project ID:
Date Analyzed: 9/30/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q111003-002

	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Duplicate AMS-3C-10	9/15/2011	AMS #3C	3822	0.073	0.019	α-Quartz	0.001	0.013	0.003	17.8
041125303-0001						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
Comment: Customer										
				N/A	N/A	α-Quartz	N/A	<0.005		N/A
Method Blank						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.255		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.018		N/A

Initial report from: 10/03/2011 13:13:39

Analyst(s)
Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. This report only relate to the samples submitted. The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-Laboratory Personnel. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument. Samples received in good condition unless otherwise noted.

In the absence of a bulk dust sample, neither the specific forms of crystalline silica nor the interfering species can be fully determined. Hence, the amount for each phase, if anticipated, will be analyzed based on primary, secondary, and/or tertiary peak data with comparison to calibration curves of known standards. It should be noted that air samples are meant for only qualifying silica (or a mineral phase) which must first be identified from a bulk dust sample.

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Industrial Hygiene
Chain of Custody

EMSL Order Number (Lab Use Only): 041125476

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Report To Contact Name: John Faeth	Bill To Company:	Sampled By (Signature): Mutuelle Enobeche
Company Name: Parsons Brinckerhoff	Attention To:	Number of Samples in Shipment: 5
Address 1: One Penn Plaza FL2	Address 1: Same	Date of Shipment: 9/21/11
Address 2: N.Y. NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 2124655411 Fax: 2126313770	Phone: Fax:	Purchase Order:
Email Results To: FaethC@pbworld.com	Project Name: 5121B	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.							Media Type:
2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)	Manufacturer/Part #:
☒	☐	☐	☐	☐	☐	☐	Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-3C-14	Air	NIOSH 7500-Silica	3864L	9/20 - 9/21	AMS#3C	Volume = 3864L
AMS-4C-14			3871L	9/20 - 9/21	AMS#4C	
AMS-7C-5			3650L	9/20 - 9/21	AMS#7C	
Blank-1		Blank				
Blank-2		Blank				

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Mutuelle Enobeche	9/21/11		

EMSL MANHATTAN LAB RECEIVED 2011 SEP 21 PM 6:09

Comments:
AMS-3C-14 Start 9/20 @ 12:50 2.5 Flow End 9/21 @ 3pm Flow 2.5
AMS-4C-14 Start 9/20 @ 13:10 2.5 Flow End 9/21 @ 15:3c Flow 2.4
AMS-7C-5 Start 9/20 @ 17:00 - Flow 2.5
End 9/21 @ 17:20 @ 2.5

041125476

EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/22/2011 8:00:00PM
EMSL Order ID: 041125476
EMSL Project ID:
Date Analyzed: 10/6/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-3C-14	9/21/2011	AMS #3C	3864	0.281	0.073	α-Quartz	0.005	0.036	0.009	12.8
041125476-0001						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
Comment: Quarz secondary peak used due to suspected interference with quartz primary peak.										
AMS-4C-14	9/21/2011	AMS #4C	3871	0.12	0.031	α-Quartz	0.005	<0.020	<0.005	N/A
041125476-0002						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
Comment: Quarz secondary peak used due to suspected interference with quartz primary peak.										
AMS-7C-5	9/21/2011	AMS #7C	3650	0.161	0.044	α-Quartz	0.001	0.018	0.005	11.2
041125476-0003						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
BLANK 1	9/21/2011	FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041125476-0004						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
BLANK 2	9/21/2011	FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.020	N/A	N/A
041125476-0005						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Quarz secondary peak used due to suspected interference with quartz primary peak.										

Initial report from: 10/06/2011 14:29:37

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. This report only relate to the samples submitted. The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-Laboratory Personnel. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument. Samples received in good condition unless otherwise noted.

In the absence of a bulk dust sample, neither the specific forms of crystalline silica nor the interfering species can be fully determined. Hence, the amount for each phase, if anticipated, will be analyzed based on primary, secondary, and/or tertiary peak data with comparison to calibration curves of known standards. It should be noted that air samples are meant for only qualifying silica (or another phase) which must first be identified from a bulk dust sample.

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/22/2011 8:00:00PM
EMSL Order ID: 041125476
EMSL Project ID:
Date Analyzed: 10/6/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q111006-001

	Collected Date	Location	Volume	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Method Blank				N/A	N/A	α-Quartz	N/A	<0.005		N/A
						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

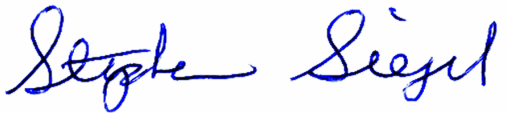
Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.255		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.019		N/A

Initial report from: 10/06/2011 14:29:37

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar



Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Industrial Hygiene Chain of Custody

EMSL Order Number (Lab Use Only): 041125612

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Report To Contact Name: John Faeth	Bill To Company:	Sampled By (Signature): Mutulle Enobelo
Company Name: Parsons Brinckerhoff	Attention To: Same	Number of Samples in Shipment: 5
Address 1: One Penn Plaza FL 2	Address 1:	Date of Shipment: 9/23/11
Address 2: NY, NY 10119	Address 2:	U.S. State where Samples Collected: NY
Phone: 212 465 5411 Fax: 212 631 3770	Phone: Fax:	Purchase Order:
Email Results To: FaethC@pbworld.com	Project Name: 512123	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.

2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)
☒	☐	☐	☐	☐	☐	☐

Media Type:
Manufacturer/Part #:
Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-3C-15	AIR	NIOSH 7500 Silica	3456 L	9/21 - 9/22	AMS #3C	
AMS-4C-15	↓	↓	3564.75L	↓	AMS #4C	
AMS-7C-6			5700 L		AMS #7C	
BlankK-1		Blank				
BlankK-2		Blank				

EMSL MANHATTAN LAB
RECEIVED
2011 SEP 23 PM 5:16

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Mutulle Enobelo	~~9/22/11~~ 9/23/11		9/23 @ 5:16pm

Comments:
AMS-3C-15 Start 9/21 @1500 Flow 2.5 End 9/22 @1500 Flow 2.3 AMS-7C-6 Start 9/21 17:25 @2.5 Flow
AMS-4C-15 Start 9/22 @1515 Flow 2.5 End 9/22 @1530 Flow 2.4 End 9/23 @9:00am @2.3 Flow

041125612

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/23/2011 9:10:00PM
EMSL Order ID: 041125612
EMSL Project ID:
Date Analyzed: 10/6/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-3C-15	9/21/2011	AMS #3C	3456	0.142	0.041	α-Quartz	0.006	<0.020	<0.006	N/A
041125612-0001						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
Comment: Quarz secondary peak used due to suspected interference with quartz primary peak.										
AMS-4C-15	9/21/2011	AMS #4C	3564.75	0.133	0.037	α-Quartz	0.001	0.015	0.004	11.3
041125612-0002						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
AMS-7C-6	9/21/2011	AMS #7C	5700	0.121	0.021	α-Quartz	0.001	0.007	0.001	5.8
041125612-0003						Cristobalite	0.004	<0.020	<0.004	N/A
						Tridymite	0.004	<0.020	<0.004	N/A
BLANK-1	9/21/2011	FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041125612-0004						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
BLANK-2	9/21/2011	FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041125612-0005						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A

Initial report from: 10/06/2011 14:35:00

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/23/2011 9:10:00PM
EMSL Order ID: 041125612
EMSL Project ID:
Date Analyzed: 10/6/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q111006-002

	Collected Date	Location	Volume	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Method Blank				N/A	N/A	α-Quartz	N/A	<0.005		N/A
						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.255		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.019		N/A

Initial report from: 10/06/2011 14:35:00

Analyst(s)
Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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041126003

EMSL ANALYTICAL, INC.

Industrial Hygiene Chain of Custody

EMSL Order Number *(Lab Use Only):*

Corporate - Cinnaminson, NJ
200 Route 130 North
Cinnaminson, NJ 08077
PHONE: 1-800-220-3675
FAX: (856) 786-5974

Report To Contact Name: John Faeth	**Bill To Company:** Parsons Brinckerhoff	**Sampled By (Signature):** Antonette Esteves
Company Name: Parsons Brinckerhoff	**Attention To:** John Faeth	**Number of Samples in Shipment:** 6
Address 1: One Penn Plaza, Floor 2	**Address 1:** One Penn Plaza, Floor 2	**Date of Shipment:** 9/27/2011
Address 2: New York, NY 10119	**Address 2:** New York, NY 10119	**U.S. State where Samples Collected:** NY
Phone : 21214655411 **Fax :** 2126313770	**Phone :** 21214655411 **Fax :** 2126313770	**Purchase Order:**
Email Results To: faeth@pbworld.com	**Project Name:** 51212B	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.

2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)
☒	☐	☐	☐	☐	☐	☐

Media Type:
Manufacturer/Part #:
Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
AMS-7-BULK	BULK	Silica Crystaline XRD - NIOSH 7500	NA	9/16/11	North and South East corner of 3rd	
AMS-3C-16	AIR	NIOSH 7500 - Silica	4263 L	9/26-9/27	AMS 3C	
AMS-4C-16	↓	↓	4224 L	↓	AMS 4C	
AMS-7C-7	↓	↓	3456 L	↓	AMS 5C	
Blank-1	↓	Blank				
Blank-2	↓	Blank				

EMSL-MANHATTAN LAB
RECEIVED
2011 SEP 28 AM 11:55

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
	9/27/11	Rasconez	9/28

Comments/Special Instructions:
AMS-3C-16 Start 9/26 @ 9:45 2.5 flow End 9/27 @ 14:45 2.4 flow
AMS-4C-16 Start 9/26 @ 9:50 2.5 flow End 9/27 @ 15:10 2.3 flow
AMS-7C-7 ~~Start~~ 9/26 @ 12:15 2.5 flow End 9/27 @ 12:16 2.3 flow

EMSL CINNAMINSON NJ
RECEIVED
2011 SEP 28 PM 8:34

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/28/2011 8:15:00PM
EMSL Order ID: 041126003
EMSL Project ID:
Date Analyzed: 10/11/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Collected Date	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
AMS-3C-16	9/26/2011	AMS 3C	4263	0.211	0.049	α-Quartz	0.001	0.019	0.004	9.0
041126003-0002						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
AMS-4C-16	9/26/2011	AMS 4C	4224	0.135	0.032	α-Quartz	0.001	0.007	0.002	5.2
041126003-0003						Cristobalite	0.005	<0.020	<0.005	N/A
						Tridymite	0.005	<0.020	<0.005	N/A
AMS-7C-7	9/26/2011	AMS 5C	3456	0.107	0.031	α-Quartz	0.001	0.005	0.001	4.7
041126003-0004						Cristobalite	0.006	<0.020	<0.006	N/A
						Tridymite	0.006	<0.020	<0.006	N/A
BLANK-1		FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041126003-0005						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										
BLANK-1		FIELD BLANK	N/A	<0.050	N/A	α-Quartz	N/A	<0.005	N/A	N/A
041126003-0006						Cristobalite	N/A	<0.020	N/A	N/A
						Tridymite	N/A	<0.020	N/A	N/A
Comment: Field Blank										

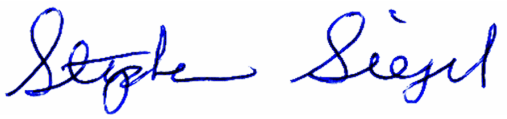
Field Blank submitted with sample set. Results are not blank corrected.

Initial report from: 10/12/2011 12:10:18

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar



Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

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A bulk dust sample sample was submitted for this project.

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Web: http://www.emsl.com Email:cinnasblab@EMSL.com

Attn: John Faeth
Parsons Brinkerhoff
One Penn Place
New York, NY 10119

Phone: 212-465-5000
Fax: 212-465-5096

Proj: 51212B

Customer ID: PRSB25
Customer PO:
Date Received: 9/28/2011 8:15:00PM
EMSL Order ID: 041126003
EMSL Project ID:
Date Analyzed: 10/11/2011

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 04Q111011-002

	Collected Date	Location	Volume	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	Analytical Sensitivty (mg/m³)	Weight (mg)	Conc. (mg/m³	% Silica
Method Blank				<0.050	N/A	α-Quartz	N/A	<0.005		N/A
						Cristobalite	N/A	<0.020		N/A
						Tridymite	N/A	<0.020		N/A

Reference Standards	Analytical Sensitivity (mg/m³)	Weight (mg)	Conc. (mg/m³)	% Silica
α-Quartz (0.250 mg)	N/A	0.266		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.020 mg)	N/A	0.020		N/A

Initial report from: 10/12/2011 12:10:18

Analyst(s)

Jian Hu

Samples analyzed by EMSL Analytical, Inc. Cinnar

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. This report only relate to the samples submitted. The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-Laboratory Personnel. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument. Samples received in good condition unless otherwise noted.

A bulk dust sample sample was submitted for this project.

EMSL Analytical, Inc.
200 Route 130 N., Cinnaminson, NJ 08077

Order ID:041126003

Attn:	John Faeth Parsons Brinkerhoff One Penn Place New York, NY 10119	Customer ID: Customer PO: Date Received:	PRSB25 9/28/11 8:15 PM
Fax:		EMSL Order:	041126003
Project:	51212B	EMSL Project ID:	
Report Date:	10/12/2011	Date Analyzed:	10/11/2011

Silica, Crystalline Analysis of Bulk Material
Performed X-Ray Diffraction (XRD) Method Modified OSHA ID-142 & Modified NIOSH Method 7500, Issue 3, 1/15/98

Sample ID	Location	% α-Quartz	% Cristobalite	%Tridymite
AMS-7-BULK 041126003-0001	NORTH&SOUTH EAST CORNER OF 83RD STREET	36.6*	<0.8	<0.8

* Quartz secondary peak used due to suspected interference with quartz primary peak.

Notes:

1. Reporting limit for Quartz = 0.2% (primary peak), 0.8% (secondary peak)
2. Reporting limit for Cristobalite and Tridymite = 0.8%

Disclaimer: All samples received in acceptable condition unless otherwise noted. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument.

Jian Hu
Analyst

Stephen Siegel, CIH- Lab Manager
Or other approved signatory

AIHA Accredited - Laboratory ID #100194

Attachment G

Laboratory Results for SO_2 NIOSH Test and Rock Samples

GALSON LABORATORIES

Mr. Steve Gladstone
Schiavone Construction
1430 2nd Avenue
Suite 103
New York, NY 10021

December 15, 2011

DOH ELAP# 11626 Account# 22691 Login# L255790

Dear Mr. Gladstone:

Enclosed are the analytical results for the samples received by our laboratory on December 15, 2011. All test results meet the quality control requirements of AIHA and NELAC unless otherwise stated in this report. All samples on the chain of custody were received in good condition unless otherwise noted.

Results in this report are based on the sampling data provided by the client and refer only to the samples as they were received at the laboratory. Unless otherwise requested, all samples will be discarded 14 days from the date of this report.

Please contact Charlene Moser at (888) 432-5227, if you would like any additional information regarding this report.

Thank you for using Galson Laboratories.

Sincerely,

Galson Laboratories

Mary G. Unangst
Laboratory Director

Enclosure(s)

GALSON LABORATORIES

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.galsonlabs.com

Client : Schiavone Construction
Site : SSK
Project No. : 2nd Avenue Subway

Date Sampled : 13-DEC-11
Date Received : 15-DEC-11
Date Analyzed : 15-DEC-11
Report ID : 719414

Account No.: 22691
Login No. : L255790

Sulfur Dioxide

EVENT #	Sample ID	Location	Lab ID	Air Vol liter	Total ug	Conc mg/m3	ppm
1	11-0191543	69TH SHAFT BOTTOM	L255790-1	90	<10	<0.11	<0.042
2	11-0191531	69TH SHAFT	L255790-2	90	<10	<0.11	<0.042
1	11-0191533	72ND SHAFT	L255790-3	90	<10	<0.11	<0.042
2	11-0191536	72nd SHAFT	L255790-4	90	<10	<0.11	<0.042
1	11-0191537	69TH ROOF	L255790-5	90	<10	<0.11	<0.042
2	11-0191558	G3 CAVERN	L255790-6	90	<10	<0.11	<0.042
2	11-0191559	69TH ROOF	L255790-7	90	<10	<0.11	<0.042
	11-0191541		L255790-8	NA	<10	NA	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: 10. ug
Analytical Method : mod. NIOSH 6004; IC
OSHA PEL (TWA) : 5 ppm
Collection Media : Filter

Submitted by: tmk
Approved by : nkp
Date : 15-DEC-11 NYS DOH # : 11626
QC by: Joe Mancuso

< -Less Than
> -Greater Than
NA -Not Applicable
mg -Milligrams
ug -Micrograms
ND -Not Detected
m3 -Cubic Meters
l -Liters
ppm -Parts per Million
kg -Kilograms
NS -Not Specified

GALSON LABORATORIES

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.galsonlabs.com

LABORATORY FOOTNOTE REPORT

Client Name : Schiavone Construction
Site : SSK
Project No. : 2nd Avenue Subway

Date Sampled : 13-DEC-11
Date Received: 15-DEC-11
Date Analyzed: 15-DEC-11

Account No.: 22691
Login No. : L255790

Unless otherwise noted below, all quality control results associated with the samples were within established control limits.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceeding the final result column may have been rounded in order to fit the report format and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

L255790 (Report ID: 719414):
The SULFUR DIOXIDE results are considered accurate to within 101% +/-10.6 based on a 95% confidence interval. The estimated uncertainty applies to the media, technology, and SOP(s) referenced in this report and does not account for any uncertainty associated with the sampling process.
SOPs: ii-n6004(4)

< -Less Than	mg -Milligrams	m3 -Cubic Meters	kg -Kilograms
> -Greater Than	ug -Micrograms	l -Liters	NS -Not Specified
NA -Not Applicable	ND -Not Detected	ppm -Parts per Million	

GALSON LABORATORIES
6601 Kirkville Rd
East Syracuse, NY 13057-9672
Tel: 315-432-5227
888-432-5227
Fax: 315-437-0571
www.galsonlabs.com

☐ New Client?

Client Account No.*: 22691

Report To*: Steve Gladstone / SSK
1430 2nd Ave Suite 103
NY, NY 10021

Phone No.*: 724-630-1919 A. YEAGER
Cell No.: 610-972-3115 S. GLADSTONE
Email Results To: andrew Yeager
Email Address: ayeager@schiavone.net
☐ Samples submitted using the FreePumpLoan™ Program.

Invoice To*: Same
Phone No.:
Email:
Purchase Order No.:
Credit Card: ☐ Credit Card on File ☐ Call for Credit Card Info
☐ Samples submitted using the FreeSamplingBadges™ Program.

RU9

Need Results By*:	(surcharge)
☐ 5 Business Days	0%
☐ 4 Business Days	35%
☐ 3 Business Days	50%
☐ 2 Business Days	75%
☐ Next Day by 6pm	100%
☐ Next Day by Noon	150%
☒ Same Day	200%

Site Name: SSK
Project: 2ND AVENUE SUBWAY
Sampled By: A-YEAGER
Comments:

List description of industry or process/interferences present in sampling area: N/A 3pc-w/wht

State samples were collected in (ex. NY): NY

Please indicate which OEL this data will be used for: ☐ OSHA PEL ☐ ACGIH TLV ☐ Cal OSHA ☐ MSHA ☑ Other (specify): EPA

Sample Identification* (Maximum of 20 characters, ID's longer than 20 characters will be abbreviated.)	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Volume, Sample Time, or Sample Area*	Sample Units*: L, ml, min., in2, cm2, ft2	Analysis Requested*	Method Reference^	Hexavalent Chromium Process (ex. welding, plating, painting, etc.)*
Example	01/01/11	2pc UW PVC	960	L	Hexavalent Chromium (Cr6)	mod. OSHA ID-215	Welding
11-0191543	12/13/11	37 MM	90	L	Part Sulfate / (SO2)	NIOSH 6004	BLASTING
11-0191531	12/13/11	37 MM	90	L	SULFUR DIOXIDE	NIOSH 6004	
11-0191533	12/13/11	37 MM	90	L		NIOSH 6004	
11-0191536	12/13/11	37 mm	90	L		NIOSH 6004	
11-0191537	12/13/11	37 mm	90	L		NIOSH 6004	
11-0191558	12/13/11	37 mm	90	L		NIOSH 6004	
11-0191559	12/13/11	37 MM	90	L		NIOSH 6004	
11-0191541	N/A	37 mm	BLANK	BLANK			

^Galson Laboratories will substitute our routine/preferred method if it does not match the method listed on the COC unless this box is checked: ☐ Use method(s) listed on COC

For metals analysis: if requesting an analyte with the option of a lower LOQ please indicate if the lower LOQ is required (only available for certain analytes see SAG):

For crystalline silica: form(s) of silica needed must be indicated (Quartz, Cristobalite, and/or Tridymite)*:

Chain of Custody	Print Name	Signature	Date/Time
Relinquished by:	Andrew Yeager	Andrew Yeager	12/14/11
Received by LAB:	C Murch H	C	12/15/11 941

Samples received after 3pm will be considered as next day's business.
*Required fields, failure to complete these fields may result in a delay in your samples being processed.

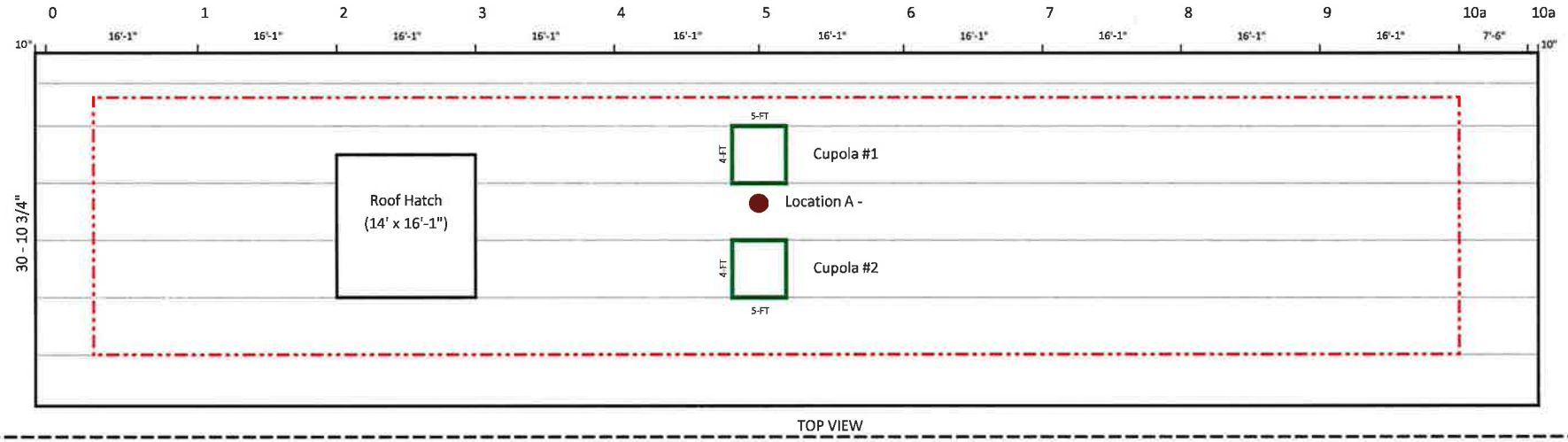
Page ___ of ___

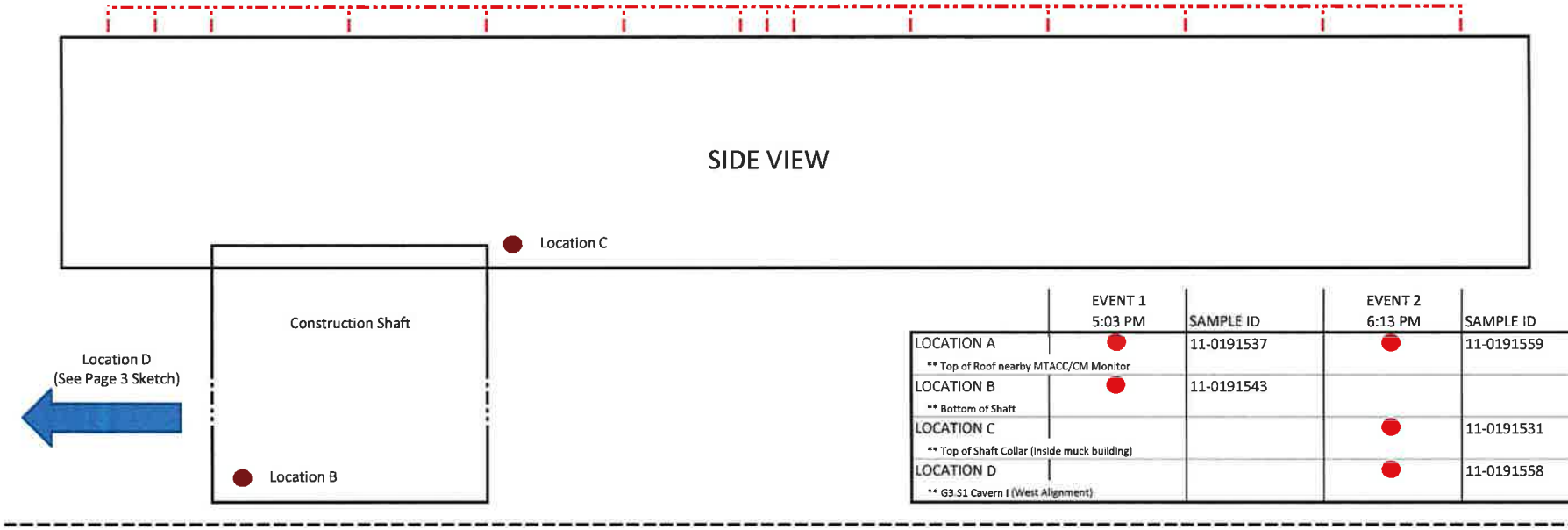
LAB ORIGINAL

Meter Location Table
12-13-2011

Meter Number	Location Description
AMS 3	Hoghouse-E2A921
AMS 13	Handheld roving-None done today- E2B141
AMS 15	69th Street muckhouse roof cupola-E2B140
AMS 20	69th Street muckhouse roof southeast-e2a920
AMS 21	69th Street muckhouse roof center-east-E2A918
AMS 22	69th Street muckhouse roof northeast-E2B139
AMS 18	72nd Street muckhouse roof cupola-E2A919
AMS 23	72nd Street muckhouse roof southeast - Vrae 13732
AMS 24	72nd Street muckhouse roof center-east- VRae 18009
AMS 25	72nd Street muckhouse roof northeast-Vrae 2871

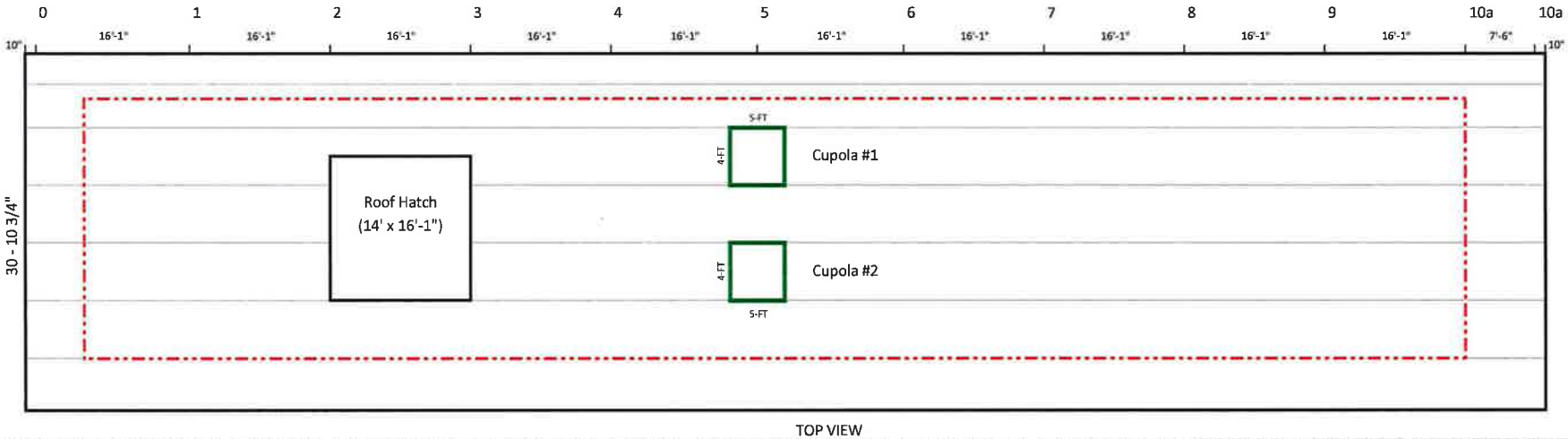
69th St Muck Enclosure

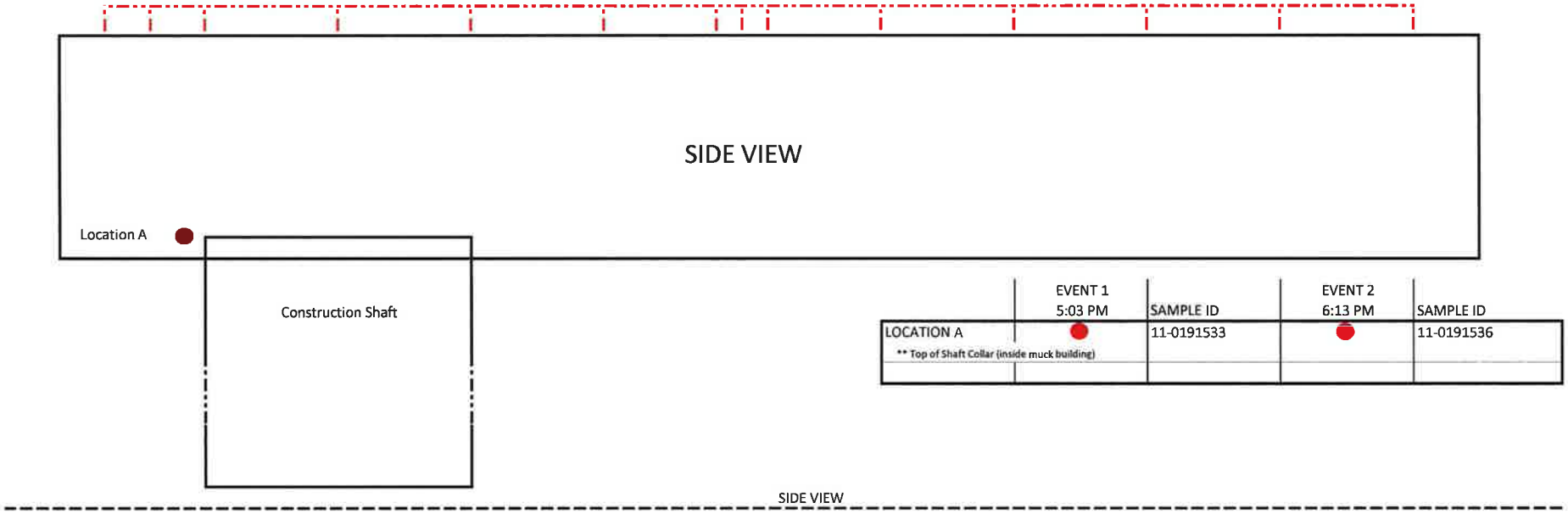




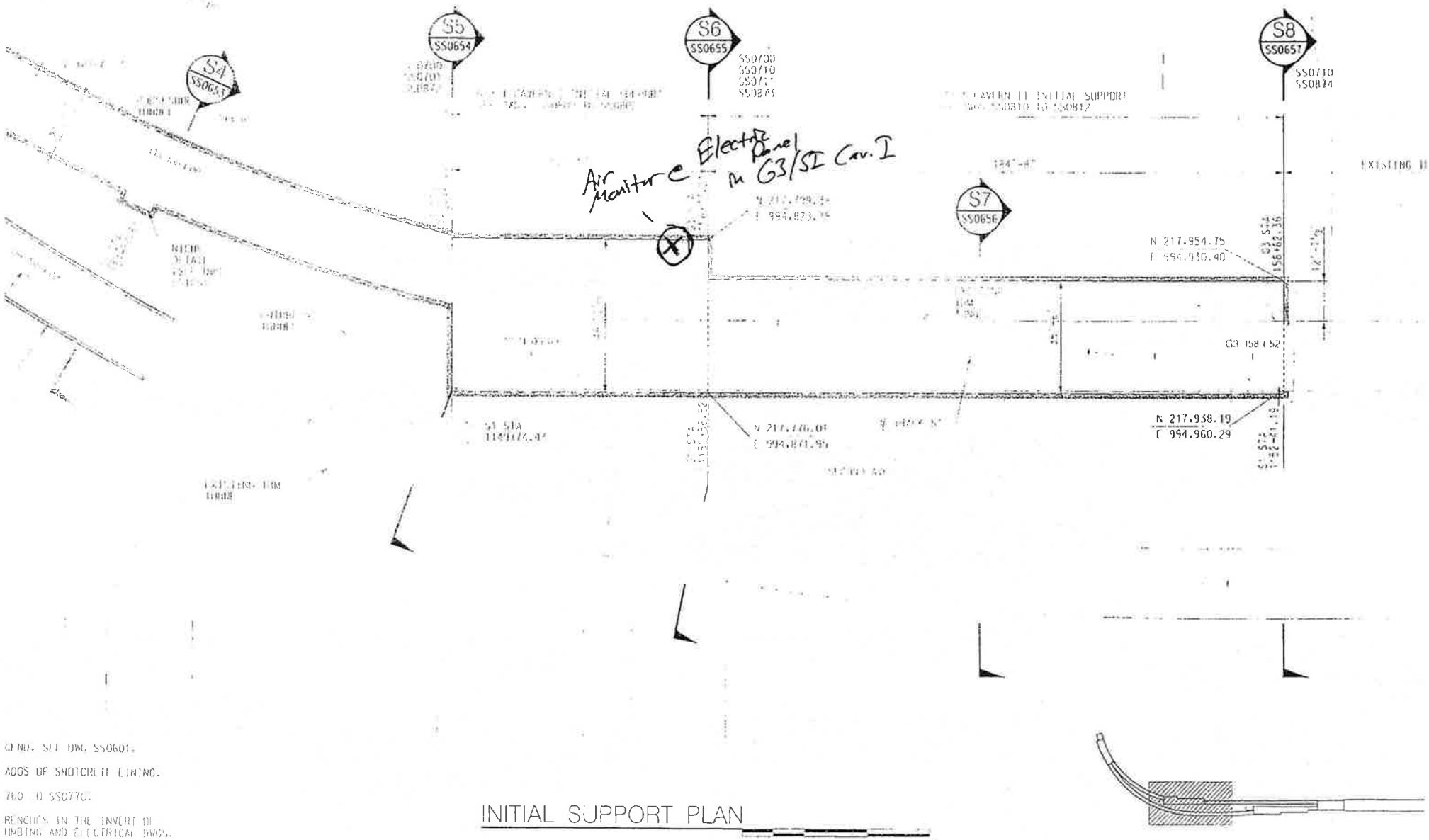
	EVENT 1 5:03 PM	SAMPLE ID	EVENT 2 6:13 PM	SAMPLE ID
LOCATION A ** Top of Roof nearby MTACC/CM Monitor	●	11-0191537	●	11-0191559
LOCATION B ** Bottom of Shaft	●	11-0191543		
LOCATION C ** Top of Shaft Collar (Inside muck building)			●	11-0191531
LOCATION D ** G3.S1 Cavern I (West Alignment)			●	11-0191558

72nd St Muck Enclosure





	EVENT 1 5:03 PM	SAMPLE ID	EVENT 2 6:13 PM	SAMPLE ID
LOCATION A ** Top of Shaft Collar (inside muck building)	●	11-0191533	●	11-0191536



G NO. SEE DWG SS0601.

ADDS OF SHOTCRETE LINING.

760 TO SS0770.

BENCHES IN THE INVERT OF
UMBING AND ELECTRICAL DWGS.

ESIGN OF EXCAVATION SEQUENCE
NCHES IN THE INVERT OF CAVERNS
NGS.

CONTRACT C 26002 RECORD DRAWINGS.

INITIAL SUPPORT PLAN

20' 10' 0 20' 40'

AJM HARRIS • ARUP
A Joint Venture

Second Avenue Subway

REV	DESCRIPTION	DATE	APPRVD
0	CONFORMED DRAWING	7/2/10	

SCALE: NOT REQUIRED

DRAWN BY: J. DALVA	SIGNATURE:	
DESIGNED BY: N.PETTERSSON	SIGNATURE:	
CHECKED BY: V. NASRI	SIGNATURE:	
APPROVED BY: J. COLLINS	SIGNATURE:	

CONTRACT C-26007

72ND STREET STATION AND G3/G4 TUNNELS STATION CAVERN AND HEAVY CIVIL, STRUCTURAL

DRAWING TITLE:
72ND STREET STA
INITIAL GROUND SU
PLAN
SHEET 2 OF

SULFUR DIOXIDE 6004

SO_2 MW: 64.06 CAS: 7446-09-5 RTECS: WS4550000

METHOD: 6004, Issue 2 **EVALUATION: PARTIAL** **Issue 1: 15 May 1989**
Issue 2: 15 August 1994

OSHA : 5 ppm
NIOSH: 2 ppm; STEL 5 ppm; Group I Pesticide
ACGIH: 2 ppm; STEL 5 ppm
(1 ppm = 2.62 mg/m^3 @ NTP)

PROPERTIES: gas; vapor density 2.26 (air = 1); BP -10 °C; MP -72.7 °C; nonflammable

SYNONYMS: none

SAMPLING

SAMPLER: FILTER + TREATED FILTER (cellulose + Na_2CO_3; preceded by 0.8-µm cellulose ester membrane)

FLOW RATE: 0.5 to 1.5 L/min

VOL-MIN: 4 L @ 5 ppm
-MAX: 200 L

SHIPMENT: routine

SAMPLE STABILITY: not determined

FIELD BLANKS: 2 to 10 field blanks per set

ACCURACY

RANGE STUDIED: not studied

BIAS: not determined

OVERALL PRECISION ($\hat{S}_{rT}$): not determined

ACCURACY: not determined

MEASUREMENT

TECHNIQUE: ION CHROMATOGRAPHY

ANALYTE: sulfite and sulfate ions

EXTRACTION: 10 mL 1.75 m$\underline{M}$ $NaHCO_3$/2.0 m$\underline{M}$ Na_2CO_3

INJECTION LOOP VOLUME: 50 µL

ELUENT: 1.75 m$\underline{M}$ $NaHCO_3$/2.0 m$\underline{M}$ Na_2CO_3, 2 to 3 mL/min

COLUMNS: Ion Pac AS4A separator, Ion Pac AG4A guard; micromembrane suppressor [2]

CONDUCTIVITY SETTING: 10 µS full scale

CALIBRATION: standard solutions of SO_3^{2-} and SO_4^{2-} in eluent

RANGE: 11 to 200 µg SO_2 per sample

ESTIMATED LOD: 3 µg SO_2 per sample [2]

PRECISION ($\bar{S}_r$): 0.042 [2]

APPLICABILITY: The working range is 0.2 to 8 ppm (0.5 to 20 mg/m^3) for a 100-L air sample. The method is applicable to STEL samples. SO_2 is collected on the back (treated) filter. Sulfuric acid, sulfate salts, and sulfite salts are collected on the front f ilter and may be quantitated as total particulate sulfate.

INTERFERENCES: Sulfur trioxide gas, if present in dry atmospheres, may give a positive interference for SO_2.

OTHER METHODS: This revises P&CAM 268 [3]. P&CAM 146 [4], P&CAM 163 [5], and S308 [6] use 0.3 $\underline{N}$ H_2O_2 for sampling, followed by titration with NaOH or barium perchlorate. P&CAM 160 [7] uses tetrachloromercurate solution and visible spectrophotometry. P&CAM 204 [8] uses a solid sorbent (molecular sieve 5A), thermal desorption, and mass spectrometry.

REAGENTS:

1. Water, deionized, filtered, specific conductance ≤10 µS/cm.
2. Fixative solution. Dissolve 25 g Na_2CO_3 in deionized water. Add 20 mL glycerol and dilute with deionized water to 1 L.
3. Eluent: 1.75 m$\underline{M}$ $NaHCO_3$/2.0 m$\underline{M}$ Na_2CO_3. Dissolve 0.588 g $NaHCO_3$ and 0.848 g Na_2CO_3 in 4 L filtered deionized water.
4. Calibration stock solutions, 1 mg/mL (as the anion). Prepare in duplicate.
   a. **Sulfite:** dissolve 0.1575 g Na_2SO_3 in water. Add 2 mL glycerol. Dilute to 100 mL. Prepare fresh daily.
   b. **Sulfate:** dissolve 0.1479 g Na_2SO_4 in deionized water. Dilute to 100 mL. Stable several weeks.

* See SPECIAL PRECAUTIONS.

EQUIPMENT:

1. Sampler: two 37-mm diameter cassette filter holders (connected in series by a M-M Luer adapter, e.g., Millipore XX1102503, or a short piece of plastic tubing) containing:
   a. (Front cassette) cellulose ester membrane filter, 0.8-µm pore size, supported by a backup pad.
   b. (Back cassette) cellulose filter (Whatman 40 or equivalent) which has been saturated with fixative solution and dried 20 to 30 min at 100 °C, supported by a porous plastic support pad.
2. Personal sampling pump, 0.5 to 1.5 L/min, with flexible connecting tubing.
3. Vials, glass, 20-mL, screw-cap, such as scintillation vials.**
4. Ion chromatograph, HPIC-AS4A anion separator and HPIC-AG4A guard, anion micromembrane suppressor, conductivity detector, and strip chart recorder. (Optional: integrator.)
5. Syringes, 10-mL, polyethylene, with luer tip.**
6. Filters, in-line, luer-tip holder with membrane filter, 13- or 25-mm, 0.45-µm pore size.
7. Micropipets, 50- to 1000-µL, with disposable tips.**
8. Volumetric flasks, 50- and 100-mL.**
9. Pipet, 10-mL.**
10. Polyethylene bottles, 250-mL.**

** Clean by rinsing thoroughly with deionized water.

SPECIAL PRECAUTIONS: None.

SAMPLING:

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Remove end caps of sampler immediately before sampling. Attach sampler to personal sampling pump with flexible tubing.
3. Sample at an accurately known flow rate between 0.5 and 1.5 L/min for a total sample size of 40 to 200 L. Do not exceed a total particulate loading of 2 mg on the front filter.
4. Seal the sampler and pack securely for shipment.
   NOTE: If determination of sulfuric acid is required, transfer the front (membrane) filter to a clean vial within 4 h to avoid low recovery of sulfate. Handle the filter with tweezers to avoid contamination.

SAMPLE PREPARATION:

5. Put the two filters from the sampler into separate, clean vials. Discard the backup pads. Add 10.0 mL eluent to each vial and let stand, with occasional vigorous shaking, for 30 min.

NOTE: The SO_2 collected on the treated (back) filter is present as sulfite, which oxidizes in air slowly (over several weeks) to sulfate. The contributions of sulfite and sulfate found on the back filter must be summed, with appropriate stoichiometric factors applied, to give the SO_2 concentration (step 11).

6. Pour each sample into a syringe fitted with an in-line filter.

CALIBRATION AND QUALITY CONTROL:

7. Calibrate daily with at least six working standards.
   a. Add known aliquots of sulfate calibration stock solution to eluent in 50-mL volumetric flasks and dilute to the mark to produce solutions containing 1 to 20 µg/mL SO_4^{2-}.
   b. Prepare sulfite standards in the same manner over the same range.
   c. Store working standards in tightly-capped polyethylene bottles. Prepare fresh working standards daily.
   d. Analyze working standards with samples and blanks (steps 8 through 10).
   Prepare a calibration graph for each anion [peak height (mm or µS) vs. µg sulfite or sulfate].

MEASUREMENT:

8. Set ion chromatograph to conditions given on page 6004-1, according to manufacturer's instructions.
9. Inject sample aliquot. For manual operation, inject 2 mL of sample from syringe to ensure complete rinse of sample loop.
   NOTE: All samples, eluents, and water flowing through the ion chromatograph must be filtered to avoid plugging system valves or columns.
10. Measure peak heights of sulfite and sulfate peaks.
   NOTE: If peak height exceeds linear calibration range, dilute with eluent, reanalyze, and apply the appropriate dilution factor in calculations.

CALCULATIONS:

11. Determine the mass, µg, of sulfate equivalent found on the front (W_f) and back (W_b) filters and in the corresponding average media blanks (B_f and B_b).
   NOTE: The sulfate equivalent is the sum of the sulfate peak, µg, and 1.200 times the sulfite peak, µg, on the chromatogram (1.200 = MW SO_4^{2-}/MW SO_3^{2-}): $\mu g_{\text{sulfate equivalent}} = \mu g_{\text{sulfate}} + 1.200\ \mu g_{\text{sulfite}}$.
12. Calculate the concentration, C_{SO2}, of sulfur dioxide, applying the factor 0.667 (MW SO_2/MW SO_4^{2-}):

$$C_{SO_2} = \frac{(W_b - B_b)}{V} \cdot 0.667,\ mg/m^3.$$

13. Calculate the concentration, C_{SO4}, of particulate sulfate (including sulfuric acid) in the air volume sampled, V (L):

$$C_{SO_4} = \frac{(W_f - B_f)}{V},\ mg/m^3.$$

EVALUATION OF METHOD:

The sampler was adapted from that of Pate, et al. [9]. In experiments in which SO_2 was generated by permeation tube and collected in impingers containing H_2O_2, untreated 0.8-µm cellulose ester membrane filters were shown to allow complete passage of SO_2 [10]. In subsequent sampling of an atmosphere containing ca. 10 ppm SO_2 at 1 L/min for 30 min, two treated filters were placed in series following a cellulose ester membrane filter. Recoveries were: 0.667 mg SO_2 from the first treated filter, 0.02 mg SO_2 from the second treated filter, and less than 0.003 mg SO_2 in the backup impinger containing 0.3 N H_2O_2 [11]. Cellulose ester filters spiked with 0.2 mg H_2SO_4 gave the following recoveries: 83.5% using H_2O extraction, 98.5% using hot H_2O extraction, and 82.5% using 0.01 M HCl for extraction.

A study on filter impregnating solutions compared $NaHCO_3$ and KOH. The chromatograms of samples from the KOH-treated filters had noticeably flattened and broadened peak shapes as well as retention times reduced by approximately 10% when compared to the chromatograms of H_2SO_4 spiked on filters impregnated with $NaHCO_3$[1].

REFERENCES:

[1] Williamson, G.Y. NIOSH/MRSB Sequence 7452-B (unpublished, July 6, 1992).
[2] Williamson, G.Y. NIOSH/MRSB Sequence 7452-C (unpublished, July 22, 1992).
[3] NIOSH Manual of Analytical Methods, 2nd ed., Vol. 5, P&CAM 268, U.S. Department of Health and Human Services, Publ. (NIOSH) 79-141 (1979).
[4] Ibid., 2nd ed., Vol. 1, P&CAM 146, Publ. (NIOSH) 77-157-A (1977).
[5] Ibid., 2nd ed., Vol. 1, P&CAM 163, Publ. (NIOSH) 77-157-A (1977).
[6] Ibid., 2nd ed., Vol. 4, S308, Publ. (NIOSH) 78-175 (1978).
[7] Ibid., 2nd ed., Vol. 1, P&CAM 160, Publ. (NIOSH) 77-157-A (1977).
[8] Ibid., 2nd ed., Vol. 1, P&CAM 204, Publ. (NIOSH) 77-157-A (1977).
[9] Pate, J.B., J.P. Lodge, Jr., and M.P. Neary. The Use of Impregnated Filters to Collect Traces of Gases in the Atmosphere, Anal. Chim. Acta, 28:341 (1963).
[10] Grote, A.A. (NIOSH, unpublished results, 1973).
[11] Eller, P.M. and M.A. Kraus. Methods for the Determination of Oxidized Sulfur and Nitrogen Species in Air, Internal Report, (unpublished, July 29, 1977).

METHOD REVISED BY:

Peter M. Eller, Ph.D., and Mary Ellen Cassinelli, NIOSH/DPSE.

EMSL Analytical, Inc.

200North, Route 130, Cinnaminson, NJ. 08077
Phone: (800) 220-3675

Attn.: *Luis Sepulveda*
Parsons Brinkerhoff
One Penn Plaza
2nd Floor
New York, NY. 10119
Phone: 212-465-5000 Fax: 212-631-3770

EMSL Case No.: 361102901
Sample(s) Received: 12/22/11
Date of Analysis: 01/09/12
Date Printed: 01/09/12
Reported By: J.Newton
Email: Luis.sepulveda@2avesubway.com

- Laboratory Report -

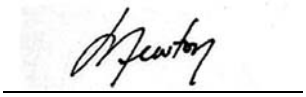
Sulfur Concentration

Project: Rock Samples from Contract 4B 72nd St. Station, Cavern

Procurement of Samples and Analytical Overview:

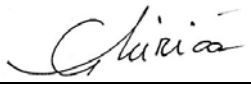
The material for analysis arrived at EMSL Analytical (Cinnaminson, NJ) on 12/22/11. The package arrived in satisfactory condition with no evidence of damage to the contents. The purpose of the analysis is to determine the identification of the individual components. The data reported herein has been obtained using the following equipment and methodologies.

Methods & Equipment: Elemental Analysis – *LECO CS200 Carbon, Sulfur Analyzer*

Analyzed by:  9 January 2012

John Newton
Senior Materials Scientist

Date

Reviewed/Approved by :  9 January 2012

Eugenia Mirica, Ph.D.
Laboratory Manager

Date

EMSL Analytical, Inc.

200North, Route 130, Cinnaminson, NJ. 08077
Phone: (800) 220-3675

Attn.: *Luis Sepulveda*
Parsons Brinkerhoff
One Penn Plaza
2nd Floor
New York, NY. 10119
Phone: 212-465-5000 Fax: 212-631-3770

EMSL Case No.: 361102901
Sample(s) Received: 12/22/11
Date of Analysis: 01/09/12
Date Printed: 01/09/12
Reported By: J.Newton
Email: Luis.sepulveda@2avesubway.com

Summary of Results:

Sample Number	Sample ID	Sulfur Content (wt%)		Comments
A	Quartz-Mica-Garnet Schist	0.0009	±0.001	N/A
B	Quartz-Mica-Amphibole Schist	0.050	±0.008	N/A
C	Pegmatite	0.0042	±0.001	N/A
D	Quartz-Mica-Garnet Schist w/ Pyrite-mineralized joint surface	0.20	±0.08	N/A
1	Quartz-Mica-Garnet Schist	0.074	±0.008	N/A
2	Quartz-Mica-Amphibole Schist	0.74	±0.08	N/A
3	Pegmatite	0.013	±0.008	N/A
4	Quartz-Mica-Garnet Schist w/ Pyrite-mineralized joint surface	0.32	±0.08	N/A

All data reported in weight percent (%) unless noted.

Analysis Calibrations:

Reference ID	S (wt%) (measured)	S (wt%) (reference)	Accuracy (±10%)	Determination
Laboratory Blank	<0.001	0.000	N/A	Pass
Calibration Ref.	0.0089	0.0082	+8.5	Pass
Verification Ref.	0.0086	0.0082	+4.9	Pass

Sample Preparation:

Each sample is hand ground and homogenized to a uniform size (≤3mm), where applicable. A sub-sample is collected and weighed in a single-use ceramic crucible with a mixture of iron and tungsten (1gm) to facilitate the conduction of electric current during analysis.

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Date of Analysis: 01/09/12
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Email: Luis.sepulveda@2avesubway.com

Important Terms, Conditions, and Limitations:

Sample Retention: Samples analyzed by EMSL will be retained for 60 days after analysis date. Storage beyond this period is available for a fee with written request prior to the initial 30 day period. Samples containing hazardous/toxic substances which require special handling may be returned to the client immediately. EMSL reserves the right to charge a sample disposal or return shipping fee.

Change Orders and Cancellation: All changes in the scope of work or turnaround time requested by the client after sample acceptance must be made in writing and confirmed in writing by EMSL. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, EMSL will complete work in progress and invoice for work completed to the point of cancellation notice. EMSL is not responsible for holding times that are exceeded due to such changes.

Warranty: EMSL warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures and with reasonable care in accordance with applicable federal, state and local laws. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. EMSL disclaims any other warranties, express or implied, including a warranty of fitness for particular purpose and warranty of merchantability.

Limits of Liability: In no event shall EMSL be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages, arising out of or in connection with EMSL's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. EMSL will not be held responsible for the improper selection of sampling devices even if we supply the device to the user. The user of the sampling device has the sole responsibility to select the proper sampler and sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of EMSL, the cost of which shall be limited to the reasonable value of the original sample delivery group (SDG) samples. In no event shall EMSL be liable to a client or any third party, whether based upon theories of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereunder.

The data and other information contained in this report, as well as any accompanying documents, represent only the samples analyzed. They are reported upon the condition that they are not to be reproduced wholly or in part for advertising or other purposes without the written approval from the laboratory.

Attachment H

The Supporting Data for Evaluation of CAMP

PM_{10} Data		
	Camp Maximum	**Station 6 Maximum**
0:00	**21.3**	**27.0**
0:15	**26.8**	**41.5**
0:30	**30.7**	**40.7**
0:45	**29.9**	**40.6**
1:00	**43.6**	**40.5**
1:15	**49.2**	**41.2**
1:30	**34.0**	**41.8**
1:45	**34.8**	**40.8**
2:00	**28.1**	**41.0**
2:15	**26.6**	**41.0**
2:30	**28.9**	**43.9**
2:45	**30.2**	**47.8**
3:00	**28.0**	**58.3**
3:15	**28.8**	**61.5**
3:30	**30.3**	**60.7**
3:45	**30.2**	**58.5**
4:00	**32.7**	**56.4**
4:15	**32.5**	**53.6**
4:30	**31.1**	**51.7**
4:45	**32.2**	**48.4**
5:00	**30.5**	**46.1**
5:15	**30.6**	**45.4**
5:30	**29.6**	**46.4**
5:45	**29.9**	**48.4**
6:00	**29.9**	**45.7**
6:15	**33.2**	**54.8**
6:30	**31.6**	**72.1**
6:45	**35.2**	**69.0**
7:00	**38.3**	**62.9**
7:15	**33.0**	**59.9**
7:30	**35.7**	**64.8**
7:45	**36.0**	**64.6**
8:00	**37.5**	**84.0**
8:15	**40.7**	**86.5**
8:30	**46.4**	**88.7**
8:45	**43.4**	**99.4**
9:00	**48.1**	**98.6**
9:15	**50.2**	**99.3**
9:30	**49.1**	**95.5**
9:45	**47.6**	**93.3**
10:00	**47.0**	**100.4**
10:15	**47.1**	**87.4**
10:30	**42.5**	**84.0**
10:45	**39.9**	**79.3**
11:00	**43.5**	**87.8**
11:15	**48.3**	**80.9**
11:30	**51.5**	**74.6**
11:45	**39.1**	**71.6**
12:00	**37.4**	**69.9**
12:15	**37.0**	**71.9**
12:30	**38.0**	**73.1**
12:45	**38.6**	**75.5**
13:00	**43.0**	**75.8**
13:15	**40.3**	**78.5**
13:30	**39.4**	**60.5**

13:45	**31.0**	**43.8**
14:00	**36.3**	**68.6**
14:15	**37.6**	**64.8**
14:30	**34.7**	**60.5**
14:45	**34.5**	**68.7**
15:00	**37.0**	**70.3**
15:15	**40.7**	**64.2**
15:30	**34.2**	**232.3**
15:45	**111.2**	**131.1**
16:00	**64.8**	**79.5**
16:15	**24.6**	**135.1**
16:30	**153.3**	**36.7**
16:45	**23.3**	**47.8**
17:00	**27.1**	**30.8**
17:15	**26.2**	**31.2**
17:30	**30.3**	**29.0**
17:45	**25.3**	**53.7**
18:00	**38.6**	**48.5**
18:15	**33.3**	**36.8**
18:30	**21.4**	**27.9**
18:45	**22.8**	**29.0**
19:00	**23.2**	**30.8**
19:15	**23.9**	**35.1**
19:30	**28.0**	**42.6**
19:45	**29.7**	**20.6**
20:00	**26.6**	**32.0**
20:15	**29.3**	**28.9**
20:30	**31.4**	**25.4**
20:45	**28.2**	**25.4**
21:00	**41.3**	**18.4**
21:15	**29.9**	**20.0**
21:30	**26.8**	**14.2**
21:45	**24.8**	**27.0**
22:00	**27.9**	**19.3**
22:15	**25.8**	**32.1**
22:30	**26.3**	**24.1**
22:45	**23.4**	**21.3**
23:00	**22.2**	**20.9**
23:15	**21.6**	**19.0**
23:30	**21.6**	**25.4**
23:45	**23.5**	**21.3**

PM10 Data for Correlation Analysis

Date/Time	E 73rd St PM10	AMS 6 PM10 73rd
9/14/2011 0:00		
9/14/2011 0:15	24.5	9.71
9/14/2011 0:30	30.71	9.42
9/14/2011 0:45	29.93	11.41
9/14/2011 1:00	43.64	13.91
9/14/2011 1:15	49.18	9.81
9/14/2011 1:30	34	9.25
9/14/2011 1:45	34.82	8.28
9/14/2011 2:00	28.11	8.65
9/14/2011 2:15	26.56	8.54
9/14/2011 2:30	25.08	9.26
9/14/2011 2:45		
9/14/2011 3:00		
9/14/2011 3:15		
9/14/2011 3:30		
9/14/2011 3:45	26.36	8.85
9/14/2011 4:00	25.77	9.44
9/14/2011 4:15	27.1	9.63
9/14/2011 4:30	26.51	9.65
9/14/2011 4:45	28.03	9.50
9/14/2011 5:00	27.41	9.93
9/14/2011 5:15	28.58	10.69
9/14/2011 5:30	29.16	11.21
9/14/2011 5:45	29.91	10.93
9/14/2011 6:00	29.86	13.41
9/14/2011 6:15	33.24	11.80
9/14/2011 6:30	31.57	13.23
9/14/2011 6:45	34.06	12.83
9/14/2011 7:00	33.75	11.93
9/14/2011 7:15	32.95	11.67
9/14/2011 7:30	35.67	12.61
9/14/2011 7:45	36	13.43
9/14/2011 8:00	37.48	12.03
9/14/2011 8:15	33.62	13.23
9/14/2011 8:30		
9/14/2011 8:45	35.35	13.02
9/14/2011 9:00	35.68	13.17
9/14/2011 9:15	35.93	13.10
9/14/2011 9:30	35.48	12.91
9/14/2011 9:45	36.65	12.09
9/14/2011 10:00	32.96	12.25
9/14/2011 10:15	33.14	11.37
9/14/2011 10:30	31.53	10.51
9/14/2011 10:45	28.76	9.29
9/14/2011 11:00	25.84	9.11
9/14/2011 11:15	25.24	9.59
9/14/2011 11:30		
9/14/2011 11:45	27.47	8.38
9/14/2011 12:00	30.42	8.49
9/14/2011 12:15	27.92	11.33
9/14/2011 12:30	26.63	7.04
9/14/2011 12:45	19.92	7.95
9/14/2011 13:00	19.9	7.05
9/14/2011 13:15	19.74	9.82
9/14/2011 13:30	34.9	7.85
9/14/2011 13:45	19.49	9.17
9/14/2011 14:00	19.52	8.33
9/14/2011 14:15		
9/14/2011 14:30		
9/14/2011 14:45	22.27	7.46
9/14/2011 15:00	22.11	9.19
9/14/2011 15:15	27.53	10.44
9/14/2011 15:30	21.79	10.59
9/14/2011 15:45	30.16	8.93
9/14/2011 16:00	26.78	10.92
9/14/2011 16:15	23.66	11.70
9/14/2011 16:30	26.97	9.27
9/14/2011 16:45	23.31	10.07
9/14/2011 17:00	27.08	9.07
9/14/2011 17:15	26.19	13.15
9/14/2011 17:30	30.25	10.47
9/14/2011 17:45	25.26	42.83
9/14/2011 18:00	38.56	21.51
9/14/2011 18:15	21.85	7.57
9/14/2011 18:30	21.41	9.01
9/14/2011 18:45	22.76	6.94
9/14/2011 19:00	23.16	8.50
9/14/2011 19:15	23.94	8.40
9/14/2011 19:30	28	10.50
9/14/2011 19:45	29.69	8.71
9/14/2011 20:00	26.58	11.11
9/14/2011 20:15	29.29	11.33
9/14/2011 20:30	31.42	10.46
9/14/2011 20:45	28.22	9.74
9/14/2011 21:00	41.31	11.13
9/14/2011 21:15	29.89	9.97
9/14/2011 21:30	26.84	8.91
9/14/2011 21:45	24.76	9.29
9/14/2011 22:00	27.88	8.87
9/14/2011 22:15	25.76	8.77
9/14/2011 22:30	26.26	8.14
9/14/2011 22:45	23.35	7.26

9/14/2011 23:00	22.16	6.84
9/14/2011 23:15	21.55	6.86
9/14/2011 23:30	21.64	7.41
9/14/2011 23:45	23.46	7.02
9/15/2011 0:00	21.28	8.25
9/15/2011 0:15	26.8	8.45
9/15/2011 0:30	26.01	8.47
9/15/2011 0:45	25.8	9.75
9/15/2011 1:00	30.13	8.88
9/15/2011 1:15	26.12	8.38
9/15/2011 1:30	23.51	8.12
9/15/2011 1:45	23.07	8.72
9/15/2011 2:00	24.56	8.71
9/15/2011 2:15	24.35	9.73
9/15/2011 2:30	28.89	10.46
9/15/2011 2:45	30.17	9.59
9/15/2011 3:00	26.75	9.31
9/15/2011 3:15	26.26	10.15
9/15/2011 3:30	28.02	11.28
9/15/2011 3:45	30.19	12.64
9/15/2011 4:00	32.66	13.07
9/15/2011 4:15	32.48	12.58
9/15/2011 4:30	31.09	13.05
9/15/2011 4:45	32.21	12.77
9/15/2011 5:00	30.51	12.51
9/15/2011 5:15	30.55	11.47
9/15/2011 5:30	29.59	7.52
9/15/2011 5:45	22.19	6.35
9/15/2011 6:00	21.25	5.51
9/15/2011 6:15	19.76	6.08
9/15/2011 6:30	20.69	5.71
9/15/2011 6:45	21.89	5.16
9/15/2011 7:00	20.42	8.45
9/15/2011 7:15	25.14	11.89
9/15/2011 7:30	30.04	13.00
9/15/2011 7:45	34.27	13.76
9/15/2011 8:00	36.46	14.91
9/15/2011 8:15	37.15	15.45
9/15/2011 8:30	38.53	14.11
9/15/2011 8:45	33.49	8.91
9/15/2011 9:00	27.77	11.45
9/15/2011 9:15	33.35	11.75
9/15/2011 9:30	34.32	10.31
9/15/2011 9:45	29.71	7.12
9/15/2011 10:00	23.47	5.11
9/15/2011 10:15	18.6	4.43
9/15/2011 10:30	18.35	4.65
9/15/2011 10:45	18.54	4.54
9/15/2011 11:00	17.3	5.41
9/15/2011 11:15	20.33	7.49
9/15/2011 11:30	23.88	8.21
9/15/2011 11:45	23.84	10.01
9/15/2011 12:00	27.61	10.15
9/15/2011 12:15	27.13	9.73
9/15/2011 12:30	27.4	9.35
9/15/2011 12:45	27.46	10.93
9/15/2011 13:00	29.04	11.43
9/15/2011 13:15	30.62	11.27
9/15/2011 13:30	29.34	11.83
9/15/2011 13:45	30.98	17.45
9/15/2011 14:00	36.27	13.98
9/15/2011 14:15	31.3	8.94
9/15/2011 14:30	24.91	10.28
9/15/2011 14:45	27.46	9.19
9/15/2011 15:00	24.95	8.59
9/15/2011 15:15	24.93	7.97
9/15/2011 15:30	22.91	7.23
9/15/2011 15:45	23.07	7.90
9/15/2011 16:00		
9/15/2011 16:15		
9/15/2011 16:30	20.39	3.50
9/15/2011 16:45	15.79	2.07
9/23/2011 9:15		
9/23/2011 9:30	29.28	87.33
9/23/2011 9:45	35.71	81.21
9/23/2011 10:00	33.99	100.43
9/23/2011 10:15	47.08	82.06
9/23/2011 10:30	31.62	55.76
9/23/2011 10:45	20.63	48.47
9/23/2011 11:00	18.05	46.37
9/23/2011 11:15	16.34	32.85
9/23/2011 11:30	11.52	28.17
9/23/2011 11:45	10.91	19.28
9/23/2011 12:00	6.1	14.13
9/23/2011 12:15	5.6	31.15
9/23/2011 12:30	11.53	13.11
9/23/2011 12:45	3.43	10.65
9/23/2011 13:00	3.61	9.45
9/23/2011 13:15	3.22	14.57
9/23/2011 13:30	4.4	24.15
9/23/2011 13:45	4.3	25.63
9/23/2011 14:00	14.68	68.63
9/23/2011 14:15	17.54	22.41
9/23/2011 14:30	7.33	29.03

9/23/2011 14:45	8.19	33.50
9/23/2011 15:00	7.95	31.08
9/23/2011 15:15	5.76	18.92
9/23/2011 15:30	5.21	16.89
9/23/2011 15:45	3.81	11.49
9/23/2011 16:00	2.49	34.02
9/23/2011 16:15	10.38	34.07
9/23/2011 16:30	9.37	36.73
9/23/2011 16:45	8.18	31.25
9/23/2011 17:00	6.79	24.58
9/23/2011 17:15	6.45	20.52
9/23/2011 17:30	5.46	18.47
9/23/2011 17:45	5.88	18.85
9/23/2011 18:00		
9/23/2011 18:15	3.26	11.60
9/23/2011 18:30	4.95	17.09
9/23/2011 18:45	4.62	13.28
9/23/2011 19:00	4.59	14.59
9/23/2011 19:15	5.08	16.60
9/23/2011 19:30	7.13	21.28
9/23/2011 19:45	6.57	19.95
9/23/2011 20:00	5.46	13.20
9/23/2011 20:15	3.78	14.35
9/23/2011 20:30	4.25	12.88
9/23/2011 20:45	3.6	11.89
9/23/2011 21:00	3.24	11.14
9/23/2011 21:15	4.25	13.77
9/23/2011 21:30	4.43	10.88
9/23/2011 21:45	3.8	9.25
9/23/2011 22:00	2.84	7.00
9/23/2011 22:15	3.24	4.84
9/23/2011 22:30	1.75	6.03
9/23/2011 22:45	2.69	8.39
9/23/2011 23:00	3.73	11.32
9/23/2011 23:15	4.8	12.72
9/23/2011 23:30	5.05	15.50
9/23/2011 23:45	6.36	21.35
9/24/2011 0:00	8.54	26.99
9/27/2011 0:00		43.69
9/27/2011 0:15	23.83	41.45
9/27/2011 0:30	23.06	40.69
9/27/2011 0:45	22.95	40.56
9/27/2011 1:00	22.87	40.45
9/27/2011 1:15	22.9	41.25
9/27/2011 1:30	22.93	41.83
9/27/2011 1:45	23.08	40.81
9/27/2011 2:00	22.17	41.04
9/27/2011 2:15	22.04	41.00
9/27/2011 2:30	21.6	43.94
9/27/2011 2:45	22.79	47.81
9/27/2011 3:00	24.99	58.29
9/27/2011 3:15	28.82	61.53
9/27/2011 3:30	30.31	60.74
9/27/2011 3:45	28.38	58.47
9/27/2011 4:00	27.63	56.35
9/27/2011 4:15	26.93	53.62
9/27/2011 4:30	25.77	51.75
9/27/2011 4:45	23.39	48.38
9/27/2011 5:00	23.31	46.07
9/27/2011 5:15	22.63	45.40
9/27/2011 5:30	22.44	46.45
9/27/2011 5:45	23.12	48.39
9/27/2011 6:00	23.86	45.75
9/27/2011 6:15	23.43	54.85
9/27/2011 6:30	27.35	72.13
9/27/2011 6:45	35.18	68.96
9/27/2011 7:00	38.26	62.94
9/27/2011 7:15	29.9	59.87
9/27/2011 7:30	28.55	64.82
9/27/2011 7:45	31.18	64.57
9/27/2011 8:00	32.57	84.03
9/27/2011 8:15	40.65	86.47
9/27/2011 8:30	41.71	88.72
9/27/2011 8:45	43.43	99.37
9/27/2011 9:00	48.1	98.63
9/27/2011 9:15	50.19	99.33
9/27/2011 9:30	49.09	95.55
9/27/2011 9:45	47.56	93.27
9/27/2011 10:00	46.95	89.03
9/27/2011 10:15	44.11	87.36
9/27/2011 10:30	42.49	75.49
9/27/2011 10:45	39.86	79.32
9/27/2011 11:00	43.49	87.81
9/27/2011 11:15	48.34	80.93
9/27/2011 11:30	42.51	74.56
9/27/2011 11:45	39.06	71.57
9/27/2011 12:00	37.35	69.93
9/27/2011 12:15	37.01	71.91
9/27/2011 12:30	38.02	73.12
9/27/2011 12:45	38.63	75.52
9/27/2011 13:00	39.74	75.77
9/27/2011 13:15	40.28	78.51
9/27/2011 13:30	39.36	60.49
9/27/2011 13:45	30.07	43.85

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9/27/2011 14:45	34.51	68.66
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9/27/2011 15:45	111.23	131.11
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9/27/2011 23:45	7.12	10.75
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9/29/2011 11:45	32.59	40.59
9/29/2011 12:00	19.81	33.54
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9/29/2011 12:30	18.17	38.08
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9/30/2011 16:15	24.1	135.07
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10/6/2011 13:30	1.77	5.99
10/6/2011 13:45	1.82	7.12
10/6/2011 14:00	2.8	7.73
10/6/2011 14:15	3.79	6.35

10/6/2011 14:30	2.51	7.17
10/6/2011 14:45	2.98	6.60
10/6/2011 15:00	2.47	
10/6/2011 15:15	0.51	5.09
10/6/2011 15:30	1.09	8.65
10/6/2011 15:45	2.91	8.79
10/6/2011 16:00	7.15	17.19
10/6/2011 16:15	5	13.11
10/6/2011 16:30	6.71	6.85
10/6/2011 16:45	0.94	4.05
10/6/2011 17:00	0.42	3.92
10/6/2011 17:15	0.2	7.05
10/6/2011 17:30	2.92	6.35
10/6/2011 17:45	3.1	7.36
10/6/2011 18:00	3.36	7.14
10/6/2011 18:15	3.8	8.02
10/6/2011 18:30	3.72	8.43
10/6/2011 18:45	3.32	15.62
10/6/2011 19:00	9.51	29.48
10/6/2011 19:15	15.17	16.65
10/6/2011 19:30	8.44	13.58
10/6/2011 19:45	6.8	15.39
10/6/2011 20:00	8.43	16.68
10/6/2011 20:15	8.63	24.57
10/6/2011 20:30	13.95	24.57
10/6/2011 20:45	14.33	17.82
10/6/2011 21:00	9.73	14.73
10/6/2011 21:15	7.05	11.61
10/6/2011 21:30	5.89	10.15
10/6/2011 21:45	5.24	10.72
10/6/2011 22:00	6.04	9.55
10/6/2011 22:15	5.28	10.51
10/6/2011 22:30	5.16	7.27
10/6/2011 22:45	3.66	6.39
10/6/2011 23:00	3.02	8.60
10/6/2011 23:15	4.52	10.12
10/6/2011 23:30	5.75	8.78
10/6/2011 23:45	4.88	6.84
10/7/2011 0:00	3.23	6.67
10/7/2011 0:15	4.11	6.01
10/7/2011 0:30	2.9	5.22
10/7/2011 0:45	2.86	5.61
10/7/2011 1:00	3.2	5.51
10/7/2011 1:15	3.24	7.77
10/7/2011 1:30	4.46	5.47
10/7/2011 1:45	3.48	5.57
10/7/2011 2:00	3.21	5.29
10/7/2011 2:15	3.31	5.89
10/7/2011 2:30	3.59	6.31
10/7/2011 2:45	4.22	6.62
10/7/2011 3:00	4.26	7.30
10/7/2011 3:15	4.66	7.04
10/7/2011 3:30	4.42	7.71
10/7/2011 3:45	4.54	6.75
10/7/2011 4:00	3.48	4.03
10/7/2011 4:15	2.5	4.65
10/7/2011 4:30	3	4.56
10/7/2011 4:45	2.49	4.22
10/7/2011 5:00	3.27	4.89
10/7/2011 5:15	3.54	5.21
10/7/2011 5:30	3.1	5.50
10/7/2011 5:45	3.67	6.41
10/7/2011 6:00	4.04	6.22
10/7/2011 6:15	3.44	7.11
10/7/2011 6:30	4.19	9.93
10/7/2011 6:45	5.21	9.32
10/7/2011 7:00	5.83	13.73
10/7/2011 7:15	6.37	9.53
10/7/2011 7:30	9.02	10.31
10/7/2011 7:45	6.73	10.29
10/7/2011 8:00	6.93	10.14
10/7/2011 8:15	6.73	10.28
10/7/2011 8:30	5.92	9.41
10/7/2011 8:45	8.53	11.17
10/7/2011 9:00	6.16	10.65
10/7/2011 9:15	7.52	9.61
10/7/2011 9:30	6.35	10.23
10/7/2011 9:45	5.97	8.68
10/7/2011 10:00	4.54	7.69
10/7/2011 10:15	4.23	10.86
10/7/2011 10:30	4.47	11.40
10/7/2011 10:45	4.81	9.43
10/7/2011 11:00	3.25	7.45
10/7/2011 11:15	3.05	6.23
10/7/2011 11:30	1.71	6.25
10/7/2011 11:45	2.04	8.21
10/7/2011 12:00	1.3	7.15
10/7/2011 12:15	0.67	7.09
10/7/2011 12:30	-0.03	6.38
10/7/2011 12:45	1.35	5.47
10/7/2011 13:00	0.44	5.37
10/7/2011 13:15	1.1	8.13
10/7/2011 13:30	2.27	10.73
10/7/2011 13:45	4.22	11.79

10/7/2011 14:00	4.6	9.64
10/7/2011 14:15		
10/7/2011 14:30	4.07	8.27
10/7/2011 14:45	2.74	5.51
10/7/2011 15:00	2.13	9.74
10/7/2011 15:15	3	6.28
10/7/2011 15:30	1.57	7.21
10/7/2011 15:45	1.07	8.07
10/7/2011 16:00	1.85	6.15
10/7/2011 16:15	1.51	32.83
10/7/2011 16:30	153.31	6.90
10/7/2011 16:45	0.55	10.95
10/7/2011 17:00	3.34	22.52
10/7/2011 17:15	18.63	31.18
10/7/2011 17:30	15.87	29.00
10/7/2011 17:45	20.74	53.67
10/7/2011 18:00	26.68	48.46
10/7/2011 18:15	33.28	36.79
10/7/2011 18:30	18.99	18.87
10/7/2011 18:45	10.82	29.01
10/7/2011 19:00	19.34	30.83
10/7/2011 19:15	14.6	35.05
10/7/2011 19:30	23.29	42.65
10/7/2011 19:45	24.71	18.48
10/7/2011 20:00	9.43	20.08
10/7/2011 20:15	9.6	15.32
10/7/2011 20:30	8.32	21.47
10/7/2011 20:45	11.52	16.96
10/7/2011 21:00		
10/7/2011 21:15	8.32	20.00
10/7/2011 21:30	10.03	14.03
10/7/2011 21:45	7.02	17.07
10/7/2011 22:00	10.6	14.01
10/7/2011 22:15	9.34	15.93
10/7/2011 22:30	8.29	12.76
10/7/2011 22:45	6.92	14.80
10/7/2011 23:00		
10/7/2011 23:15	7.33	15.93
10/7/2011 23:30	11.17	25.44
10/7/2011 23:45	17.01	17.28
10/8/2011 0:00	10.19	14.53

VOC Data		
	MAX	MAX
	AMS 6	Camp 73rd St
0:00	**0.0**	**0.6**
0:15	**0.0**	**0.6**
0:30	**0.0**	**0.3**
0:45	**0.0**	**0.4**
1:00	**0.0**	**0.8**
1:15	**0.0**	**0.2**
1:30	**0.0**	**0.1**
1:45	**0.0**	**0.3**
2:00	**0.0**	**0.7**
2:15	**0.0**	**0.9**
2:30	**0.0**	**0.9**
2:45	**0.0**	**0.5**
3:00	**0.0**	**1.5**
3:15	**0.0**	**0.5**
3:30	**0.0**	**0.7**
3:45	**0.0**	**0.9**
4:00	**0.0**	**0.9**
4:15	**0.0**	**0.7**
4:30	**0.0**	**0.7**
4:45	**0.0**	**0.5**
5:00	**0.0**	**0.6**
5:15	**0.0**	**0.4**
5:30	**0.0**	**0.3**
5:45	**0.0**	**0.7**
6:00	**0.0**	**0.7**
6:15	**0.0**	**0.3**
6:30	**0.1**	**0.7**
6:45	**0.2**	**0.8**
7:00	**0.3**	**1.1**
7:15	**0.3**	**1.3**
7:30	**0.3**	**0.4**
7:45	**0.3**	**0.8**
8:00	**0.3**	**0.6**
8:15	**0.3**	**1.5**
8:30	**0.4**	**1.3**
8:45	**0.3**	**2.2**
9:00	**0.3**	**2.7**
9:15	**0.3**	**2.6**
9:30	**0.3**	**1.2**
9:45	**0.3**	**0.7**
10:00	**0.3**	**0.7**
10:15	**0.3**	**1.3**
10:30	**0.3**	**0.0**
10:45	**0.3**	**0.2**
11:00	**0.3**	**2.4**
11:15	**0.3**	**0.3**
11:30	**0.2**	**1.5**
11:45	**0.2**	**0.5**
12:00	**0.2**	**0.2**
12:15	**0.2**	**0.5**
12:30	**0.2**	**0.9**
12:45	**0.8**	**1.0**
13:00	**0.6**	**0.4**
13:15	**0.2**	**0.7**
13:30	**0.1**	**1.2**
13:45	**0.2**	**0.2**

14:00	**0.2**	**8.7**
14:15	**0.2**	**8.5**
14:30	**0.2**	**8.5**
14:45	**0.2**	**8.0**
15:00	**0.2**	**8.5**
15:15	**0.2**	**8.3**
15:30	**0.2**	**9.2**
15:45	**0.2**	**8.8**
16:00	**0.1**	**9.1**
16:15	**0.1**	**8.8**
16:30	**0.1**	**9.4**
16:45	**0.1**	**9.9**
17:00	**0.1**	**9.7**
17:15	**0.1**	**9.5**
17:30	**0.2**	**9.1**
17:45	**0.2**	**10.7**
18:00	**0.2**	**10.1**
18:15	**0.2**	**10.5**
18:30	**0.1**	**9.2**
18:45	**0.2**	**9.2**
19:00	**0.2**	**10.2**
19:15	**0.1**	**9.9**
19:30	**0.1**	**9.4**
19:45	**0.2**	**9.4**
20:00	**0.2**	**9.8**
20:15	**0.2**	**9.8**
20:30	**0.2**	**8.8**
20:45	**0.2**	**9.2**
21:00	**0.2**	**9.3**
21:15	**0.2**	**9.6**
21:30	**0.2**	**10.1**
21:45	**0.2**	**9.1**
22:00	**0.2**	**8.9**
22:15	**0.0**	**9.0**
22:30	**0.0**	**9.4**
22:45	**0.0**	**9.1**
23:00	**0.0**	**8.9**
23:15	**0.0**	**8.3**
23:30	**0.0**	**10.0**
23:45	**0.0**	**9.9**

VOC Data for Correlation Analysis

Date/Time	AMS 6	73rd St
9/12/2011 0:00	0.0	0.6
9/12/2011 0:15	0.0	0.6
9/12/2011 0:30	0.0	0.3
9/12/2011 0:45	0.0	0.4
9/12/2011 1:00	0.0	0.8
9/12/2011 1:15	0.0	0.2
9/12/2011 1:30	0.0	0.1
9/12/2011 1:45	0.0	0.3
9/12/2011 2:00	0.0	0.7
9/12/2011 2:15	0.0	0.9
9/12/2011 2:30	0.0	0.9
9/12/2011 2:45	0.0	0.5
9/12/2011 3:00	0.0	1.5
9/12/2011 3:15	0.0	0.5
9/12/2011 3:30	0.0	0.7
9/12/2011 3:45	0.0	0.9
9/12/2011 4:00	0.0	0.9
9/12/2011 4:15	0.0	0.7
9/12/2011 4:30	0.0	0.7
9/12/2011 4:45	0.0	0.5
9/12/2011 5:00	0.0	0.6
9/12/2011 5:15	0.0	0.4
9/12/2011 5:30	0.0	0.3
9/12/2011 5:45	0.0	0.7
9/12/2011 6:00	0.0	0.7
9/12/2011 6:15	0.0	0.3
9/12/2011 6:30	0.0	0.7
9/12/2011 6:45	0.0	0.8
9/12/2011 7:00	0.0	1.1
9/12/2011 7:15	0.0	1.3
9/12/2011 7:30	0.0	0.4
9/12/2011 7:45	0.0	0.8
9/12/2011 8:00	0.0	0.6
9/12/2011 8:15	0.0	1.5
9/12/2011 8:30		
9/12/2011 8:45	0.0	1.6
9/12/2011 9:00	0.0	2.0
9/12/2011 9:15	0.0	1.5
9/12/2011 9:30	0.0	0.9
9/12/2011 9:45	0.0	0.7
9/12/2011 10:00	0.0	0.7
9/12/2011 10:15	0.0	1.3
9/12/2011 10:30		
9/12/2011 10:45		
9/12/2011 11:00	0.0	2.4
9/12/2011 11:15		
9/12/2011 11:30	0.0	1.5
9/12/2011 11:45		
9/12/2011 12:00	0.0	0.0
9/12/2011 12:15	0.0	0.3
9/12/2011 12:30	0.0	0.9
9/12/2011 12:45	0.0	1.0
9/12/2011 13:00	0.0	0.0
9/12/2011 13:15	0.0	0.0
9/12/2011 13:30	0.0	0.0
9/12/2011 13:45	0.0	0.0
9/12/2011 14:00	0.0	0.0
9/12/2011 14:15		
9/12/2011 14:30	0.0	0.0
9/12/2011 14:45	0.0	0.0
9/12/2011 15:00	0.0	0.0
9/12/2011 15:15	0.0	0.5
9/12/2011 15:30		
9/12/2011 15:45		
9/12/2011 16:00	0.0	0.9
9/12/2011 16:15	0.0	1.1
9/12/2011 16:30	0.1	1.3
9/12/2011 16:45	0.1	1.3
9/12/2011 17:00	0.1	0.9
9/12/2011 17:15	0.1	0.5
9/12/2011 17:30	0.1	0.7
9/12/2011 17:45	0.2	0.0
9/12/2011 18:00	0.2	0.1
9/12/2011 18:15	0.2	0.0
9/12/2011 18:30	0.1	0.1
9/12/2011 18:45	0.2	0.2
9/12/2011 19:00	0.1	0.2
9/12/2011 19:15	0.1	0.2
9/12/2011 19:30	0.1	0.2
9/12/2011 19:45	0.1	0.1
9/12/2011 20:00	0.2	0.1
9/12/2011 20:15	0.2	0.0
9/12/2011 20:30	0.2	0.3
9/12/2011 20:45	0.2	0.0
9/12/2011 21:00	0.2	0.0
9/12/2011 21:15	0.2	0.0
9/12/2011 21:30	0.2	0.0
9/12/2011 21:45	0.2	0.0
9/12/2011 22:00	0.2	0.0
9/14/2011 7:30	0.2	0.0
9/14/2011 7:45	0.2	0.0
9/14/2011 8:00	0.3	0.0

9/14/2011 8:15	0.2	0.0
9/14/2011 8:30		
9/14/2011 8:45	0.2	0.0
9/14/2011 9:00	0.2	0.0
9/14/2011 9:15	0.2	0.0
9/14/2011 9:30	0.2	0.0
9/14/2011 9:45	0.2	0.0
9/14/2011 10:00	0.2	0.0
9/14/2011 10:15	0.2	0.0
9/14/2011 10:30	0.2	0.0
9/14/2011 10:45	0.2	0.0
9/14/2011 11:00	0.2	0.0
9/14/2011 11:15	0.2	0.2
9/14/2011 11:30		
9/14/2011 11:45		
9/14/2011 12:00	0.1	0.0
9/14/2011 12:15	0.1	0.0
9/14/2011 12:30	0.1	0.0
9/14/2011 12:45	0.1	0.0
9/14/2011 13:00	0.0	0.0
9/14/2011 13:15	0.0	0.0
9/14/2011 13:30	0.0	0.2
9/14/2011 13:45	0.0	0.2
9/14/2011 14:00	0.0	0.0
9/14/2011 14:15		
9/14/2011 14:30		
9/14/2011 14:45	0.0	0.1
9/14/2011 15:00	0.0	0.1
9/14/2011 15:15	0.0	0.1
9/14/2011 15:30	0.0	0.0
9/14/2011 15:45	0.0	0.0
9/14/2011 16:00	0.0	0.0
9/14/2011 16:15	0.0	0.2
9/14/2011 16:30	0.0	0.0
9/14/2011 16:45	0.0	0.0
9/14/2011 17:00	0.0	0.1
9/14/2011 17:15	0.0	0.0
9/14/2011 17:30	0.0	0.0
9/14/2011 17:45	0.1	0.0
9/14/2011 18:00	0.1	0.0
9/14/2011 18:15	0.0	0.0
9/14/2011 18:30	0.0	0.0
9/14/2011 18:45	0.0	0.0
9/14/2011 19:00	0.0	0.0
9/14/2011 19:15	0.0	0.2
9/14/2011 19:30	0.0	0.7
9/14/2011 19:45	0.0	0.0
9/14/2011 20:00	0.0	0.2
9/14/2011 20:15	0.0	0.1
9/14/2011 20:30	0.0	0.0
9/14/2011 20:45	0.0	0.0
9/14/2011 21:00	0.0	0.0
9/14/2011 21:15	0.0	0.0
9/14/2011 21:30	0.0	0.0
9/14/2011 21:45	0.0	0.0
9/14/2011 22:00	0.0	0.1
9/15/2011 8:15		
9/15/2011 8:30	0.1	0.0
9/15/2011 8:45	0.2	0.0
9/15/2011 9:00	0.1	0.0
9/15/2011 9:15	0.1	0.0
9/15/2011 9:30	0.2	0.0
9/15/2011 9:45	0.1	0.0
9/15/2011 10:00	0.1	0.0
9/15/2011 10:15	0.1	0.0
9/15/2011 10:30	0.1	0.0
9/15/2011 10:45	0.2	0.0
9/15/2011 11:00	0.1	0.0
9/15/2011 11:15	0.1	0.0
9/15/2011 11:30	0.1	0.0
9/15/2011 11:45	0.1	0.0
9/15/2011 12:00	0.1	0.0
9/15/2011 12:15	0.1	0.0
9/15/2011 12:30	0.1	0.0
9/15/2011 12:45	0.1	0.0
9/15/2011 13:00	0.1	0.0
9/15/2011 13:15	0.1	0.0
9/15/2011 13:30	0.1	0.0
9/15/2011 13:45	0.2	0.0
9/15/2011 14:00	0.2	0.0
9/15/2011 14:15	0.2	0.0
9/15/2011 14:30	0.2	0.0
9/15/2011 14:45	0.2	0.0
9/15/2011 15:00	0.1	0.0
9/15/2011 15:15	0.2	0.0
9/15/2011 15:30	0.2	0.0
9/15/2011 15:45	0.2	0.0
9/15/2011 16:00		
9/15/2011 16:15		
9/15/2011 16:30	0.0	0.0
9/15/2011 16:45	0.0	0.0
9/15/2011 17:00	0.0	0.0
9/15/2011 17:15	0.0	0.0
9/15/2011 17:30	0.0	0.0

9/15/2011 17:45	0.0	0.0
9/15/2011 18:00	0.0	0.0
9/15/2011 18:15	0.0	0.0
9/15/2011 18:30	0.0	0.0
9/15/2011 18:45	0.0	0.0
9/15/2011 19:00	0.0	0.0
9/15/2011 19:15	0.1	0.0
9/15/2011 19:30	0.1	0.0
9/15/2011 19:45	0.2	0.0
9/15/2011 20:00	0.1	0.0
9/15/2011 20:15	0.0	0.0
9/15/2011 20:30	0.0	0.0
9/15/2011 20:45	0.0	0.0
9/15/2011 21:00	0.0	0.0
9/15/2011 21:15	0.0	0.0
9/15/2011 21:30		
9/15/2011 21:45		
9/15/2011 22:00		
9/16/2011 8:15		
9/16/2011 8:30	0.4	0.0
9/16/2011 8:45	0.1	0.0
9/16/2011 9:00	0.1	0.0
9/16/2011 9:15	0.1	0.0
9/16/2011 9:30	0.0	0.0
9/16/2011 9:45	0.1	0.0
9/16/2011 10:00	0.0	0.0
9/16/2011 10:15	0.1	0.0
9/16/2011 10:30	0.0	0.0
9/16/2011 10:45	0.0	0.0
9/16/2011 11:00		
9/16/2011 11:15		
9/16/2011 11:30		
9/16/2011 11:45	0.0	0.0
9/16/2011 12:00	0.0	0.0
9/16/2011 12:15	0.0	0.0
9/16/2011 12:30	0.0	0.1
9/16/2011 12:45	0.0	0.0
9/16/2011 13:00	0.0	0.0
9/16/2011 13:15	0.0	0.0
9/16/2011 13:30	0.0	0.0
9/16/2011 13:45	0.0	0.0
9/16/2011 14:00	0.0	0.0
9/16/2011 14:15		
9/16/2011 14:30		
9/16/2011 14:45	0.0	0.0
9/16/2011 15:00	0.0	0.0
9/16/2011 15:15	0.0	0.0
9/16/2011 15:30	0.0	0.0
9/16/2011 15:45	0.0	0.0
9/16/2011 16:00	0.0	0.0
9/16/2011 16:15	0.0	0.0
9/16/2011 16:30	0.0	0.0
9/16/2011 16:45	0.0	0.0
9/16/2011 17:00	0.0	0.0
9/16/2011 17:15	0.0	0.0
9/16/2011 17:30		
9/16/2011 17:45	0.0	0.0
9/16/2011 18:00	0.0	0.0
9/16/2011 18:15	0.0	0.0
9/16/2011 18:30	0.0	0.0
9/16/2011 18:45	0.0	0.0
9/16/2011 19:00	0.0	0.0
9/16/2011 19:15	0.0	0.0
9/16/2011 19:30	0.0	0.0
9/16/2011 19:45	0.0	0.0
9/16/2011 20:00	0.0	0.0
9/16/2011 20:15	0.0	0.0
9/16/2011 20:30	0.0	0.1
9/16/2011 20:45	0.1	0.0
9/16/2011 21:00	0.1	0.0
9/16/2011 21:15	0.0	0.0
9/16/2011 21:30	0.0	0.0
9/16/2011 21:45	0.0	0.0
9/16/2011 22:00	0.0	0.0
9/16/2011 22:15	0.0	0.0
9/16/2011 22:30	0.0	0.0
9/16/2011 22:45	0.0	0.0
9/16/2011 23:00	0.0	0.0
9/16/2011 23:15	0.0	0.0
9/16/2011 23:30	0.0	0.0
9/16/2011 23:45	0.0	0.0
9/19/2011 17:30	0.2	9.1
9/19/2011 17:45	0.1	10.7
9/19/2011 18:00	0.1	10.1
9/19/2011 18:15	0.1	10.5
9/19/2011 18:30	0.1	9.2
9/19/2011 18:45	0.1	9.2
9/19/2011 19:00	0.2	10.2
9/19/2011 19:15	0.1	9.9
9/19/2011 19:30	0.1	9.4
9/19/2011 19:45	0.1	9.4
9/19/2011 20:00	0.2	9.8
9/19/2011 20:15	0.1	9.3
9/19/2011 20:30	0.1	8.4

9/19/2011 20:45	0.1	8.9
9/19/2011 21:00	0.1	8.2
9/19/2011 21:15	0.2	7.9
9/19/2011 21:30	0.2	8.0
9/20/2011 7:30	0.1	0.1
9/20/2011 7:45	0.1	0.1
9/20/2011 8:00	0.1	0.1
9/20/2011 8:15	0.1	0.1
9/20/2011 8:30	0.1	1.3
9/20/2011 8:45	0.1	2.2
9/20/2011 9:00	0.1	2.7
9/20/2011 9:15	0.1	2.6
9/20/2011 9:30	0.1	1.2
9/20/2011 9:45	0.1	0.2
9/20/2011 10:00	0.1	0.4
9/20/2011 10:15	0.1	0.3
9/20/2011 10:30	0.1	0.0
9/20/2011 10:45	0.1	0.2
9/20/2011 11:00	0.1	0.0
9/20/2011 11:15	0.1	0.3
9/20/2011 11:30	0.1	0.0
9/20/2011 11:45	0.1	0.5
9/20/2011 12:00	0.1	0.2
9/20/2011 12:15	0.1	0.5
9/20/2011 12:30	0.1	0.7
9/20/2011 12:45	0.2	0.7
9/20/2011 13:00	0.1	0.4
9/20/2011 13:15	0.1	0.7
9/20/2011 13:30	0.1	1.2
9/20/2011 13:45		
9/20/2011 14:00		
9/20/2011 14:15		
9/20/2011 14:30	0.0	1.2
9/20/2011 14:45	0.0	1.7
9/20/2011 15:00	0.0	1.8
9/20/2011 15:15	0.0	1.9
9/20/2011 15:30	0.0	1.7
9/20/2011 15:45	0.0	1.3
9/20/2011 16:00	0.0	1.1
9/20/2011 16:15	0.0	1.8
9/20/2011 16:30	0.0	2.4
9/20/2011 16:45	0.0	1.9
9/20/2011 17:00	0.0	2.8
9/20/2011 17:15	0.0	2.2
9/20/2011 17:30	0.0	2.4
9/20/2011 17:45	0.0	4.0
9/20/2011 18:00	0.0	6.4
9/20/2011 18:15	0.0	6.9
9/20/2011 18:30	0.0	7.8
9/20/2011 18:45	0.0	7.7
9/20/2011 19:00	0.0	7.5
9/20/2011 19:15	0.0	7.3
9/20/2011 19:30	0.0	7.1
9/20/2011 19:45		
9/20/2011 20:00	0.0	6.6
9/20/2011 20:15	0.0	6.5
9/20/2011 20:30	0.0	6.6
9/20/2011 20:45	0.0	6.6
9/20/2011 21:00	0.0	8.7
9/20/2011 21:15	0.0	9.6
9/20/2011 21:30	0.0	10.1
9/20/2011 21:45	0.0	9.0
9/20/2011 22:00		
9/20/2011 22:15		
9/21/2011 6:30		
9/21/2011 6:45		
9/21/2011 7:00		
9/21/2011 7:15		
9/21/2011 7:30		
9/21/2011 7:45		
9/21/2011 8:00		
9/21/2011 8:15		
9/21/2011 8:30		
9/21/2011 8:45		
9/21/2011 9:00		
9/21/2011 9:15		
9/21/2011 9:30		
9/21/2011 9:45		
9/21/2011 10:00		
9/21/2011 10:15		
9/21/2011 10:30		
9/21/2011 10:45		
9/21/2011 11:00		
9/21/2011 11:15		
9/21/2011 11:30		
9/21/2011 11:45		
9/21/2011 12:00		
9/21/2011 12:15		
9/21/2011 12:30		
9/21/2011 12:45		
9/21/2011 13:00		
9/21/2011 13:15		
9/21/2011 13:30		
9/21/2011 13:45		

9/21/2011 14:00		
9/21/2011 14:15		
9/21/2011 14:30		
9/21/2011 14:45		
9/21/2011 15:00		
9/21/2011 15:15		
9/21/2011 15:30		
9/21/2011 15:45		
9/21/2011 16:00		
9/21/2011 16:15		
9/21/2011 16:30		
9/21/2011 16:45		
9/21/2011 17:00		
9/21/2011 17:15		
9/21/2011 17:30		
9/21/2011 17:45		
9/21/2011 18:00		
9/21/2011 18:15		
9/21/2011 18:30		
9/21/2011 18:45		
9/21/2011 19:00		
9/21/2011 19:15		
9/21/2011 19:30		
9/21/2011 19:45		
9/21/2011 20:00		
9/21/2011 20:15		
9/22/2011 16:30		
9/22/2011 16:45		
9/22/2011 17:00		
9/22/2011 17:15		
9/22/2011 17:30		
9/22/2011 17:45		
9/22/2011 18:00		
9/22/2011 18:15		
9/22/2011 18:30		
9/22/2011 18:45		
9/22/2011 19:00		
9/22/2011 19:15		
9/22/2011 19:30		
9/22/2011 19:45		
9/22/2011 20:00		
9/22/2011 20:15		
9/22/2011 20:30		
9/22/2011 20:45		
9/22/2011 21:00		
9/22/2011 21:15		
9/22/2011 21:30		
9/22/2011 21:45		
9/22/2011 22:00		
9/23/2011 7:45		
9/23/2011 8:00		
9/23/2011 8:15		
9/23/2011 8:30		
9/23/2011 8:45		
9/23/2011 9:00		
9/23/2011 9:15		
9/23/2011 9:30		
9/23/2011 9:45		
9/23/2011 10:00		
9/23/2011 10:15		
9/23/2011 10:30		
9/23/2011 10:45		
9/23/2011 11:00		
9/23/2011 11:15		
9/23/2011 11:30		
9/23/2011 11:45		
9/23/2011 12:00		
9/23/2011 12:15		
9/23/2011 12:30		
9/23/2011 12:45		
9/23/2011 13:00		
9/23/2011 13:15		
9/23/2011 13:30		
9/23/2011 13:45		
9/23/2011 14:00	0.0	8.7
9/23/2011 14:15	0.0	8.5
9/23/2011 14:30	0.0	8.5
9/23/2011 14:45	0.0	8.0
9/23/2011 15:00	0.0	8.5
9/23/2011 15:15	0.0	8.3
9/23/2011 15:30	0.0	9.2
9/23/2011 15:45	0.0	8.8
9/23/2011 16:00	0.0	9.1
9/23/2011 16:15	0.0	8.8
9/23/2011 16:30	0.0	9.4
9/23/2011 16:45	0.0	9.9
9/23/2011 17:00	0.0	9.7
9/23/2011 17:15	0.0	9.5
9/23/2011 17:30	0.0	8.9
9/23/2011 17:45	0.0	9.1
9/23/2011 18:00		
9/23/2011 18:15	0.0	9.2
9/23/2011 18:30	0.0	8.9
9/23/2011 18:45	0.0	8.7

9/23/2011 19:00	0.0	9.4
9/23/2011 19:15	0.0	9.2
9/23/2011 19:30	0.0	9.2
9/23/2011 19:45	0.0	8.8
9/23/2011 20:00	0.0	9.7
9/23/2011 20:15	0.0	9.8
9/23/2011 20:30	0.0	8.8
9/23/2011 20:45	0.0	9.2
9/23/2011 21:00	0.0	9.3
9/23/2011 21:15	0.0	9.1
9/23/2011 21:30	0.0	9.1
9/23/2011 21:45	0.0	9.1
9/23/2011 22:00	0.0	8.9
9/23/2011 22:15	0.0	9.0
9/23/2011 22:30	0.0	9.4
9/23/2011 22:45	0.0	9.1
9/23/2011 23:00	0.0	8.9
9/23/2011 23:15	0.0	8.3
9/23/2011 23:30	0.0	10.0
9/23/2011 23:45	0.0	9.9
9/27/2011 7:00	0.1	0.0
9/27/2011 7:15	0.2	0.0
9/27/2011 7:30	0.1	0.0
9/27/2011 7:45	0.1	0.0
9/27/2011 8:00	0.1	0.0
9/27/2011 8:15	0.1	0.0
9/27/2011 8:30	0.2	0.0
9/27/2011 8:45	0.2	0.0
9/27/2011 9:00	0.2	0.0
9/27/2011 9:15	0.2	0.0
9/27/2011 9:30	0.2	0.0
9/27/2011 9:45	0.2	0.0
9/27/2011 10:00	0.2	0.0
9/27/2011 10:15	0.2	0.0
9/27/2011 10:30	0.2	0.0
9/27/2011 10:45	0.1	0.0
9/27/2011 11:00	0.1	0.0
9/27/2011 11:15	0.1	0.0
9/27/2011 11:30	0.1	0.0
9/27/2011 11:45	0.1	0.0
9/27/2011 12:00	0.1	0.0
9/27/2011 12:15	0.1	0.0
9/27/2011 12:30	0.1	0.0
9/27/2011 12:45	0.8	0.0
9/27/2011 13:00	0.6	0.0
9/27/2011 13:15	0.2	0.0
9/27/2011 13:30	0.1	0.0
9/27/2011 13:45	0.1	0.0
9/27/2011 14:00	0.1	0.0
9/27/2011 14:15	0.1	0.0
9/27/2011 14:30	0.1	0.0
9/27/2011 14:45	0.1	0.0
9/27/2011 15:00	0.1	0.0
9/27/2011 15:15	0.1	0.0
9/27/2011 15:30	0.1	0.0
9/27/2011 15:45	0.1	0.0
9/27/2011 16:00	0.0	0.0
9/27/2011 16:15	0.0	0.0
9/27/2011 16:30	0.0	0.0
9/27/2011 16:45	0.0	0.0
9/27/2011 17:00	0.0	0.0
9/27/2011 17:15	0.0	0.0
9/27/2011 17:30	0.0	0.0
9/27/2011 17:45	0.0	0.0
9/27/2011 18:00	0.0	0.0
9/27/2011 18:15	0.0	0.0
9/27/2011 18:30	0.0	0.0
9/27/2011 18:45	0.0	0.0
9/27/2011 19:00	0.0	0.0
9/27/2011 19:15	0.0	0.0
9/27/2011 19:30	0.0	0.0
9/27/2011 19:45	0.0	0.0
9/27/2011 20:00	0.0	0.0
9/27/2011 20:15	0.0	0.0
9/27/2011 20:30	0.0	0.0
9/27/2011 20:45	0.0	0.0
9/27/2011 21:00	0.0	0.0
9/27/2011 21:15	0.0	0.0
9/27/2011 21:30	0.0	0.0
9/27/2011 21:45	0.0	0.0
9/27/2011 22:00	0.0	0.0
9/27/2011 22:15	0.0	0.0
9/27/2011 22:30	0.0	0.0
9/28/2011 9:00	0.0	0.0
9/28/2011 9:15	0.0	0.0
9/28/2011 9:30	0.0	0.0
9/28/2011 9:45	0.0	0.0
9/28/2011 10:00	0.0	0.0
9/28/2011 10:15	0.0	0.0
9/28/2011 10:30	0.0	0.0
9/28/2011 10:45	0.0	0.0
9/28/2011 11:00	0.0	0.0
9/28/2011 11:15	0.0	0.0
9/28/2011 11:30	0.0	0.0

9/28/2011 11:45	0.0	0.0
9/28/2011 12:00	0.0	0.0
9/28/2011 12:15	0.0	0.0
9/28/2011 12:30	0.0	0.0
9/28/2011 12:45	0.0	0.0
9/28/2011 13:00	0.0	0.0
9/28/2011 13:15	0.0	0.0
9/28/2011 13:30	0.0	0.0
9/28/2011 13:45	0.0	0.0
9/28/2011 14:00	0.0	0.0
9/28/2011 14:15	0.0	0.0
9/28/2011 14:30	0.0	0.0
9/28/2011 14:45	0.0	0.0
9/28/2011 15:00	0.0	0.0
9/28/2011 15:15	0.0	0.0
9/28/2011 15:30		
9/28/2011 15:45	0.0	0.0
9/28/2011 16:00	0.0	0.0
9/28/2011 16:15	0.0	0.0
9/28/2011 16:30	0.0	0.0
9/28/2011 16:45	0.0	0.0
9/28/2011 17:00	0.0	0.0
9/28/2011 17:15	0.0	0.0
9/28/2011 17:30	0.0	0.0
9/28/2011 17:45	0.0	0.0
9/28/2011 18:00	0.0	0.0
9/28/2011 18:15	0.0	0.0
9/28/2011 18:30	0.0	0.0
9/28/2011 18:45	0.0	0.0
9/28/2011 19:00	0.0	0.0
9/28/2011 19:15	0.0	0.0
9/28/2011 19:30	0.0	0.0
9/28/2011 19:45	0.0	0.0
9/28/2011 20:00	0.0	0.0
9/28/2011 20:15	0.0	0.0
9/28/2011 20:30	0.0	0.0
9/28/2011 20:45	0.0	0.0
9/28/2011 21:00	0.0	0.0
9/28/2011 21:15	0.0	0.0
9/28/2011 21:30	0.0	0.0
9/28/2011 21:45	0.0	0.0
9/28/2011 22:00	0.0	
9/29/2011 7:45		
9/29/2011 8:00		
9/29/2011 8:15		
9/29/2011 8:30		
9/29/2011 8:45		
9/29/2011 9:00		
9/29/2011 9:15		
9/29/2011 9:30		
9/29/2011 9:45		
9/29/2011 10:00		
9/29/2011 10:15	0.0	0.0
9/29/2011 10:30	0.0	0.0
9/29/2011 10:45	0.1	0.0
9/29/2011 11:00	0.1	0.0
9/29/2011 11:15	0.1	0.0
9/29/2011 11:30	0.1	0.0
9/29/2011 11:45	0.1	0.0
9/29/2011 12:00	0.1	0.0
9/29/2011 12:15	0.1	0.0
9/29/2011 12:30	0.0	0.0
9/29/2011 12:45	0.0	0.0
9/29/2011 13:00	0.0	0.0
9/29/2011 13:15	0.0	0.0
9/29/2011 13:30	0.0	0.0
9/29/2011 13:45	0.1	0.0
9/29/2011 14:00	0.0	0.0
9/29/2011 14:15	0.1	0.0
9/29/2011 14:30	0.1	0.0
9/29/2011 14:45	0.0	0.0
9/29/2011 15:00	0.1	0.0
9/29/2011 15:15	0.0	0.0
9/29/2011 15:30	0.1	0.0
9/29/2011 15:45	0.0	0.0
9/29/2011 16:00	0.0	0.0
9/29/2011 16:15	0.0	0.0
9/29/2011 16:30	0.0	0.0
9/29/2011 16:45	0.1	0.0
9/29/2011 17:00	0.1	0.0
9/29/2011 17:15	0.1	0.0
9/29/2011 17:30	0.1	0.0
9/29/2011 17:45	0.1	0.0
9/29/2011 18:00	0.1	0.0
9/29/2011 18:15	0.1	0.0
9/29/2011 18:30	0.1	0.0
9/29/2011 18:45	0.1	0.0
9/29/2011 19:00	0.1	0.0
9/29/2011 19:15	0.1	0.0
9/29/2011 19:30	0.1	0.0
9/29/2011 19:45	0.2	0.0
9/29/2011 20:00	0.1	0.0
9/29/2011 20:15		
9/29/2011 20:30	0.1	0.0

9/29/2011 20:45	0.1	0.0
9/29/2011 21:00	0.1	0.0
9/29/2011 21:15	0.2	0.0
9/29/2011 21:30	0.1	0.0
9/29/2011 21:45	0.1	0.0
9/30/2011 6:30	0.1	0.0
9/30/2011 6:45	0.2	0.0
9/30/2011 7:00	0.1	0.0
9/30/2011 7:15	0.1	0.0
9/30/2011 7:30	0.1	0.0
9/30/2011 7:45	0.1	0.0
9/30/2011 8:00	0.1	0.0
9/30/2011 8:15	0.2	0.0
9/30/2011 8:30	0.2	0.0
9/30/2011 8:45	0.2	0.0
9/30/2011 9:00	0.2	0.0
9/30/2011 9:15	0.2	0.0
9/30/2011 9:30	0.1	0.0
9/30/2011 9:45	0.2	0.0
9/30/2011 10:00	0.1	0.0
9/30/2011 10:15	0.1	0.0
9/30/2011 10:30	0.1	0.0
9/30/2011 10:45	0.1	0.0
9/30/2011 11:00	0.1	0.0
9/30/2011 11:15		
9/30/2011 11:30	0.1	0.0
9/30/2011 11:45	0.1	0.0
9/30/2011 12:00	0.1	0.0
9/30/2011 12:15	0.1	0.0
9/30/2011 12:30	0.1	0.0
9/30/2011 12:45	0.1	0.0
9/30/2011 13:00	0.1	0.0
9/30/2011 13:15	0.1	0.0
9/30/2011 13:30	0.1	0.0
9/30/2011 13:45	0.1	0.0
9/30/2011 14:00	0.1	0.0
9/30/2011 14:15	0.1	0.0
9/30/2011 14:30	0.0	0.0
9/30/2011 14:45	0.0	0.0
9/30/2011 15:00	0.0	0.0
9/30/2011 15:15		
9/30/2011 15:30		
9/30/2011 15:45	0.1	0.0
9/30/2011 16:00	0.1	0.0
9/30/2011 16:15	0.1	0.0
10/3/2011 7:30	0.3	0.0
10/3/2011 7:45	0.3	0.0
10/3/2011 8:00	0.3	0.0
10/3/2011 8:15	0.3	0.0
10/3/2011 8:30	0.3	0.0
10/3/2011 8:45	0.3	0.0
10/3/2011 9:00	0.3	0.0
10/3/2011 9:15	0.3	0.0
10/3/2011 9:30	0.3	0.0
10/3/2011 9:45	0.3	0.0
10/3/2011 10:00	0.3	0.0
10/3/2011 10:15	0.3	0.0
10/3/2011 10:30	0.3	0.0
10/3/2011 10:45	0.3	0.0
10/3/2011 11:00	0.3	0.0
10/3/2011 11:15	0.3	0.0
10/3/2011 11:30	0.2	0.0
10/3/2011 11:45	0.2	0.0
10/3/2011 12:00	0.2	0.0
10/3/2011 12:15	0.2	0.0
10/3/2011 12:30	0.2	0.0
10/3/2011 12:45	0.2	0.0
10/3/2011 13:00	0.2	0.0
10/3/2011 13:15	0.1	0.0
10/3/2011 13:30		
10/3/2011 13:45	0.2	0.0
10/3/2011 14:00	0.1	0.0
10/3/2011 14:15	0.2	0.0
10/3/2011 14:30	0.1	0.0
10/3/2011 14:45	0.1	0.0
10/3/2011 15:00	0.2	0.0
10/3/2011 15:15	0.2	0.0
10/3/2011 15:30	0.2	0.0
10/3/2011 15:45	0.2	0.0
10/3/2011 16:00		
10/3/2011 16:15	0.0	0.0
10/3/2011 16:30	0.0	0.0
10/3/2011 16:45	0.0	0.0
10/3/2011 17:00	0.0	0.0
10/3/2011 17:15	0.0	0.0
10/3/2011 17:30	0.0	0.0
10/3/2011 17:45	0.0	0.0
10/3/2011 18:00	0.0	0.0
10/3/2011 18:15	0.0	0.0
10/3/2011 18:30	0.0	0.0
10/3/2011 18:45	0.0	0.0
10/3/2011 19:00	0.0	0.0
10/3/2011 19:15	0.0	0.0
10/3/2011 19:30	0.0	0.0

10/3/2011 19:45	0.0	0.0
10/3/2011 20:00	0.0	0.0
10/3/2011 20:15	0.1	0.0
10/3/2011 20:30	0.0	0.0
10/3/2011 20:45	0.1	0.0
10/3/2011 21:00	0.1	0.0
10/3/2011 21:15	0.0	0.0
10/3/2011 21:30	0.0	0.0
10/4/2011 5:30		
10/4/2011 5:45	0.0	0.0
10/4/2011 6:00	0.0	0.0
10/4/2011 6:15	0.0	0.0
10/4/2011 6:30	0.0	0.0
10/4/2011 6:45	0.0	0.0
10/4/2011 7:00	0.0	0.0
10/4/2011 7:15	0.0	0.0
10/4/2011 7:30	0.0	0.0
10/4/2011 7:45	0.0	0.0
10/4/2011 8:00	0.0	0.0
10/4/2011 8:15	0.0	0.0
10/4/2011 8:30	0.0	0.0
10/4/2011 8:45	0.0	0.0
10/4/2011 9:00	0.0	0.0
10/4/2011 9:15	0.0	0.0
10/4/2011 9:30	0.0	0.0
10/4/2011 9:45	0.0	0.0
10/4/2011 10:00	0.0	0.0
10/4/2011 10:15	0.0	0.0
10/4/2011 10:30	0.0	0.0
10/4/2011 10:45	0.0	0.0
10/4/2011 11:00	0.0	0.0
10/4/2011 11:15	0.0	0.0
10/4/2011 11:30	0.0	0.0
10/4/2011 11:45	0.0	0.0
10/4/2011 12:00	0.1	0.0
10/4/2011 12:15	0.1	0.0
10/4/2011 12:30	0.1	0.0
10/4/2011 12:45	0.1	0.0
10/4/2011 13:00	0.1	0.0
10/4/2011 13:15	0.1	0.0
10/4/2011 13:30	0.1	0.0
10/4/2011 13:45	0.2	0.0
10/4/2011 14:00	0.2	0.0
10/4/2011 14:15	0.0	0.0
10/4/2011 14:30	0.0	0.0
10/4/2011 14:45	0.0	0.0
10/4/2011 15:00	0.0	0.0
10/4/2011 15:15	0.0	0.0
10/4/2011 15:30	0.0	0.0
10/4/2011 15:45	0.0	0.0
10/4/2011 16:00		
10/4/2011 16:15	0.0	0.0
10/4/2011 16:30	0.0	0.0
10/4/2011 16:45	0.0	0.0
10/4/2011 17:00	0.0	0.0
10/4/2011 17:15	0.0	0.0
10/4/2011 17:30	0.0	0.0
10/4/2011 17:45	0.0	0.0
10/4/2011 18:00	0.0	0.0
10/4/2011 18:15	0.0	0.0
10/4/2011 18:30	0.0	0.0
10/4/2011 18:45	0.0	0.0
10/4/2011 19:00	0.0	0.0
10/4/2011 19:15	0.0	0.0
10/4/2011 19:30	0.0	0.0
10/4/2011 19:45	0.0	0.0
10/4/2011 20:00	0.0	0.0
10/4/2011 20:15	0.0	0.0
10/4/2011 20:30	0.0	0.0
10/4/2011 20:45	0.0	0.0
10/4/2011 21:00	0.0	0.0
10/4/2011 21:15	0.0	0.0
10/4/2011 21:30	0.0	0.0
10/4/2011 21:45	0.0	0.0
10/4/2011 22:00	0.0	0.0
10/4/2011 22:15	0.0	0.0
10/4/2011 22:30	0.0	0.0
10/5/2011 9:45	0.0	0.0
10/5/2011 10:00	0.0	0.0
10/5/2011 10:15	0.0	0.0
10/5/2011 10:30	0.0	0.0
10/5/2011 10:45	0.0	0.0
10/5/2011 11:00	0.0	0.0
10/5/2011 11:15	0.0	0.0
10/5/2011 11:30	0.0	0.0
10/5/2011 11:45	0.0	0.0
10/5/2011 12:00	0.0	0.0
10/5/2011 12:15	0.0	0.0
10/5/2011 12:30	0.0	0.0
10/5/2011 12:45	0.0	0.0
10/5/2011 13:00	0.0	0.0
10/5/2011 13:15	0.0	0.0
10/5/2011 13:30	0.0	0.0
10/5/2011 13:45	0.0	0.0

10/5/2011 14:00	0.0	0.0
10/5/2011 14:15	0.0	0.0
10/5/2011 14:30	0.0	0.0
10/5/2011 14:45	0.0	0.0
10/5/2011 15:30	0.0	0.0
10/5/2011 15:45	0.0	0.0
10/5/2011 16:00	0.0	0.0
10/5/2011 16:15	0.0	0.0
10/5/2011 16:30	0.0	0.0
10/5/2011 16:45	0.0	0.0
10/5/2011 17:00	0.0	0.0
10/5/2011 17:15	0.0	0.0
10/5/2011 17:30	0.1	0.0
10/5/2011 17:45	0.1	0.0
10/5/2011 18:00	0.0	0.0
10/5/2011 18:15	0.0	0.0
10/5/2011 18:30	0.0	0.0
10/5/2011 18:45	0.0	0.0
10/5/2011 19:00	0.0	0.0
10/5/2011 19:15	0.0	0.0
10/5/2011 19:30	0.0	0.0
10/5/2011 19:45	0.0	0.0
10/5/2011 20:00	0.0	0.0
10/5/2011 20:15	0.0	0.0
10/5/2011 20:30	0.0	0.0
10/5/2011 20:45	0.0	0.0
10/5/2011 21:00	0.0	0.0
10/5/2011 21:15	0.0	0.0
10/5/2011 21:30	0.0	0.0
10/6/2011 7:00	0.3	0.0
10/6/2011 7:15	0.3	0.0
10/6/2011 7:30	0.3	0.0
10/6/2011 7:45	0.3	0.0
10/6/2011 8:00	0.3	0.0
10/6/2011 8:15	0.3	0.0
10/6/2011 8:30	0.3	0.0
10/6/2011 8:45	0.3	0.0
10/6/2011 9:00	0.3	0.0
10/6/2011 9:15	0.3	0.0
10/6/2011 9:30	0.3	0.0
10/6/2011 9:45	0.3	0.0
10/6/2011 10:00	0.3	0.0
10/6/2011 10:15	0.3	0.0
10/6/2011 10:30	0.3	0.0
10/6/2011 10:45	0.3	0.0
10/6/2011 11:00	0.2	0.0
10/6/2011 11:15	0.2	0.0
10/6/2011 11:30	0.1	0.0
10/6/2011 11:45	0.1	0.0
10/6/2011 12:00	0.1	0.0
10/6/2011 12:15		
10/6/2011 12:30	0.1	0.0
10/6/2011 12:45	0.1	0.0
10/6/2011 13:00	0.1	0.0
10/6/2011 13:15	0.1	0.0
10/6/2011 13:30	0.1	0.0
10/6/2011 13:45	0.1	0.0
10/6/2011 14:00	0.1	0.0
10/6/2011 14:15	0.1	0.0
10/6/2011 14:30	0.1	0.0
10/6/2011 14:45		
10/6/2011 15:00		
10/6/2011 15:15	0.0	0.0
10/6/2011 15:30	0.0	0.0
10/6/2011 15:45	0.0	0.0
10/6/2011 16:00	0.1	0.0
10/6/2011 16:15	0.0	0.0
10/6/2011 16:30	0.0	0.0
10/6/2011 16:45	0.0	0.0
10/6/2011 17:00	0.0	0.0
10/6/2011 17:15	0.0	0.0
10/6/2011 17:30	0.0	0.0
10/6/2011 17:45	0.0	0.0
10/6/2011 18:00	0.0	0.0
10/6/2011 18:15	0.0	0.0
10/6/2011 18:30	0.0	0.0
10/6/2011 18:45	0.0	0.0
10/6/2011 19:00	0.0	0.0
10/6/2011 19:15	0.0	0.0
10/6/2011 19:30	0.0	0.0
10/6/2011 19:45	0.0	0.0
10/6/2011 20:00	0.1	0.0
10/6/2011 20:15	0.1	0.0
10/6/2011 20:30	0.1	0.0
10/6/2011 20:45	0.1	0.0
10/6/2011 21:00	0.1	0.0
10/6/2011 21:15	0.1	0.0
10/6/2011 21:30		
10/7/2011 7:45		
10/7/2011 8:00		

Attachment I

Odor Data Analysis – WMW Test Output

Summary Statistics for Raw Full Data Sets - C4B Monitoring Stations - Ammonia

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
1B.NH3	52	0	3.363	0.813	0.466	0.964	0.982	0.691	1.341	0.941	1.208
1B.NH3 BKD	783	0	3.733	0.964	0.558	1.139	1.067	0.828	0.97	-0.128	1.107
2B.NH3	47	0	0.49	0.033	0	0.00925	0.0962	0	3.619	13.65	2.919
2B.NH3 BKD	731	0	0.387	0.0155	0	0.00284	0.0533	0	3.937	16.36	3.448
3B.NH3	63	0	0.963	0.299	0.00167	0.117	0.342	0.00247	0.492	-1.448	1.141
3B.NH3 BKD	738	0	1.083	0.318	0.344	0.109	0.33	0.509	0.386	-1.284	1.039
4B.NH3	60	0	0.356	0.0511	0	0.00908	0.0953	0	2.082	3.579	1.866
4B.NH3 BKD	689	0	0.432	0.0452	0	0.00821	0.0906	0	2.105	3.67	2.003
5B.NH3	55	0	0.429	0.075	0	0.0128	0.113	0	1.338	0.673	1.508
5B.NH3 BKD	738	0	0.45	0.0742	0	0.0106	0.103	0	1.155	-0.00731	1.389
6B.NH3	44	0	0.513	0.0881	0	0.0304	0.174	0	1.691	1.159	1.979
6B.NH3 BKD	556	0	0.747	0.0769	0	0.0298	0.173	0	1.947	2.12	2.246

Percentiles for Raw Full Data Sets

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
1B.NH3	52	0	0	0	0	0.466	1.176	1.383	2.626	3.08	3.299
1B.NH3 BKD	783	0	0	0	0	0.558	1.624	1.838	2.679	3.291	3.588
2B.NH3	47	0	0	0	0	0	0	0.00667	0.105	0.177	0.436
2B.NH3 BKD	731	0	0	0	0	0	0	0	0.0175	0.168	0.231
3B.NH3	63	0	0	0	0	0.00167	0.601	0.723	0.772	0.831	0.942
3B.NH3 BKD	738	0	0	0	0	0.344	0.567	0.63	0.787	0.875	1.003
4B.NH3	60	0	0	0	0	0	0.0721	0.116	0.147	0.318	0.345
4B.NH3 BKD	689	0	0	0	0	0	0.0288	0.1	0.188	0.258	0.372
5B.NH3	55	0	0	0	0	0	0.153	0.2	0.256	0.282	0.373
5B.NH3 BKD	738	0	0	0	0	0	0.13	0.176	0.258	0.293	0.325
6B.NH3	44	0	0	0	0	0	0.021	0.136	0.448	0.49	0.505
6B.NH3 BKD	556	0	0	0	0	0	0	0	0.448	0.497	0.567

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C4B.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	1B NH3 Blast		2B NH3 Blast	
Background Data:	1B NH3 Non-Blast		2B NH3 Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	52	783	47	731
Number of Distinct Observations	19	315	1	1
Minimum	0	0	0	0
Maximum	3.363	3.733	0	0
Mean	0.658	0.837	0	0
Median	0	0	0	0
SD	1.046	1.135	0	0
SE of Mean	0.145	0.0406	0	0
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	19966		18307	
WMW Test U-Stat	-1.051		-0.0003348	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.853		0.5	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C4B.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	3B NH3 Blast		4B NH3 Blast	
Background Data:	3B NH3 Non-Blast		4B NH3 Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	63	738	60	689
Number of Distinct Observations	1	10	1	1
Minimum	0	0	0	0
Maximum	0	1.083	0	0
Mean	0	0.0126	0	0
Median	0	0	0	0
SD	0	0.114	0	0
SE of Mean	0	0.00418	0	0
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	24980		22500	
WMW Test U-Stat	-0.161		-0.0003111	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.564		0.5	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C4B.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	5B NH3 Blast		6B NH3 Blast	
Background Data:	5B NH3 Non-Blast		6B NH3 Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	55	738	44	556
Number of Distinct Observations	1	1	1	1
Minimum	0	0	0	0
Maximum	0	0	0	0
Mean	0	0	0	0
Median	0	0	0	0
SD	0	0	0	0
SE of Mean	0	0	0	0
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	21835		13222	
WMW Test U-Stat	-0.0003051		-0.0004517	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.5		0.5	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Summary Statistics for Raw Full Data Sets - C5A Monitoring Stations - Ammonia

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
7B.NH3	13	0	0.492	0.196	0.085	0.0453	0.213	0.126	0.362	-1.925	1.087
7B.NH3 BKD	491	0	0.579	0.0242	0	0.00906	0.0952	0	4.298	17.84	3.934
8B.NH3	22	0	0.131	0.00911	0	0.00086367	0.0294	0	3.852	15.5	3.226
8B.NH3 BKD	717	0	0.473	0.0216	0	0.00354	0.0595	0	4.472	24.55	2.753
9B.NH3	21	0	0.0867	0.00413	0	0.00035767	0.0189	0	4.583	21	4.583
9B.NH3 BKD	622	0	3.558	0.239	0	0.465	0.682	0	3.725	13.55	2.857
10B.NH3	16	0	0.38	0.146	0.0975	0.018	0.134	0.145	0.342	-1.437	0.917
10B.NH3 BKD	533	0	0.602	0.145	0	0.0378	0.194	0	1.021	-0.41	1.341

Percentiles for Raw Full Data Sets

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
7B.NH3	13	0	0	0	0	0.085	0.427	0.447	0.467	0.478	0.489
7B.NH3 BKD	491	0	0	0	0	0	0	0	0	0.203	0.512
8B.NH3	22	0	0	0	0	0	0	0	0.0137	0.0491	0.114
8B.NH3 BKD	717	0	0	0	0	0	0	0.013	0.0933	0.1	0.357
9B.NH3	21	0	0	0	0	0	0	0	0	0	0.0693
9B.NH3 BKD	622	0	0	0	0	0	0.148	0.219	0.473	1.633	3.477
10B.NH3	16	0	0	0	0.0025	0.0975	0.293	0.293	0.302	0.323	0.369
10B.NH3 BKD	533	0	0	0	0	0	0.242	0.317	0.5	0.528	0.593

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C5A.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	7B NH3 Blast		8B NH3 Blast	
Background Data:	7B NH3 Non-Blast		8B NH3 Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	13	491	22	717
Number of Distinct Observations	1	1	1	1
Minimum	0	0	0	0
Maximum	0	0	0	0
Mean	0	0	0	0
Median	0	0	0	0
SD	0	0	0	0
SE of Mean	0	0	0	0
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	3283		8140	
WMW Test U-Stat	-0.0009647		-0.000507	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.5		0.5	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C5A.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	9B NH3 Blast		10B NH3 Blast	
Background Data:	9B NH3 Non-Blast		10B NH3 Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	21	622	16	533
Number of Distinct Observations	1	46	1	1
Minimum	0	0	0	0
Maximum	0	3.558	0	0
Mean	0	0.179	0	0
Median	0	0	0	0
SD	0	0.683	0	0
SE of Mean	0	0.0274	0	0
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	6290		4400	
WMW Test U-Stat	-0.565		-0.0007998	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.714		0.5	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Summary Statistics for Raw Full Data Sets - C4B Monitoring Stations - Nitrogen Oxide

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
1B.NO	45	0	0	0	0	0	0	0	N/A	N/A	N/A
1B.NO BKD	592	0	1.052	0.00178	0	0.00187	0.0432	0	24.33	592	24.33
2B.NO	35	0	0	0	0	0	0	0	N/A	N/A	N/A
2B.NO BKD	557	0	0	0	0	0	0	0	N/A	N/A	N/A
3B.NO	45	0	1.09	0.0471	0	0.0488	0.221	0	4.581	19.89	4.691
3B.NO BKD	536	0	0	0	0	0	0	0	N/A	N/A	N/A
4B.NO	43	0	1.43	0.115	0	0.133	0.365	0	2.98	7.403	3.182
4B.NO BKD	549	0	0	0	0	0	0	0	N/A	N/A	N/A
5B.NO	41	0	0	0	0	0	0	0	N/A	N/A	N/A
5B.NO BKD	561	0	0	0	0	0	0	0	N/A	N/A	N/A
6B.NO	41	0	1.12	0.0273	0	0.0306	0.175	0	6.403	41	6.403
6B.NO BKD	490	0	1.2	0.00471	0	0.00544	0.0738	0	15.64	244	15.65

Percentiles for Raw Full Data Sets

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
1B.NO	45	0	0	0	0	0	0	0	0	0	0
1B.NO BKD	592	0	0	0	0	0	0	0	0	0	0
2B.NO	35	0	0	0	0	0	0	0	0	0	0
2B.NO BKD	557	0	0	0	0	0	0	0	0	0	0
3B.NO	45	0	0	0	0	0	0	0	0	0	1.064
3B.NO BKD	536	0	0	0	0	0	0	0	0	0	0
4B.NO	43	0	0	0	0	0	0	0	0	1.103	1.375
4B.NO BKD	549	0	0	0	0	0	0	0	0	0	0
5B.NO	41	0	0	0	0	0	0	0	0	0	0
5B.NO BKD	561	0	0	0	0	0	0	0	0	0	0
6B.NO	41	0	0	0	0	0	0	0	0	0	0.672
6B.NO BKD	490	0	0	0	0	0	0	0	0	0	0

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C4B.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	1B NO Blast		2B NO Blast	
Background Data:	1B NO Non-Blast		2B NO Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	45	592	35	557
Number of Distinct Observations	1	2	1	1
Minimum	0	0	0	0
Maximum	0	1.052	0	0
Mean	0	0.00178	0	0
Median	0	0	0	0
SD	0	0.0432	0	0
SE of Mean	0	0.00178	0	0
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	14333		10378	
WMW Test U-Stat	-0.0193		-0.0005094	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.508		0.5	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C4B.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	3B NO Blast		4B NO Blast	
Background Data:	3B NO Non-Blast		4B NO Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	45	536	43	549
Number of Distinct Observations	3	1	5	1
Minimum	0	0	0	0
Maximum	1.09	0	1.43	0
Mean	0.0471	0	0.115	0
Median	0	0	0	0
SD	0.221	0	0.365	0
SE of Mean	0.0329	0	0.0557	0
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	13631		13848	
WMW Test U-Stat	0.495		1.016	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.31		0.155	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C4B.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	5B NO Blast		6B NO Blast	
Background Data:	5B NO Non-Blast		6B NO Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	41	561	41	490
Number of Distinct Observations	1	1	2	3
Minimum	0	0	0	0
Maximum	0	0	1.12	1.2
Mean	0	0	0.0273	0.00471
Median	0	0	0	0
SD	0	0	0.175	0.0738
SE of Mean	0	0	0.0273	0.00333
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	12362		11110	
WMW Test U-Stat	-0.0004651		0.216	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.5		0.415	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Summary Statistics for Raw Full Data Sets - C5A Monitoring Stations - Nitrogen Oxide

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
7B.NO	16	0	0	0	0	0	0	0	N/A	N/A	N/A
7B.NO BKD	454	0	2.91	0.18	0	0.258	0.508	0	2.987	8.965	2.82
8B.NO	13	0	0	0	0	0	0	0	N/A	N/A	N/A
8B.NO BKD	549	0	0	0	0	0	0	0	N/A	N/A	N/A
9B.NO	20	0	0	0	0	0	0	0	N/A	N/A	N/A
9B.NO BKD	524	0	1.757	0.0604	0	0.0688	0.262	0	4.24	16.72	4.342
10B.NO	19	0	0	0	0	0	0	0	N/A	N/A	N/A
10B.NO BKD	532	0	1.67	0.0176	0	0.0236	0.154	0	8.812	77.43	8.748

Percentiles for Raw Full Data Sets

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
7B.NO	16	0	0	0	0	0	0	0	0	0	0
7B.NO BKD	454	0	0	0	0	0	0	0	1.127	1.252	2.48
8B.NO	13	0	0	0	0	0	0	0	0	0	0
8B.NO BKD	549	0	0	0	0	0	0	0	0	0	0
9B.NO	20	0	0	0	0	0	0	0	0	0	0
9B.NO BKD	524	0	0	0	0	0	0	0	0	0.85	1.225
10B.NO	19	0	0	0	0	0	0	0	0	0	0
10B.NO BKD	532	0	0	0	0	0	0	0	0	0	1.11

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C5A.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	7B NO Blast		8B NO Blast	
Background Data:	7B NO Non-Blast		8B NO Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	16	454	13	549
Number of Distinct Observations	1	52	1	1
Minimum	0	0	0	0
Maximum	0	2.91	0	0
Mean	0	0.18	0	0
Median	0	0	0	0
SD	0	0.508	0	0
SE of Mean	0	0.0238	0	0
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	3312		3660	
WMW Test U-Stat	-0.855		-0.0008641	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.804		0.5	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C5A.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	9B NO Blast		10B NO Blast	
Background Data:	9B NO Non-Blast		10B NO Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	20	524	19	532
Number of Distinct Observations	1	26	1	7
Minimum	0	0	0	0
Maximum	0	1.757	0	1.67
Mean	0	0.0604	0	0.0176
Median	0	0	0	0
SD	0	0.262	0	0.154
SE of Mean	0	0.0115	0	0.00666
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	5180		5178	
WMW Test U-Stat	-0.392		-0.0983	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.653		0.539	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Summary Statistics for Raw Full Data Sets - C4B Monitoring Stations - Nitrogen Dioxide

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
1B.NO2	45	0	0.2	0.0619	0	0.00531	0.0729	0	0.473	-1.538	1.177
1B.NO2 BKD	575	0	0.25	0.0694	0.1	0.00431	0.0656	0.0943	0.0875	-1.546	0.945
2B.NO2	36	0	0.16	0.0372	0	0.00337	0.0581	0	1.023	-0.78	1.561
2B.NO2 BKD	539	0	0.2	0.0271	0	0.00274	0.0523	0	1.611	1.155	1.928
3B.NO2	42	0	0.22	0.049	0	0.0064	0.08	0	1.114	-0.612	1.633
3B.NO2 BKD	519	0	0.202	0.0293	0	0.00341	0.0584	0	1.648	1.086	1.994
4B.NO2	44	0	0.105	0.00466	0	0.00046674	0.0216	0	4.525	19.37	4.637
4B.NO2 BKD	530	0	0.14	0.00606	0	0.0005952	0.0244	0	3.819	12.8	4.028
5B.NO2	41	0	0.235	0.011	0	0.00241	0.0491	0	4.365	17.98	4.475
5B.NO2 BKD	544	0	0.222	0.00829	0	0.00143	0.0378	0	4.498	18.81	4.565
6B.NO2	40	0	0.39	0.134	0.184	0.0131	0.115	0.119	0.0283	-1.201	0.857
6B.NO2 BKD	483	0	0.4	0.138	0.198	0.0126	0.112	0.0618	-0.0773	-1.126	0.813

Percentiles for Raw Full Data Sets

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
1B.NO2	45	0	0	0	0	0	0.13	0.142	0.161	0.174	0.196
1B.NO2 BKD	575	0	0	0	0	0.1	0.12	0.13	0.15	0.166	0.193
2B.NO2	36	0	0	0	0	0	0.1	0.11	0.13	0.143	0.157
2B.NO2 BKD	539	0	0	0	0	0	0	0.1	0.11	0.14	0.19
3B.NO2	42	0	0	0	0	0	0.14	0.159	0.178	0.2	0.216
3B.NO2 BKD	519	0	0	0	0	0	0	0.1	0.14	0.16	0.193
4B.NO2	44	0	0	0	0	0	0	0	0	0	0.103
4B.NO2 BKD	530	0	0	0	0	0	0	0	0	0.1	0.11
5B.NO2	41	0	0	0	0	0	0	0	0	0	0.227
5B.NO2 BKD	544	0	0	0	0	0	0	0	0	0	0.199
6B.NO2	40	0	0	0	0	0.184	0.2	0.207	0.262	0.281	0.355
6B.NO2 BKD	483	0	0	0	0	0.198	0.203	0.21	0.25	0.3	0.39

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C4B.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	1B NO2 Blast		2B NO2 Blast	
Background Data:	1B NO2 Non-Blast		2B NO2 Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	45	575	36	539
Number of Distinct Observations	13	63	7	14
Minimum	0	0	0	0
Maximum	0.2	0.25	0.16	0.2
Mean	0.0619	0.0694	0.0372	0.0271
Median	0	0.1	0	0
SD	0.0729	0.0656	0.0581	0.0523
SE of Mean	0.0109	0.00274	0.00968	0.00225
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	13408		11250	
WMW Test U-Stat	-0.488		0.913	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.687		0.181	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C4B.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	3B NO2 Blast		4B NO2 Blast	
Background Data:	3B NO2 Non-Blast		4B NO2 Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	42	519	44	530
Number of Distinct Observations	10	46	3	4
Minimum	0	0	0	0
Maximum	0.22	0.202	0.105	0.14
Mean	0.049	0.0293	0.00466	0.00606
Median	0	0	0	0
SD	0.08	0.0584	0.0216	0.0244
SE of Mean	0.0123	0.00256	0.00326	0.00106
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	12979		12502	
WMW Test U-Stat	1.164		-0.141	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.122		0.556	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C4B.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	5B NO2 Blast		6B NO2 Blast	
Background Data:	5B NO2 Non-Blast		6B NO2Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	41	544	40	483
Number of Distinct Observations	3	27	22	110
Minimum	0	0	0	0
Maximum	0.235	0.222	0.39	0.4
Mean	0.011	0.00829	0.134	0.138
Median	0	0	0.184	0.198
SD	0.0491	0.0378	0.115	0.112
SE of Mean	0.00767	0.00162	0.0181	0.00511
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	12049		9960	
WMW Test U-Stat	0.034		-0.567	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.486		0.715	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Summary Statistics for Raw Full Data Sets - Monitoring Stations C5A - Nitrogen Dioxide

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
7B.NO2	8	0	0.3	0.0863	0	0.0173	0.131	0	1.161	-0.569	1.524
7B.NO2 BKD	425	0	0.99	0.0376	0	0.0172	0.131	0	5.369	32.87	3.482
8B.NO2	15	0	0	0	0	0	0	0	N/A	N/A	N/A
8B.NO2 BKD	545	0	0.14	0.0015	0	0.00017788	0.0133	0	8.948	79.95	8.864
9B.NO2	12	0	0	0	0	0	0	0	N/A	N/A	N/A
9B.NO2 BKD	485	0	0.1	0.00041237	0	0.000041152	0.00641	0	15.52	240	15.56
10B.NO2	17	0	0.1	0.0235	0	0.00191	0.0437	0	1.372	-0.149	1.858
10B.NO2 BKD	534	0	0.16	0.027	0	0.00211	0.0459	0	1.157	-0.528	1.7

Percentiles for Raw Full Data Sets

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
7B.NO2	8	0	0	0	0	0	0.153	0.212	0.286	0.293	0.299
7B.NO2 BKD	425	0	0	0	0	0	0	0	0.166	0.21	0.908
8B.NO2	15	0	0	0	0	0	0	0	0	0	0
8B.NO2 BKD	545	0	0	0	0	0	0	0	0	0	0.1
9B.NO2	12	0	0	0	0	0	0	0	0	0	0
9B.NO2 BKD	485	0	0	0	0	0	0	0	0	0	0
10B.NO2	17	0	0	0	0	0	0	0.08	0.1	0.1	0.1
10B.NO2 BKD	534	0	0	0	0	0	0.1	0.1	0.1	0.1	0.136

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C5A.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	7B NO2 Blast		8B NO2 Blast	
Background Data:	7B NO2 Non-Blast		8B NO2 Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	8	425	17	534
Number of Distinct Observations	4	26	2	23
Minimum	0	0	0	0
Maximum	0.3	0.99	0.1	0.16
Mean	0.0863	0.0376	0.0235	0.027
Median	0	0	0	0
SD	0.131	0.131	0.0437	0.0459
SE of Mean	0.0465	0.00636	0.0106	0.00199
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	2159		4533	
WMW Test U-Stat	1.203		-0.248	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.114		0.598	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	C5A.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	9B NO2 Blast		10B NO2 Blast	
Background Data:	9B NO2 Non-Blast		10B NO2 Non-Blast	
Raw Statistics				
	Site	Background	Site	Background
Number of Valid Observations	12	485	17	534
Number of Distinct Observations	1	2	2	23
Minimum	0	0	0	0
Maximum	0	0.1	0.1	0.16
Mean	0	0.00041237	0.0235	0.027
Median	0	0	0	0
SD	0	0.00641	0.0437	0.0459
SE of Mean	0	0.00029129	0.0106	0.00199
Wilcoxon-Mann-Whitney (WMW) Test				
Site Rank Sum W-Stat	2976		4533	
WMW Test U-Stat	-0.0254		-0.248	
WMW Critical Value (0.050)	1.645		1.645	
P-Value	0.51		0.598	
H0: Mean/Median of Site or AOC <= Mean/Median of Background				
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**	

Summary Statistics for Raw Full Data Sets - C4B Monitoring Stations - Hydrogen Sulfide

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
H2S AMS 1 Blast	16	0	0.00902	0.0062	0.00735	5.9454E-06	0.00244	0.00215	-1.186	1.224	0.393
H2S AMS 1 Non-Blast	96	0	0.00995	0.00395	0.00427	0.000011395	0.00338	0.00514	0.0132	-1.493	0.854
H2S AMS 3 Blast	17	0	0.00828	0.00523	0.00592	7.8877E-06	0.00281	0.0017	-1.039	0.0479	0.537
H2S AMS 3 Non-Blast	110	0	0.00953	0.00302	0.00303	0.000010107	0.00318	0.0045	0.366	-1.443	1.053
H2S AMS 4 Blast	17	0	0.00938	0.00568	0.00608	7.7421E-06	0.00278	0.00252	-0.849	0.214	0.49
H2S AMS 4 Non-Blast	125	0	0.00921	0.00355	0.00403	8.3725E-06	0.00289	0.0039	-0.0913	-1.426	0.815
H2S AMS 6 Blast	17	0	0.00923	0.00412	0.00485	8.8842E-06	0.00298	0.00225	-0.378	-0.989	0.724
H2S AMS 6 Non-Blast	125	0	0.00847	0.00316	0.0033	0.000007968	0.00282	0.00489	0.226	-1.235	0.894

Percentiles for Raw Full Data Sets

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
H2S AMS 1 Blast	16	0.00269	0.0036	0.00373	0.00508	0.00735	0.0078	0.00808	0.00847	0.00869	0.00895
H2S AMS 1 Non-Blast	96	0	0	0	0	0.00427	0.00693	0.00723	0.00828	0.00888	0.00976
H2S AMS 3 Blast	17	0	0	0.00392	0.00482	0.00592	0.00707	0.00751	0.0081	0.00826	0.00828
H2S AMS 3 Non-Blast	110	0	0	0	0	0.00303	0.00604	0.00641	0.00764	0.00818	0.00858
H2S AMS 4 Blast	17	0	0.00188	0.00398	0.00437	0.00608	0.00737	0.0077	0.00877	0.00892	0.00929
H2S AMS 4 Non-Blast	125	0	0	0	0	0.00403	0.00583	0.00612	0.00714	0.00799	0.00813
H2S AMS 6 Blast	17	0	0	0	0	0.00485	0.00598	0.00629	0.00701	0.00754	0.00889
H2S AMS 6 Non-Blast	125	0	0	0	0	0.0033	0.00533	0.0057	0.00731	0.00804	0.00832

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	H2S AMS 1 Blast		H2S AMS 3 Blast		H2S AMS 4 Blast		H2S AMS 6 Blast	
Background Data:	H2S AMS 1 Non-Blast		H2S AMS 3 Non-Blast		H2S AMS 4 Non-Blast		H2S AMS 6 Non-Blast	
Raw Statistics								
	Site	Background	Site	Background	Site	Background	Site	Background
Number of Valid Observations	16	96	17	110	17	125	17	125
Number of Distinct Observations	16	58	15	56	16	80	13	77
Minimum	0	0	0	0	0	0	0	0
Maximum	0.00902	0.00995	0.00828	0.00953	0.00938	0.00921	0.00923	0.00847
Mean	0.0062	0.00395	0.00523	0.00302	0.00568	0.00355	0.00412	0.00316
Median	0.00735	0.00427	0.00592	0.00303	0.00608	0.00403	0.00485	0.0033
SD	0.00244	0.00338	0.00281	0.00318	0.00278	0.00289	0.00298	0.00282
SE of Mean	0.00060958	0.00034453	0.00068116	0.00030312	0.00067485	0.0002588	0.00072291	0.00025248
Wilcoxon-Mann-Whitney (WMW) Test								
Site Rank Sum W-Stat	1209		1446		1650		1439	
WMW Test U-Stat	2.532		2.531		2.724		1.398	
WMW Critical Value (0.050)	1.645		1.645		1.645		1.645	
P-Value	0.00567		0.00568		0.00322		0.081	
H0: Mean/Median of Site or AOC <= Mean/Median of Background								
Conclusion with Alpha = 0.05	**Reject H0, Conclude Site > Background**		**Reject H0, Conclude Site > Background**		**Reject H0, Conclude Site > Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value < alpha (0.05)		**P-Value < alpha (0.05)**		**P-Value < alpha (0.05)**		**P-Value >= alpha (0.05)**	

Summary Statistics for Raw Full Data Sets - Monitoring Stations C4B - Sulfur Dioxide

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
SO2 A	26	0	0	0	0	0	0	0	N/A	N/A	N/A
SO2 A_Bkgrd	319	0	0	0	0	0	0	0	N/A	N/A	N/A
SO2 B	32	0	0.402	0.0189	0	0.00534	0.073	0	5.003	26.32	3.874
SO2 B_Bkgrd	387	0	0.801	0.00876	0	0.00421	0.0649	0	9.424	96.41	7.406
SO2 C	21	0	0.114	0.00611	0	0.00062252	0.025	0	4.475	20.26	4.083
SO2 C_Bkgrd	287	0	0.0775	0.00037456	0	0.000024007	0.0049	0	14.51	221	13.08
SO2 D	25	0	0.259	0.0274	0	0.00408	0.0639	0	2.724	7.387	2.332
SO2 D_Bkgrd	254	0	0.175	0.0069	0	0.00055316	0.0235	0	4.747	26.86	3.408

Percentiles for Raw Full Data Sets

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
SO2 A	26	0	0	0	0	0	0	0	0	0	0
SO2 A_Bkgrd	319	0	0	0	0	0	0	0	0	0	0
SO2 B	32	0	0	0	0	0	0	0	0.0218	0.0791	0.31
SO2 B_Bkgrd	387	0	0	0	0	0	0	0	0	0	0.24
SO2 C	21	0	0	0	0	0	0	0	0	0.0142	0.0942
SO2 C_Bkgrd	287	0	0	0	0	0	0	0	0	0	0
SO2 D	25	0	0	0	0	0	0	0.032	0.098	0.159	0.238
SO2 D_Bkgrd	254	0	0	0	0	0	0	0	0.0245	0.05	0.122

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data:	H2S AMS 1 Blast		H2S AMS 3 Blast		H2S AMS 4 Blast		H2S AMS 6 Blast	
Background Data:	H2S AMS 1 Non-Blast		H2S AMS 3 Non-Blast		H2S AMS 4 Non-Blast		H2S AMS 6 Non-Blast	
Raw Statistics								
	Site	Background	Site	Background	Site	Background	Site	Background
Number of Valid Observations	26	319	32	387	21	287	25	254
Number of Distinct Observations	1	1	6	17	3	3	7	19
Minimum	0	0	0	0	0	0	0	0
Maximum	0	0	0.402	0.801	0.114	0.0775	0.259	0.175
Mean	0	0	0.0189	0.00876	0.00611	0.00037456	0.0274	0.0069
Median	0	0	0	0	0	0	0	0
SD	0	0	0.073	0.0649	0.025	0.0049	0.0639	0.0235
SE of Mean	0	0	0.0129	0.0033	0.00544	0.00028922	0.0128	0.00148
Wilcoxon-Mann-Whitney (WMW) Test								
Site Rank Sum W-Stat	4498		7426		3511		3919	
WMW Test U-Stat	-0.00102		1.071		0.674		1.086	
WMW Critical Value (0.050)	1.645		1.645		1.645		1.645	
P-Value	0.5		0.142		0.25		0.139	
H0: Mean/Median of Site or AOC <= Mean/Median of Background								
Conclusion with Alpha = 0.05	**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**		**Do Not Reject H0, Conclude Site <= Background**	
	P-Value >= alpha (0.05)		**P-Value >= alpha (0.05)**		**P-Value >= alpha (0.05)**		**P-Value >= alpha (0.05)**	