



Healthy Buildings
Bay Area
1000 Broadway Suite 200E
Oakland, CA 94607
o: 510.210.3333
info@healthybuildings.com

July 25, 2016

Judy Yu
Human Resources Manager
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Dear Ms. Yu:

**Post Construction/Pre-Occupancy IAQ Inspection
375 Beale Street, San Francisco**

This is a report of the Healthy Buildings’ Post-Construction Phase 2 Indoor Environmental Quality Inspection of the newly renovated BAAQMD spaces in the 375 Beale Street building in San Francisco, CA. We understand that the area inspected has been recently renovated and this inspection and sampling, performed during the days of May 25th, 26th, 27th and July 9th, 10th, 2016, was conducted after the renovation was substantially complete.

Healthy Buildings has developed a post-construction/pre-occupancy program to assist management in reducing risk of indoor air complaints following renovations. The goals of this inspection include:

- Quickly identifying IAQ problems, or potential problems, so they can be corrected in a timely manner.
- Enhancing the relationship between management and occupants by demonstrating a genuine concern for the occupants’ well-being.
- Improving occupant productivity and reducing absenteeism and worker’s compensation claims.
- Protecting against liability and demonstrating due-diligence by retaining an independent, respected third-party professional.

Sixteen (16) sampling locations were selected throughout the occupied space to complete 8-hour testing for carbon monoxide, ozone, PM10 dusts, PM2.5 dusts, volatile organic compounds (VOCs), formaldehyde (HCHO) and caprolactam.

No.	Location
1	1F South Central Yerba Buena Conference Room 107/109
2	1F East Central Building Engineering Office 130
3	2F East Central Open Offices 242C
4	2F Northeast Lab XRF 234
5	2F East Interior Office 218
6	6F South Central Conference Room 6206
7	6F East Central Office 6344

No.	Location
8	6F Southwest Office 6213
9	6F Northwest Office 6124
10	6F Northeast Office 6326
11	7F Northeast Cube Area 7312
12	7F Southwest Cube Area 7215
13	7F Northwest Office 7115
14	8F Northeast Office 8316
15	8F South Central Work Room 8358
16	8F Southwest Office 8224
17	Outdoor Reference

Reporting Guidelines

Healthy Buildings has included in this report standards, threshold limit values, time weighted averages, or other recommended acceptable levels for various indoor air pollutants based on the findings and publications of several U.S. government agencies, independent industrial hygiene organizations, and other bodies. Furthermore, based on our professional opinion, we have selected the most appropriate guidelines in interpreting the data gathered during this inspection. If further information is required in appreciating the guidelines used by Healthy Buildings, please feel free to request such information.

Observations

The recently renovated areas include the 1st, 2nd, 6th, 7th, and 8th floors. The areas contained furnishings and equipment typical to commercial office space. The space was in good overall condition. Please note: final construction punch list activities, moving furniture and equipment and areas with early occupancy were noted to be ongoing within the spaces during testing.

Methodology

Contaminant	Target Concentration	Healthy Buildings Sampling Method
Formaldehyde	CARB REL Levels (27 ppb) and/or OSHA REL Levels (750 ppb) and/or OEHHA levels (14 ppb)	EPA Method TO-11A
Particulates (PM 10)	50 micrograms per cubic meter	EPA Method IP-10A
Particulates (PM2.5)	15 micrograms per cubic meter	EPA Method IP-10A
Ozone	0.075 parts per million	ASTM D5149 – 02
Total Volatile Organic Compounds (TVOCs)	500 micrograms per cubic meter	EPA Method TO-17
Carbon Monoxide	9 parts per million but not greater than 2 ppm above outdoor levels	EPA Method IP-3C



Caprolactam	OEHHA REL Levels (1.4 ppb) and/or CDC REL Levels (220 ppb)	EPA Method TO-17
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Air Sampling Summary (See Following Tables for Detailed Results)

Air quality testing results for carbon monoxide, ozone, PM10 dusts, PM2.5 dusts, volatile organic compounds (VOCs), formaldehyde (HCHO) and caprolactam are summarized below.

1. Carbon monoxide, a toxic, odorless byproduct of fuel combustion, was less than detection limits (1ppm), indicating no indoor sources of this contaminant during the inspection.
2. Ozone levels were less than detection limits, indicating no indoor sources of this contaminant during the inspection and were below the guideline of 0.075 ppm.
3. All airborne PM10 dust levels were below the guideline of 50 ug/m³.
4. All airborne PM2.5 dust levels were below the guideline of 15 ug/m³.
5. Volatile organic compounds (TVOCs) results were less than the guideline of 500 ug/m³
6. All Formaldehyde results were below the CARB 8-hour Recommended Exposure Limit (REL) of 27 ppb and OEHHA guideline of 14 ppb.
7. All Caprolactam results were below the OEHHA 8-hour Recommended Exposure Limit (REL) of 1.4 ppb.

Conclusions and Recommendations

Following renovations, Healthy Buildings conducted a focused indoor air quality sampling at the 375 Beale Street building located in San Francisco, CA during the days of May 25th – 27th, 2016. Please note the following findings and recommendations:

- The data collected for ozone, carbon monoxide, PM-10, PM-2.5, TVOCs, formaldehyde and caprolactam indicate that the indoor air quality meets applicable indoor air quality standards for these contaminants.

For Healthy Buildings,

Joel Ritschel, LEED AP, CBCP, CEA, REP, MFBA
 Regional Manager



Attachments: Tables of Results

Test Sampling and Analysis for Formaldehyde Content

Objective: To measure the levels of formaldehyde gas present and compare with standards.

Method: Air sampling for eight hours with a calibrated air pump using sorbent tubes equipped with silica gel DNPH coated adsorbent cartridges equipped with an ozone scrubber. After collection the tubes are analyzed using high-performance liquid chromatography (HPLC). This is equal to EPA Method TO-11A.

No.	Location	Formaldehyde Concentration (ppb)
1	1F South Central Yerba Buena Conference Room 107/109	6.3
2	1F East Central Building Engineering Office 130	3.1
3	2F East Central Open Offices 242C	2.5
4	2F Northeast Lab XRF 234	7.8
5	2F East Interior Office 218	5.1
6	6F South Central Conference Room 6206	4.4
7	6F East Central Office 6344	3.3
8	6F Southwest Office 6213	6.1
9	6F Northwest Office 6124	2.7
10	6F Northeast Office 6326	<0.0017
11	7F Northeast Cube Area 7312	2.9
12	7F Southwest Cube Area 7215	3.8
13	7F Northwest Office 7115	2.7
14	8F Northeast Office 8316	3.1
15	8F South Central Work Room 8358	3.1
16	8F Southwest Office 8224	3.4
17	Outdoors	21

Conclusions:

All Formaldehyde results were below the CARB 8-hour Recommended Exposure Limit (REL) of 27 ppb and OEHHA guideline of 14 ppb.



LA Testing
 5431 Industrial Drive, Huntington Beach, CA 92649

Order ID: 331612666

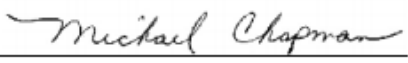
<p>Attn: Results Healthy Buildings International 25381 Commercentre Drive Suite 150 Lake Forest, CA 92630 Fax: 949-450-1120 Phone: 949-450-1111 Email: results@healthybuildings.com Report Date: 07/18/16</p>	<p>Customer ID: 32HBI72 Customer PO: Date Received: 07/13/16 LA Testing Order: 331612666 Project: 1606019SF Date Analyzed: 07/13/16</p>
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**FORMALDEHYDE by NIOSH 2016M, Issue 2, March 2003
 SKC 226-120**

LA Testing Sample ID	Client ID	Air Volume (L)	Component	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	Reporting Limit (mg/sample)
331612666-0001	1H	49.6	Formaldehyde	0.00038	0.0077	0.0063	0.00010
331612666-0002	2H	46.4	Formaldehyde	0.00017	0.0038	0.0031	0.00010
331612666-0003	3H	49.6	Formaldehyde	0.00015	0.0030	0.0025	0.00010
331612666-0004	4H	47.0	Formaldehyde	0.00045	0.0096	0.0078	0.00010
331612666-0005	5H	47.8	Formaldehyde	0.00030	0.0063	0.0051	0.00010
331612666-0006	6H	45.7	Formaldehyde	0.00025	0.0054	0.0044	0.00010
331612666-0007	7H	47.6	Formaldehyde	0.00019	0.0040	0.0033	0.00010
331612666-0008	8H	49.7	Formaldehyde	0.00037	0.0075	0.0061	0.00010
331612666-0009	9H	46.8	Formaldehyde	0.00016	0.0034	0.0027	0.00010

Sample received in acceptable condition unless otherwise noted. This report relates only to the samples reported above. This report may not be reproduced except in full, without written approval by LA Testing. Quality Control Data associated with this sample set is within acceptable limits. The results for this sample set have not been blank corrected. Tube front and tube back analyzed separately, tube backs are ND unless otherwise indicated. *Note: Tube back was detected and added to the result.

JD
 Analyst


 Michael Chapman, Laboratory Manager

AIHA-LAP, LLC Accredited - Laboratory ID #101650



LA Testing
 5431 Industrial Drive, Huntington Beach, CA 92649

Order ID: 331612666

Attn: Results	Customer ID: 32HBI72
Healthy Buildings International	Customer PO:
25381 Commercentre Drive	Date Received: 07/13/16
Suite 150	LA Testing Order: 331612666
Lake Forest, CA 92630	
Fax: 949-450-1120	Project: 1606019SF
Phone: 949-450-1111	
Email: results@healthybuildings.com	Date Analyzed: 07/13/16
Report Date: 07/18/16	

**FORMALDEHYDE by NIOSH 2016M, Issue 2, March 2003
 SKC 226-120**

LA Testing Sample ID	Client ID	Air Volume (L)	Component	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	Reporting Limit (mg/sample)
331612666-0010	10H	47.5	Formaldehyde	<0.00010	<0.0021	<0.0017	0.00010
331612666-0011	11H	49.9	Formaldehyde	0.00018	0.0036	0.0029	0.00010
331612666-0012	12H	49.6	Formaldehyde	0.00023	0.0047	0.0038	0.00010
331612666-0013	13H	45.7	Formaldehyde	0.00015	0.0033	0.0027	0.00010
331612666-0014	14H	47.57	Formaldehyde	0.00018	0.0038	0.0031	0.00010
331612666-0015	15H	49.8	Formaldehyde	0.00019	0.0038	0.0031	0.00010
331612666-0016	16H	46.8	Formaldehyde	0.00019	0.0042	0.0034	0.00010
331612666-0017	17H	47.9	Formaldehyde	*0.0012	0.025	0.021	0.00010

Sample received in acceptable condition unless otherwise noted. This report relates only to the samples reported above. This report may not be reproduced except in full, without written approval by LA Testing. Quality Control Data associated with this sample set is within acceptable limits. The results for this sample set have not been blank corrected. Tube front and tube back analyzed separately, tube backs are ND unless otherwise indicated. *Note: Tube back was detected and added to the result.

JD
 Analyst

Michael Chapman
 Michael Chapman, Laboratory Manager

AIHA-LAP, LLC Accredited - Laboratory ID #101650

Test Weighing of Airborne Particles (PM-10)

Objective: To assess the weight airborne particles at or less than 10 microns in size at random locations of the building and compare with available standards.

Method: Air sampling for eight hours with a calibrated air pump at approximately 10 LPM using a Model 200 PEM impactor with a 10 µm cut point onto a pre-weighted filter and weighing of the filter on a calibrated laboratory balance. This is comparable to NIOSH 0600 and is equal to EPA IP-10A.

No.	Location	PM-10 Particulate (µg/m ³)
1	1F South Central Yerba Buena Conference Room 107/109	<0.010
2	1F East Central Building Engineering Office 130	<0.010
3	2F East Central Open Offices 242C	<0.010
4	2F Northeast Lab XRF 234	<0.010
5	2F East Interior Office 218	<0.010
6	6F South Central Conference Room 6206	<0.010
7	6F East Central Office 6344	<0.010
8	6F Southwest Office 6213	<0.010
9	6F Northwest Office 6124	<0.010
10	6F Northeast Office 6326	<0.010
11	7F Northeast Cube Area 7312	<0.010
12	7F Southwest Cube Area 7215	<0.010
13	7F Northwest Office 7115	<0.010
14	8F Northeast Office 8316	<0.010
15	8F South Central Work Room 8358	<0.010
16	8F Southwest Office 8224	<0.010

Conclusions:

The PM10 results from the testing are no more than <0.010 µg/m³, well below the recommended acceptable upper limit for airborne PM-10 particles of 50 micrograms per cubic meter of air.



LA Testing
 11652 Knott Street Unit F5, Garden Grove, CA 92841
 Phone/Fax: (714) 828-4999 / (714) 828-4944
<http://www.LATesting.com> gardengrovelab@lateesting.com

LA Testing Order: 331609832
 CustomerID: 32HBI72
 CustomerPO:
 ProjectID:

Attn: **Results** Phone: (949) 450-1111
Healthy Buildings International Fax:
25381 Commercentre Drive Received: 06/01/16 12:00 PM
Suite 150 Analysis Date: 6/2/2016
Lake Forest, CA 92630 Collected:

Project: 1605004SF

**Test Report: PM10 Analysis of Particulate Matter Performed by EPA Reference Method
 40 CFR, Chapter I, Part 50, App. J**

Sample	Location	Volume (L)	Initial Weight (mg)	Final Weight (mg)	Sample Weight (mg)	Concentration (mg/m ³)	Reporting Limit (mg/m ³)	Notes
1P10 331609832-0001		4800	59.895	59.925	<0.05	<0.010	0.010	
2P10 331609832-0002		4800	60.948	60.967	<0.05	<0.010	0.010	
3P10 331609832-0003		4800	51.512	51.524	<0.05	<0.010	0.010	
4P10 331609832-0004		4800	55.546	55.541	<0.05	<0.010	0.010	
5P10 331609832-0005		4800	61.683	61.677	<0.05	<0.010	0.010	
6P10 331609832-0006		4800	57.172	57.191	<0.05	<0.010	0.010	
7P10 331609832-0007		4800	61.449	61.450	<0.05	<0.010	0.010	
8P10 331609832-0008		4800	53.170	53.163	<0.05	<0.010	0.010	
9P10 331609832-0009		4800	56.543	56.555	<0.05	<0.010	0.010	
10P10 331609832-0010		4800	61.129	61.131	<0.05	<0.010	0.010	
11P10 331609832-0011		4800	64.067	64.080	<0.05	<0.010	0.010	

Analyst(s)
 Barbara Przybylska (16)

Michael Chapman
 Michael Chapman, Laboratory Manager
 or other approved signatory

The laboratory is not responsible for data reported in mg/m³, which is dependent on volume collected by non-laboratory personnel. This report relates only to the samples reported above. This report may not be reproduced, except in full, without written permission.
 Samples analyzed by LA Testing Garden Grove, CA.

Initial report from 06/02/2016 16:48:08



LA Testing
 11652 Knott Street Unit F5, Garden Grove, CA 92641
 Phone/Fax: (714) 828-4999 / (714) 828-4944
<http://www.LATesting.com> gardengrovelab@latesting.com

LA Testing Order: 331609832
 CustomerID: 32HBI72
 CustomerPO:
 ProjectID:

Attn: **Results** Phone: (949) 450-1111
Healthy Buildings International Fax:
25381 Commercentre Drive Received: 06/01/16 12:00 PM
Suite 150 Analysis Date: 6/2/2016
Lake Forest, CA 92630 Collected:
 Project: 1605004SF

**Test Report: PM10 Analysis of Particulate Matter Performed by EPA Reference Method
 40 CFR, Chapter I, Part 50, App. J**

Sample	Location	Volume (L)	Initial Weight (mg)	Final Weight (mg)	Sample Weight (mg)	Concentration (mg/m ³)	Reporting Limit (mg/m ³)	Notes
12P10 331609832-0012		4800	55.717	55.722	<0.05	<0.010	0.010	
13P10 331609832-0013		4800	60.360	60.384	<0.05	<0.010	0.010	
14P10 331609832-0014		4800	57.088	57.083	<0.05	<0.010	0.010	
15P10 331609832-0015		4800	55.244	55.255	<0.05	<0.010	0.010	
16P10 331609832-0016		4800	60.218	60.208	<0.05	<0.010	0.010	

Notes: Discernable field blank not submitted with samples.
 Results are not field blank corrected.

Analyst(s)
 Barbara Przybylska (16)

Michael Chapman
 Michael Chapman, Laboratory Manager
 or other approved signatory

The laboratory is not responsible for data reported in mg/m³, which is dependent on volume collected by non-laboratory personnel. This report relates only to the samples reported above. This report may not be reproduced, except in full, without written permission.
 Samples analyzed by LA Testing Garden Grove, CA.

Initial report from 06/02/2016 16:48:08

Test Weighing of Airborne Particles (PM-2.5)

Objective: To assess the weight airborne particles at or less than 2.5 microns in size at random locations of the building and compare with available standards.

Method: Air sampling for eight hours with a calibrated air pump at approximately 10 LPM using a Model 200 PEM impactor with a 2.5 µm cut point onto a pre-weighted filter and weighing of the filter on a calibrated laboratory balance. This is comparable to NIOSH 0600 and is equal to EPA IP-10A.

No.	Location	PM-2.5 Particulate (µg/m ³)
1	1F South Central Yerba Buena Conference Room 107/109	<0.010
2	1F East Central Building Engineering Office 130	<0.010
3	2F East Central Open Offices 242C	<0.010
4	2F Northeast Lab XRF 234	<0.010
5	2F East Interior Office 218	<0.010
6	6F South Central Conference Room 6206	<0.010
7	6F East Central Office 6344	<0.010
8	6F Southwest Office 6213	<0.010
9	6F Northwest Office 6124	<0.010
10	6F Northeast Office 6326	<0.010
11	7F Northeast Cube Area 7312	<0.010
12	7F Southwest Cube Area 7215	<0.010
13	7F Northwest Office 7115	<0.010
14	8F Northeast Office 8316	<0.010
15	8F South Central Work Room 8358	<0.010
16	8F Southwest Office 8224	<0.010

Conclusions:

The PM-2.5 results from the testing are no more than <0.010 µg/m³, well below the recommended acceptable upper limit for airborne PM-2.5 particles of 15 micrograms per cubic meter of air.



LA Testing
 11652 Knott Street, Unit F5, Garden Grove, CA 92841

Order ID: 331609833

Attn:	Results	Customer ID:	32HBI72
	Healthy Buildings International	Customer PO:	
	25381 Commercentre Drive, Suite 150	Date Received:	06/01/16
	Lake Forest, CA 92630	LA Testing Order:	331609833
Phone:	949-450-1111	Project:	1605004SF
Fax:		Date Analyzed:	06/03/16
Email:	<i>results@healthybuildings.com</i>		
Report Date:	06/03/16		

**PM2.5 Analysis of Particulate Matter Performed by EPA Reference Method
 40 CFR, Chapter I, Part 50, App. J**

Lab ID	Volume (L)	Sample ID	Analyte	mg	mg/m3	Reporting Limit (mg)
331609833-0001	4800	1 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0002	4800	2 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0003	4800	3 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0004	4800	4 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0005	4800	5 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0006	4800	6 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0007	4800	7 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0008	4800	8 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050

Samples were not blank corrected. All QA/QC was acceptable. This report relates only to the samples reported above. Media submitted on Pre-weighed PM-2.5 filter cassettes.

MNH
 Analyst

Michael Chapman
 Michael Chapman, Laboratory Manager
 Or other approved signatory

AIHA Accredited - Laboratory ID #101650
 Page 1 of 2



LA Testing
 11652 Knott Street, Unit F5, Garden Grove, CA 92841

Order ID: 331609833

Attn:	Results	Customer ID:	32HBI72
	Healthy Buildings International	Customer PO:	
	25381 Commercentre Drive, Suite 150	Date Received:	06/01/16
	Lake Forest, CA 92630	LA Testing Order:	331609833
Phone:	949-450-1111	Project:	1605004SF
Fax:		Date Analyzed:	06/03/16
Email:	<i>results@healthybuildings.com</i>		
Report Date:	06/03/16		

**PM2.5 Analysis of Particulate Matter Performed by EPA Reference Method
 40 CFR, Chapter I, Part 50, App. J**

Lab ID	Volume (L)	Sample ID	Analyte	mg/sample	ppm	Reporting Limit (mg)
331609833-0009	4800	9 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0010	4800	10 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0011	4800	11 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0012	4800	12 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0013	4800	13 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0014	4800	14 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0015	4800	15 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050
331609833-0016	4800	16 P 2.5	PM 2.5 Analysis	<0.05	<0.010	0.050

Samples were not blank corrected. All QA/QC was acceptable. This report relates only to the samples reported above. Media submitted on Pre-weighed PM-2.5 filter cassettes.

MNH
 Analyst

Michael Chapman
 Michael Chapman, Laboratory Manager
 Or other approved signatory

AIHA Accredited - Laboratory ID #101650
 Page 2 of 2

Test Sampling and Analysis for Airborne TVOCs

Objective: To estimate the amounts of volatile organic compounds present in the building air.

Method: Air sampling using multi-bed sorbent tubes. Sorbent tubes are analyzed by double thermal desorption and subsequent analysis by capillary gas chromatography and mass spectroscopy. All non-calibrated compound mass values are estimated and reported as internal standard equivalents. Calculations are performed by summing the integrated total ionic chromatogram (TIC) areas in a sample less the TIC area of the closest internal standard over the retention time interval. The ratio of summed area to the area of the internal standard is calculated. This value is multiplied by the internal standard mass to obtain the equivalent sample mass. The mass of each detected target compound is converted to an air concentration ($\mu\text{g}/\text{m}^3$) and compared to its allowable concentration in Table 4.1 of CDPH v1.1 (except formaldehyde). This method follows EPA Method TO-17.

No.	Location	Total Target VOCs ($\mu\text{g}/\text{m}^3$)
1	1F South Central Yerba Buena Conference Room 107/109	10.36
2	1F East Central Building Engineering Office 130	172.88
3	2F East Central Open Offices 242C	90.71
4	2F Northeast Lab XRF 234	22.39
5	2F East Interior Office 218	72.95
6	6F South Central Conference Room 6206	11.24
7	6F East Central Office 6344	17.22
8	6F Southwest Office 6213	23.17
9	6F Northwest Office 6124	6.89
10	6F Northeast Office 6326	0.0
11	7F Northeast Cube Area 7312	0.0
12	7F Southwest Cube Area 7215	3.37
13	7F Northwest Office 7115	9.52
14	8F Northeast Office 8316	44.63
15	8F South Central Work Room 8358	9.96
16	8F Southwest Office 8224	6.78

Conclusions:

On the days of our testing, the TVOC levels were no more than $172.88 \mu\text{g}/\text{m}^3$, well below the recommended guideline of $500 \mu\text{g}/\text{m}^3$.



Healthy Buildings
 3926 Pender Drive, Suite 120
 Fairfax, VA 22030
 Ph: (703) 323-4400
 Fax: (703) 323-4440

Total Volatile Organic Compound (TVOC) Analysis by GC/MS

Lab ID/Sample #	40004_1	40004_2	40004_3
Client Project #	1605004SF	1605004SF	1605004SF
Tube Serial #	1399	1091	1053
Sample Description	1F CR 109	1F eng ofc 130	2F EC ofcopen 242C
Analyst	MN	MN	MN
Analysis Date	6/1/2016	6/1/2016	6/1/2016
Collection Date	5/25/16-5/26/16	5/25/16-5/26/16	5/25/16-5/26/16
Total Liters	7.09	7.59	6.49

Analyte	Concentration (ug/m ³)	Concentration (ug/m ³)	Concentration (ug/m ³)
Propylene	< 0.49	U 4.23	< 0.53
Dichlorodifluoromethane	< 1.39	U 4.63	< 1.52
1,2-Dichlorotetrafluoroethane	< 1.97	U < 1.84	U < 2.15
Chloromethane	< 0.58	U < 0.54	U < 0.64
Vinyl Chloride	< 0.72	U < 0.67	U < 0.79
1,3-Butadiene	< 0.62	U < 0.58	U < 0.68
Bromomethane	< 1.09	U < 1.02	U < 1.20
Chloroethane	< 0.74	U < 0.69	U < 0.81
Trichlorofluoromethane	< 1.58	U < 1.48	U < 1.73
Ethanol	< 0.53	U 121.94	63.51
1,1,2-Trichloro-1,2,2-trifluoroethane	< 2.16	U < 2.02	U < 2.36
1,1-Dichloroethylene	< 1.12	U < 1.04	U < 1.22
Acetone	1.47	8.20	11.84
Carbon disulfide	< 0.88	U < 0.82	U < 0.96
2-Propanol	< 0.69	U < 0.65	U < 0.76
Dichloromethane	< 0.98	U 20.03	12.04
tert-Butyl methyl ether	< 1.02	U < 0.95	U < 1.11
cis-1,2-Dichloroethylene	< 1.12	U < 1.04	U < 1.22
Hexane	< 0.99	U < 0.93	U < 1.09
1,1-Dichloroethane	< 1.14	U < 1.07	U < 1.25
Vinyl Acetate	< 0.99	U < 0.93	U < 1.08
trans-1,2-Dichloroethylene	< 1.12	U < 1.04	U < 1.22
Ethyl Acetate	1.10	< 0.95	U < 1.11

Tetrahydrofuran	< 0.83	U < 0.78	U < 0.91	U
Chloroform	< 1.38	U < 1.29	U < 1.50	U
Cyclohexane	5.14	< 0.91	U < 1.06	U
1,1,1-Trichloroethane	< 1.54	U < 1.44	U < 1.68	U
Carbon Tetrachloride	< 1.77	U < 1.66	U < 1.94	U
Benzene	< 0.90	U < 0.84	U < 0.98	U
1,2-Dichloroethane	< 1.14	U < 1.07	U < 1.25	U
Heptane	< 1.16	U < 1.08	U < 1.26	U
Trichloroethylene	< 1.52	U < 1.42	U < 1.66	U
1,2-Dichloropropane	< 1.30	U < 1.22	U < 1.42	U
1,4-Dioxane	< 1.02	U < 0.95	U < 1.11	U
Bromodichloromethane	< 1.89	U < 1.76	U < 2.06	U
trans-1,3-Dichloropropene	< 1.28	U < 1.20	U < 1.40	U
4-Methyl-2-Pentanone	< 1.16	U < 1.16	U < 1.26	U
Toluene	2.64	5.41	3.33	
cis-1,3-Dichloropropene	< 1.28	U < 1.28	U < 1.40	U
1,1,2-Trichloroethane	< 1.54	U < 1.54	U < 1.68	U
Tetrachloroethylene	< 1.91	U < 1.91	U < 2.09	U
2-Hexanone	< 1.16	U < 1.16	U < 1.26	U
Dibromochloromethane	< 2.40	U < 2.40	U < 2.62	U
1,2-Dibromoethane	< 2.17	U < 2.17	U < 2.37	U
Chlorobenzene	< 1.30	U < 1.30	U < 1.42	U
Ethylbenzene	< 1.22	U 1.91	< 1.34	U
m,p-Xylene	< 1.22	U 1.81	< 1.34	U
o-Xylene	< 1.22	U 1.59	< 1.34	U
Styrene	< 1.20	U 3.11	< 1.31	U
Bromoform	< 2.91	U < 2.91	U < 3.18	U
1,1,2,2-Tetrachloroethane	< 1.94	U < 1.94	U < 2.11	U
4-Ethyltoluene	< 1.39	U < 1.39	U < 1.51	U
1,2,4-Trimethylbenzene	< 1.39	U < 1.39	U < 1.51	U
Mesitylene	< 1.39	U < 1.39	U < 1.51	U
1,3-Dichlorobenzene	< 1.70	U < 1.70	U < 1.85	U
1,4-Dichlorobenzene	< 1.70	U < 1.70	U < 1.85	U
Benzyl chloride	< 1.46	U < 1.46	U < 1.59	U
1,2-Dichlorobenzene	< 1.70	U < 1.70	U < 1.85	U
1,2,4-Trichlorobenzene	< 2.09	U < 2.09	U < 2.29	U
Hexachloro-1,3-butadiene	< 3.01	U < 3.01	U < 3.29	U
Acetaldehyde*	ND	ND	ND	
Dimethylformamide (N,N-)*	ND	ND	ND	
Epichlorohydrin*	ND	ND	ND	
Ethylene glycol*	ND	ND	ND	
Ethylene glycol monoethyl ether*	ND	ND	ND	

Ethylene glycol monoethyl ether acetate*	ND	ND	ND
Ethylene glycol monomethyl ether*	ND	ND	ND
Ethylene glycol monomethyl ether acetate*	ND	ND	ND
Isophorone*	ND	ND	ND
Naphthalene*	ND	ND	ND
4-PCH*	ND	ND	ND
Phenol*	ND	ND	ND
Propylene glycol monomethyl ether*	ND	ND	ND
Total Target VOCs	10.36	172.88	90.71



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Total Volatile Organic Compound (TVOC) Analysis by GC/MS

Lab ID/Sample #	40004_4	40004_5	40004_6
Client Project #	1605004SF	1605004SF	1605004SF
Tube Serial #	1605	9249	1852
Sample Description	2F NE xrf lab	2F ec int ofc 218	6F sc int cr 6206
Analyst	MN	MN	MN
Analysis Date	6/1/2016	6/1/2016	6/1/2016
Collection Date	5/25/16-5/26/16	5/25/16-5/26/16	5/25/16-5/26/16
Total Liters	6.59	7.72	6.49

Analyte	Concentration (ug/m ³)	Concentration (ug/m ³)	Concentration (ug/m ³)
Propylene	< 0.52	U 0.83	< 0.53
Dichlorodifluoromethane	< 1.50	U < 1.28	U < 1.52
1,2-Dichlorotetrafluoroethane	< 2.12	U < 1.81	U < 2.15
Chloromethane	< 0.63	U < 0.53	U < 0.64
Vinyl Chloride	< 0.78	U < 0.66	U < 0.79
1,3-Butadiene	< 0.67	U < 0.57	U < 0.68
Bromomethane	< 1.18	U < 1.01	U < 1.20
Chloroethane	< 0.80	U < 0.68	U < 0.81
Trichlorofluoromethane	< 1.70	U < 1.45	U < 1.73
Ethanol	19.48	59.85	5.74
1,1,2-Trichloro-1,2,2-trifluoroethane	< 2.32	U < 1.98	U < 2.36
1,1-Dichloroethylene	< 1.20	U < 1.03	U < 1.22
Acetone	2.91	8.40	5.50
Carbon disulfide	< 0.94	U < 0.81	U < 0.96
2-Propanol	< 0.75	U < 0.64	U < 0.76
Dichloromethane	< 1.05	U < 0.90	U < 1.07
tert-Butyl methyl ether	< 1.09	U < 0.93	U < 1.11
cis-1,2-Dichloroethylene	< 1.20	U < 1.03	U < 1.22
Hexane	< 1.07	U < 0.91	U < 1.09
1,1-Dichloroethane	< 1.23	U < 1.05	U < 1.25
Vinyl Acetate	< 1.07	U < 0.91	U < 1.08
trans-1,2-Dichloroethylene	< 1.20	U < 1.03	U < 1.22
Ethyl Acetate	< 1.09	U < 0.93	U < 1.11

Tetrahydrofuran	< 0.89	U < 0.76	U < 0.91	U
Chloroform	< 1.48	U < 1.26	U < 1.50	U
Cyclohexane	< 1.04	U < 0.89	U < 1.06	U
1,1,1-Trichloroethane	< 1.66	U < 1.41	U < 1.68	U
Carbon Tetrachloride	< 1.91	U < 1.63	U < 1.94	U
Benzene	< 0.97	U < 0.83	U < 0.98	U
1,2-Dichloroethane	< 1.23	U < 1.05	U < 1.25	U
Heptane	< 1.24	U < 1.06	U < 1.26	U
Trichloroethylene	< 1.63	U < 1.39	U < 1.66	U
1,2-Dichloropropane	< 1.40	U < 1.20	U < 1.42	U
1,4-Dioxane	< 1.09	U < 0.93	U < 1.11	U
Bromodichloromethane	< 2.03	U < 1.74	U < 2.06	U
trans-1,3-Dichloropropene	< 1.38	U < 1.18	U < 1.40	U
4-Methyl-2-Pentanone	< 1.24	U < 1.06	U < 1.26	U
Toluene	< 1.14	U 2.49	< 1.16	U
cis-1,3-Dichloropropene	< 1.38	U < 1.18	U < 1.40	U
1,1,2-Trichloroethane	< 1.66	U < 1.41	U < 1.68	U
Tetrachloroethylene	< 2.06	U < 1.76	U < 2.09	U
2-Hexanone	< 1.24	U < 1.06	U < 1.26	U
Dibromochloromethane	< 2.58	U < 2.21	U < 2.62	U
1,2-Dibromoethane	< 2.33	U < 1.99	U < 2.37	U
Chlorobenzene	< 1.40	U < 1.19	U < 1.42	U
Ethylbenzene	< 1.32	U < 1.12	U < 1.34	U
m,p-Xylene	< 1.32	U < 1.12	U < 1.34	U
o-Xylene	< 1.32	U < 1.12	U < 1.34	U
Styrene	< 1.29	U 1.39	< 1.31	U
Bromoform	< 3.14	U < 2.68	U < 3.18	U
1,1,2,2-Tetrachloroethane	< 2.08	U < 1.78	U < 2.11	U
4-Ethyltoluene	< 1.49	U < 1.27	U < 1.51	U
1,2,4-Trimethylbenzene	< 1.49	U < 1.27	U < 1.51	U
Mesitylene	< 1.49	U < 1.27	U < 1.51	U
1,3-Dichlorobenzene	< 1.82	U < 1.56	U < 1.85	U
1,4-Dichlorobenzene	< 1.82	U < 1.56	U < 1.85	U
Benzyl chloride	< 1.57	U < 1.34	U < 1.59	U
1,2-Dichlorobenzene	< 1.82	U < 1.56	U < 1.85	U
1,2,4-Trichlorobenzene	< 2.25	U < 1.92	U < 2.29	U
Hexachloro-1,3-butadiene	< 3.24	U < 2.76	U < 3.29	U
Acetaldehyde*	ND	ND	ND	
Dimethylformamide (N,N-)*	ND	ND	ND	
Epichlorohydrin*	ND	ND	ND	
Ethylene glycol*	ND	ND	ND	
Ethylene glycol monoethyl ether*	ND	ND	ND	

Ethylene glycol monoethyl ether acetate*	ND	ND	ND
Ethylene glycol monomethyl ether*	ND	ND	ND
Ethylene glycol monomethyl ether acetate*	ND	ND	ND
Isophorone*	ND	ND	ND
Naphthalene*	ND	ND	ND
4-PCH*	ND	ND	ND
Phenol*	ND	ND	ND
Propylene glycol monomethyl ether*	ND	ND	ND
Total Target VOCs	22.39	72.95	11.24



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Total Volatile Organic Compound (TVOC) Analysis by GC/MS

Lab ID/Sample #	40004_7	40004_8	40004_9
Client Project #	1605004SF	1605004SF	1605004SF
Tube Serial #	10	4972	7
Sample Description	6F EC int ofc 6344	6F SW int ofc 6213	6F NW int 6124 ofc
Analyst	MN	MN	MN
Analysis Date	6/1/2016	6/1/2016	6/1/2016
Collection Date	5/25/16-5/26/16	5/25/16-5/26/16	5/25/16-5/26/16
Total Liters	6.59	7.72	7.59

Analyte	Concentration (ug/m ³)	Concentration (ug/m ³)	Concentration (ug/m ³)
Propylene	1.52	< 0.45	U < 0.45
Dichlorodifluoromethane	< 1.50	U < 1.28	U < 1.30
1,2-Dichlorotetrafluoroethane	< 2.12	U < 1.81	U < 1.84
Chloromethane	< 0.63	U < 0.53	U < 0.54
Vinyl Chloride	< 0.78	U < 0.66	U < 0.67
1,3-Butadiene	< 0.67	U < 0.57	U < 0.58
Bromomethane	2.57	< 1.01	U 1.16
Chloroethane	< 0.80	U < 0.68	U < 0.69
Trichlorofluoromethane	< 1.70	U < 1.45	U < 1.48
Ethanol	3.47	13.68	< 0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	< 2.32	U < 1.98	U < 2.02
1,1-Dichloroethylene	< 1.20	U < 1.03	U < 1.04
Acetone	3.17	4.38	3.20
Carbon disulfide	< 0.94	U < 0.81	U < 0.82
2-Propanol	< 0.75	U < 0.64	U < 0.65
Dichloromethane	< 1.05	U < 0.90	U < 0.91
tert-Butyl methyl ether	< 1.09	U < 0.93	U < 0.95
cis-1,2-Dichloroethylene	< 1.20	U < 1.03	U < 1.04
Hexane	< 1.07	U < 0.91	U < 0.93
1,1-Dichloroethane	< 1.23	U < 1.05	U < 1.07
Vinyl Acetate	< 1.07	U < 0.91	U < 0.93
trans-1,2-Dichloroethylene	< 1.20	U < 1.03	U < 1.04
Ethyl Acetate	< 1.09	U < 0.93	U < 0.95
Tetrahydrofuran	< 0.89	U < 0.76	U < 0.78

Chloroform	< 1.48	U < 1.26	U < 1.29	U
Cyclohexane	< 1.04	U < 0.89	U < 0.91	U
1,1,1-Trichloroethane	< 1.66	U < 1.41	U < 1.44	U
Carbon Tetrachloride	< 1.91	U < 1.63	U < 1.66	U
Benzene	< 0.97	U < 0.83	U < 0.84	U
1,2-Dichloroethane	< 1.23	U < 1.05	U < 1.07	U
Heptane	< 1.24	U < 1.06	U < 1.08	U
Trichloroethylene	< 1.63	U < 1.39	U < 1.42	U
1,2-Dichloropropane	< 1.40	U < 1.20	U < 1.22	U
1,4-Dioxane	< 1.09	U < 0.93	U < 0.95	U
Bromodichloromethane	< 2.03	U < 1.74	U < 1.76	U
trans-1,3-Dichloropropene	< 1.38	U < 1.18	U < 1.20	U
4-Methyl-2-Pentanone	< 1.24	U < 1.06	U < 1.08	U
Toluene	< 1.14	U < 0.98	U 2.54	
cis-1,3-Dichloropropene	< 1.38	U < 1.18	U < 1.20	U
1,1,2-Trichloroethane	< 1.66	U < 1.41	U < 1.44	U
Tetrachloroethylene	< 2.06	U < 1.76	U < 1.79	U
2-Hexanone	< 1.24	U < 1.06	U < 1.08	U
Dibromochloromethane	< 2.58	U < 2.21	U < 2.24	U
1,2-Dibromoethane	< 2.33	U < 1.99	U < 2.02	U
Chlorobenzene	< 1.40	U < 1.19	U < 1.21	U
Ethylbenzene	2.17	1.58	< 1.14	U
m,p-Xylene	2.47	1.92	< 1.14	U
o-Xylene	1.85	1.61	< 1.14	U
Styrene	< 1.29	U < 1.10	U < 1.12	U
Bromoform	< 3.14	U < 2.68	U < 2.72	U
1,1,2,2-Tetrachloroethane	< 2.08	U < 1.78	U < 1.81	U
4-Ethyltoluene	< 1.49	U < 1.27	U < 1.29	U
1,2,4-Trimethylbenzene	< 1.49	U < 1.27	U < 1.29	U
Mesitylene	< 1.49	U < 1.27	U < 1.29	U
1,3-Dichlorobenzene	< 1.82	U < 1.56	U < 1.58	U
1,4-Dichlorobenzene	< 1.82	U < 1.56	U < 1.58	U
Benzyl chloride	< 1.57	U < 1.34	U < 1.36	U
1,2-Dichlorobenzene	< 1.82	U < 1.56	U < 1.58	U
1,2,4-Trichlorobenzene	< 2.25	U < 1.92	U < 1.95	U
Hexachloro-1,3-butadiene	< 3.24	U < 2.76	U < 2.81	U
Acetaldehyde*	ND	ND	ND	
Dimethylformamide (N,N-)*	ND	ND	ND	
Epichlorohydrin*	ND	ND	ND	
Ethylene glycol*	ND	ND	ND	
Ethylene glycol monoethyl ether*	ND	ND	ND	

Ethylene glycol monoethyl ether acetate*	ND	ND	ND
Ethylene glycol monomethyl ether*	ND	ND	ND
Ethylene glycol monomethyl ether acetate*	ND	ND	ND
Isophorone*	ND	ND	ND
Naphthalene*	ND	ND	ND
4-PCH*	ND	ND	ND
Phenol*	ND	ND	ND
Propylene glycol monomethyl ether*	ND	ND	ND
Total Target VOCs	17.22	23.17	6.89



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Total Volatile Organic Compound (TVOC) Analysis by GC/MS

Lab ID/Sample #	40004_10
Client Project #	1605004SF
Tube Serial #	551
Sample Description	6F NE int ofc 6326
Analyst	MN
Analysis Date	6/1/2016
Collection Date	5/25/16-5/26/16
Total Liters	8.80

Analyte	Concentration (ug/m ³)	
Propylene	< 0.39	U
Dichlorodifluoromethane	< 1.12	U
1,2-Dichlorotetrafluoroethane	< 1.59	U
Chloromethane	< 0.47	U
Vinyl Chloride	< 0.58	U
1,3-Butadiene	< 0.50	U
Bromomethane	< 0.88	U
Chloroethane	< 0.60	U
Trichlorofluoromethane	< 1.28	U
Ethanol	< 0.43	U
1,1,2-Trichloro-1,2,2-trifluoroethane	< 1.74	U
1,1-Dichloroethylene	< 0.90	U
Acetone	< 0.54	U
Carbon disulfide	< 0.71	U
2-Propanol	< 0.56	U
Dichloromethane	< 0.79	U
tert-Butyl methyl ether	< 0.82	U
cis-1,2-Dichloroethylene	< 0.90	U
Hexane	< 0.80	U
1,1-Dichloroethane	< 0.92	U
Vinyl Acetate	< 0.80	U
trans-1,2-Dichloroethylene	< 0.90	U
Ethyl Acetate	< 0.82	U
Tetrahydrofuran	< 0.67	U

Chloroform	< 1.11	U
Cyclohexane	< 0.78	U
1,1,1-Trichloroethane	< 1.24	U
Carbon Tetrachloride	< 1.43	U
Benzene	< 0.73	U
1,2-Dichloroethane	< 0.92	U
Heptane	< 0.93	U
Trichloroethylene	< 1.22	U
1,2-Dichloropropane	< 1.05	U
1,4-Dioxane	< 0.82	U
Bromodichloromethane	< 1.52	U
trans-1,3-Dichloropropene	< 1.03	U
4-Methyl-2-Pentanone	< 0.93	U
Toluene	< 0.86	U
cis-1,3-Dichloropropene	< 1.03	U
1,1,2-Trichloroethane	< 1.24	U
Tetrachloroethylene	< 1.54	U
2-Hexanone	< 0.93	U
Dibromochloromethane	< 1.94	U
1,2-Dibromoethane	< 1.75	U
Chlorobenzene	< 1.05	U
Ethylbenzene	< 0.99	U
m,p-Xylene	< 0.99	U
o-Xylene	< 0.99	U
Styrene	< 0.97	U
Bromoform	< 2.35	U
1,1,1,2-Tetrachloroethane	< 1.56	U
4-Ethyltoluene	< 1.12	U
1,2,4-Trimethylbenzene	< 1.12	U
Mesitylene	< 1.12	U
1,3-Dichlorobenzene	< 1.37	U
1,4-Dichlorobenzene	< 1.37	U
Benzyl chloride	< 1.18	U
1,2-Dichlorobenzene	< 1.37	U
1,2,4-Trichlorobenzene	< 1.69	U
Hexachloro-1,3-butadiene	< 2.42	U
Acetaldehyde*	ND	
Dimethylformamide (N,N-)*	ND	
Epichlorohydrin*	ND	
Ethylene glycol*	ND	
Ethylene glycol monoethyl ether*	ND	



Ethylene glycol monoethyl ether acetate*	ND
Ethylene glycol monomethyl ether*	ND
Ethylene glycol monomethyl ether acetate*	ND
Isophorone*	ND
Naphthalene*	ND
4-PCH*	ND
Phenol*	ND
Propylene glycol monomethyl ether*	ND
Total Target VOCs	0.00



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Total Volatile Organic Compound (TVOC) Analysis by GC/MS

Lab ID/Sample #	40004_11	40004_12	40004_13
Client Project #	1605004SF	1605004SF	1605004SF
Tube Serial #	G0187588	G0140051	G0142036
Sample Description	7F NE cube area 7312	7F SW cube area 7215	7F NW int ofc 7115
Analyst	MN	MN	MN
Analysis Date	6/2/2016	6/2/2016	6/2/2016
Collection Date	5/27/2016	5/27/2016	5/27/2016
Total Liters	8.80	7.10	6.60

Analyte	Concentration (ug/m ³)	Concentration (ug/m ³)	Concentration (ug/m ³)
Propylene	< 0.39	U < 0.48	U 1.02
Dichlorodifluoromethane	< 1.12	U < 1.39	U < 1.50
1,2-Dichlorotetrafluoroethane	< 1.59	U < 1.97	U < 2.12
Chloromethane	< 0.47	U < 0.58	U 1.00
Vinyl Chloride	< 0.58	U < 0.72	U < 0.77
1,3-Butadiene	< 0.50	U < 0.62	U < 0.67
Bromomethane	< 0.88	U < 1.09	U 4.49
Chloroethane	< 0.60	U < 0.74	U < 0.80
Trichlorofluoromethane	< 1.28	U < 1.58	U < 1.70
Ethanol	< 0.43	U < 0.53	U < 0.57
1,1,2-Trichloro-1,2,2-trifluoroethane	< 1.74	U < 2.16	U < 2.32
1,1-Dichloroethylene	< 0.90	U < 1.12	U < 1.20
Acetone	< 0.54	U 3.37	2.05
Carbon disulfide	< 0.71	U < 0.88	U < 0.94
2-Propanol	< 0.56	U < 0.69	U < 0.74
Dichloromethane	< 0.79	U < 0.98	U < 1.05
tert-Butyl methyl ether	< 0.82	U < 1.02	U < 1.09
cis-1,2-Dichloroethylene	< 0.90	U < 1.12	U < 1.20
Hexane	< 0.80	U < 0.99	U < 1.07
1,1-Dichloroethane	< 0.92	U < 1.14	U < 1.23
Vinyl Acetate	< 0.80	U < 0.99	U < 1.07
trans-1,2-Dichloroethylene	< 0.90	U < 1.12	U < 1.20
Ethyl Acetate	< 0.82	U < 1.01	U < 1.09

Tetrahydrofuran	< 0.67	U < 0.83	U < 0.89	U
Chloroform	< 1.11	U < 1.37	U < 1.48	U
Cyclohexane	< 0.78	U < 0.97	U < 1.04	U
1,1,1-Trichloroethane	< 1.24	U < 1.54	U < 1.65	U
Carbon Tetrachloride	< 1.43	U < 1.77	U < 1.91	U
Benzene	< 0.73	U < 0.90	U 0.97	
1,2-Dichloroethane	< 0.92	U < 1.14	U < 1.23	U
Heptane	< 0.93	U < 1.15	U < 1.24	U
Trichloroethylene	< 1.22	U < 1.51	U < 1.63	U
1,2-Dichloropropane	< 1.05	U < 1.30	U < 1.40	U
1,4-Dioxane	< 0.82	U < 1.01	U < 1.09	U
Bromodichloromethane	< 1.52	U < 1.89	U < 2.03	U
trans-1,3-Dichloropropene	< 1.03	U < 1.28	U < 1.37	U
4-Methyl-2-Pentanone	< 0.93	U < 0.93	U < 1.24	U
Toluene	< 0.86	U < 0.86	U < 1.14	U
cis-1,3-Dichloropropene	< 1.03	U < 1.03	U < 1.37	U
1,1,2-Trichloroethane	< 1.24	U < 1.24	U < 1.65	U
Tetrachloroethylene	< 1.54	U < 1.54	U < 2.05	U
2-Hexanone	< 0.93	U < 0.93	U < 1.24	U
Dibromochloromethane	< 1.94	U < 1.94	U < 2.58	U
1,2-Dibromoethane	< 1.75	U < 1.75	U < 2.33	U
Chlorobenzene	< 1.05	U < 1.05	U < 1.39	U
Ethylbenzene	< 0.99	U < 0.99	U < 1.32	U
m,p-Xylene	< 0.99	U < 0.99	U < 1.32	U
o-Xylene	< 0.99	U < 0.99	U < 1.32	U
Styrene	< 0.97	U < 0.97	U < 1.29	U
Bromoform	< 2.35	U < 2.35	U < 3.13	U
1,1,2,2-Tetrachloroethane	< 1.56	U < 1.56	U < 2.08	U
4-Ethyltoluene	< 1.12	U < 1.12	U < 1.49	U
1,2,4-Trimethylbenzene	< 1.12	U < 1.12	U < 1.49	U
Mesitylene	< 1.12	U < 1.12	U < 1.49	U
1,3-Dichlorobenzene	< 1.37	U < 1.37	U < 1.82	U
1,4-Dichlorobenzene	< 1.37	U < 1.37	U < 1.82	U
Benzyl chloride	< 1.18	U < 1.18	U < 1.57	U
1,2-Dichlorobenzene	< 1.37	U < 1.37	U < 1.82	U
1,2,4-Trichlorobenzene	< 1.69	U < 1.69	U < 2.25	U
Hexachloro-1,3-butadiene	< 2.42	U < 2.42	U < 3.23	U
Acetaldehyde*	ND	ND	ND	
Dimethylformamide (N,N-)*	ND	ND	ND	
Epichlorohydrin*	ND	ND	ND	
Ethylene glycol*	ND	ND	ND	
Ethylene glycol monoethyl ether*	ND	ND	ND	

Ethylene glycol monoethyl ether acetate*	ND	ND	ND
Ethylene glycol monomethyl ether*	ND	ND	ND
Ethylene glycol monomethyl ether acetate*	ND	ND	ND
Isophorone*	ND	ND	ND
Naphthalene*	ND	ND	ND
4-PCH*	ND	ND	ND
Phenol*	ND	ND	ND
Propylene glycol monomethyl ether*	ND	ND	ND
Total Target VOCs	0.00	3.37	9.52



Healthy Buildings

3251 Old Lee Highway, Suite 100
 Fairfax, VA 22030
 Ph: (703) 323-4400
 Fax: (703) 323-4440

Total Volatile Organic Compound (TVOC) Analysis by GC/MS

Lab ID/Sample #	40004_14	40004_15	40004_16
Client Project #	1605004SF	1605004SF	1605004SF
Tube Serial #	G0140076	G0151363	G0143083
Sample Description	8F NE perim ofc 8316	8F SC work room 8358	8F SW int ofc 8224
Analyst	MN	MN	MN
Analysis Date	6/2/2016	6/2/2016	6/2/2016
Collection Date	5/27/2016	5/27/2016	5/27/2016
Total Liters	6.50	7.72	7.59

Analyte	Concentration (ug/m ³)	Concentration (ug/m ³)	Concentration (ug/m ³)
Propylene	< 0.53	U < 0.45	U < 0.45
Dichlorodifluoromethane	< 1.52	U < 1.28	U < 1.30
1,2-Dichlorotetrafluoroethane	< 2.15	U < 1.81	U < 1.84
Chloromethane	< 0.64	U < 0.53	U < 0.54
Vinyl Chloride	< 0.79	U < 0.66	U < 0.67
1,3-Butadiene	< 0.68	U < 0.57	U < 0.58
Bromomethane	< 1.19	U < 1.01	U < 1.02
Chloroethane	< 0.81	U < 0.68	U < 0.69
Trichlorofluoromethane	< 1.73	U < 1.45	U < 1.48
Ethanol	32.19	5.37	4.40
1,1,2-Trichloro-1,2,2-trifluoroethane	< 2.36	U < 1.98	U < 2.02
1,1-Dichloroethylene	< 1.22	U < 1.03	U < 1.04
Acetone	6.06	4.59	2.38
Carbon disulfide	< 0.96	U < 0.81	U < 0.82
2-Propanol	< 0.76	U < 0.64	U < 0.65
Dichloromethane	< 1.07	U < 0.90	U < 0.91
tert-Butyl methyl ether	< 1.11	U < 0.93	U < 0.95
cis-1,2-Dichloroethylene	< 1.22	U < 1.03	U < 1.04
Hexane	< 1.08	U < 0.91	U < 0.93
1,1-Dichloroethane	< 1.24	U < 1.05	U < 1.07
Vinyl Acetate	< 1.08	U < 0.91	U < 0.93
trans-1,2-Dichloroethylene	< 1.22	U < 1.03	U < 1.04
Ethyl Acetate	< 1.11	U < 0.93	U < 0.95

Tetrahydrofuran	< 0.91	U < 0.76	U < 0.78	U
Chloroform	< 1.50	U < 1.26	U < 1.29	U
Cyclohexane	< 1.06	U < 0.89	U < 0.91	U
1,1,1-Trichloroethane	< 1.68	U < 1.41	U < 1.44	U
Carbon Tetrachloride	< 1.93	U < 1.63	U < 1.66	U
Benzene	< 0.98	U < 0.83	U < 0.84	U
1,2-Dichloroethane	< 1.24	U < 1.05	U < 1.07	U
Heptane	< 1.26	U < 1.06	U < 1.08	U
Trichloroethylene	< 1.65	U < 1.39	U < 1.42	U
1,2-Dichloropropane	< 1.42	U < 1.20	U < 1.22	U
1,4-Dioxane	< 1.11	U < 0.93	U < 0.95	U
Bromodichloromethane	< 2.06	U < 1.74	U < 1.76	U
trans-1,3-Dichloropropene	< 1.40	U < 1.18	U < 1.20	U
4-Methyl-2-Pentanone	< 1.26	U < 1.06	U < 1.08	U
Toluene	1.44	< 0.98	U < 0.99	U
cis-1,3-Dichloropropene	< 1.40	U < 1.18	U < 1.20	U
1,1,2-Trichloroethane	< 1.68	U < 1.41	U < 1.44	U
Tetrachloroethylene	< 2.09	U < 1.76	U < 1.79	U
2-Hexanone	< 1.26	U < 1.06	U < 1.08	U
Dibromochloromethane	< 2.62	U < 2.21	U < 2.24	U
1,2-Dibromoethane	< 2.36	U < 1.99	U < 2.02	U
Chlorobenzene	< 1.42	U < 1.19	U < 1.21	U
Ethylbenzene	< 1.34	U < 1.12	U < 1.14	U
m,p-Xylene	2.04	< 1.12	U < 1.14	U
o-Xylene	< 1.34	U < 1.12	U < 1.14	U
Styrene	< 1.31	U < 1.10	U < 1.12	U
Bromoform	< 3.18	U < 2.68	U < 2.72	U
1,1,2,2-Tetrachloroethane	< 2.11	U < 1.78	U < 1.81	U
4-Ethyltoluene	< 1.51	U < 1.27	U < 1.29	U
1,2,4-Trimethylbenzene	< 1.51	U < 1.27	U < 1.29	U
Mesitylene	2.90	< 1.27	U < 1.29	U
1,3-Dichlorobenzene	< 1.85	U < 1.56	U < 1.58	U
1,4-Dichlorobenzene	< 1.85	U < 1.56	U < 1.58	U
Benzyl chloride	< 1.59	U < 1.34	U < 1.36	U
1,2-Dichlorobenzene	< 1.85	U < 1.56	U < 1.58	U
1,2,4-Trichlorobenzene	< 2.28	U < 1.92	U < 1.95	U
Hexachloro-1,3-butadiene	< 3.28	U < 2.76	U < 2.81	U
Acetaldehyde*	ND	ND	ND	
Dimethylformamide (N,N-)*	ND	ND	ND	
Epichlorohydrin*	ND	ND	ND	
Ethylene glycol*	ND	ND	ND	
Ethylene glycol monoethyl ether*	ND	ND	ND	

Ethylene glycol monoethyl ether acetate*	ND	ND	ND
Ethylene glycol monomethyl ether*	ND	ND	ND
Ethylene glycol monomethyl ether acetate*	ND	ND	ND
Isophorone*	ND	ND	ND
Naphthalene*	ND	ND	ND
4-PCH*	ND	ND	ND
Phenol*	ND	ND	ND
Propylene glycol monomethyl ether*	ND	ND	ND
Total Target VOCs	44.63	9.96	6.78

Test Sampling and Analysis for Airborne Caprolactam

Objective: To estimate the amounts of caprolactam present in the building air.

Method: Air sampling using multi-bed sorbent tubes. Sorbent tubes are analyzed by double thermal desorption and subsequent analysis by capillary gas chromatography and mass spectroscopy. This method follows EPA Method TO-17.

No.	Location	Concentration of Caprolactam (ppb)
1	1F South Central Yerba Buena Conference Room 107/109	0.8
2	1F East Central Building Engineering Office 130	0.8
3	2F East Central Open Offices 242C	0.8
4	2F Northeast Lab XRF 234	0.3
5	2F East Interior Office 218	0.2
6	6F South Central Conference Room 6206	0.5
7	6F East Central Office 6344	0.6
8	6F Southwest Office 6213	0.5
9	6F Northwest Office 6124	0.6
10	6F Northeast Office 6326	0.4
11	7F Northeast Cube Area 7312	0.6
12	7F Southwest Cube Area 7215	0.5
13	7F Northwest Office 7115	0.5
14	8F Northeast Office 8316	0.9
15	8F South Central Work Room 8358	0.5
16	8F Southwest Office 8224	0.7
17	Outdoors	--

Conclusions:

All Caprolactam results were below the OEHHA 8-hour Recommended Exposure Limit (REL) of 1.4 ppb.

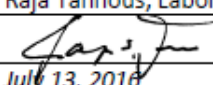
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BERKELEY ANALYTICAL
 815 Harbour Way South, Suite 6
 Richmond, CA 94804
 Ph. 510-236-2325; Fax 510-236-2335
 E-mail info@berkeleyanalytical.com

Analysis of Field-Collected Air Samples

Customer and Project Information	
Report Certification	
Report number	803-003-IH-July1316
Report date	July 13, 2016
Certified by (Name/Title)	Raja Tannous, Laboratory Director
Signature	
Date	July 13, 2016
Methods	
U.S. EPA TO-17	Determination of Volatile Organic Compounds in Ambient...
Customer Information	
Customer:	Healthy Buildings International
City/State/Country	Oakland, CA, USA
Contact name/Title	Joel Ritschel
Phone number	973-518-2430
Project Information	
Project number	1605004SF
Project name	BAAQMD
Project location	Not given
Project date	July 10, 2016
Laboratory Receiving Information	
Date samples received by lab	July 11, 2016
Condition of samples	No observed problems
Lab tracking numbers	803-003-01 to 803-003-17



Sample Information, Caprolactam

Sample No.	Sample Description	Sampler No.	Date Collected	Volume* (L)	Analysis Type	Specified Method
1C	1	058850	July 10, 2016	7.29	Caprolactam	TO-17
2C	2	059926	July 10, 2016	7.7	Caprolactam	TO-17
3C	3	058837	July 10, 2016	7.3	Caprolactam	TO-17
4C	4	059957	July 10, 2016	7.6	Caprolactam	TO-17
5C	5	051152	July 10, 2016	7.4	Caprolactam	TO-17
6C	6	059922	July 10, 2016	7.5	Caprolactam	TO-17
7C	7	058836	July 10, 2016	7.4	Caprolactam	TO-17
8C	8	059958	July 10, 2016	7.4	Caprolactam	TO-17
9C	9	058849	July 10, 2016	7.3	Caprolactam	TO-17
10C	10	051153	July 10, 2016	7.5	Caprolactam	TO-17
11C	11	059928	July 10, 2016	7.5	Caprolactam	TO-17
12C	12	051119	July 10, 2016	7.4	Caprolactam	TO-17
13C	13	059921	July 10, 2016	7.3	Caprolactam	TO-17
14C	14	058846	July 10, 2016	7.5	Caprolactam	TO-17
15C	15	051196	July 10, 2016	7.3	Caprolactam	TO-17
16C	16	059931	July 10, 2016	7.4	Caprolactam	TO-17
17C	17	059956	July 10, 2016	7.5	Caprolactam	TO-17

*Volume in liters reported by customer



Analytical Information, Caprolactam

Sample No.	Lab Track. No.	Method	Date Analyzed	Analyst	Data File
1C	803-003-01	TO-17	July 12, 2016	R. Gill	T160712_07
2C	803-003-02	TO-17	July 12, 2016	R. Gill	T160712_08
3C	803-003-03	TO-17	July 12, 2016	R. Gill	T160712_09
4C	803-003-04	TO-17	July 12, 2016	R. Gill	T160712_10
5C	803-003-05	TO-17	July 12, 2016	R. Gill	T160712_11
6C	803-003-06	TO-17	July 12, 2016	R. Gill	T160712_12
7C	803-003-07	TO-17	July 12, 2016	R. Gill	T160712_13
8C	803-003-08	TO-17	July 12, 2016	R. Gill	T160712_14
9C	803-003-09	TO-17	July 12, 2016	R. Gill	T160712_15
10C	803-003-10	TO-17	July 12, 2016	R. Gill	T160712_16
11C	803-003-11	TO-17	July 12, 2016	R. Gill	T160712_17
12C	803-003-12	TO-17	July 12, 2016	R. Gill	T160712_18
13C	803-003-13	TO-17	July 12, 2016	R. Gill	T160712_19
14C	803-003-14	TO-17	July 12, 2016	R. Gill	T160712_20
15C	803-003-15	TO-17	July 12, 2016	R. Gill	T160712_21
16C	803-003-16	TO-17	July 12, 2016	R. Gill	T160712_22
17C	803-003-17	TO-17	July 12, 2016	R. Gill	T160712_23



Project Specific Information

Air samples for the analysis of caprolactam (CAS # 105-60-2) were received by the laboratory on July 12, 2016. There were seventeen multi-sorbent tubes for the analysis of caprolactam. The analytical results for caprolactam are presented in Table 1. All laboratory data, including but not limited to raw instrument files, calibration files, and quality control checks used to generate the results will be made available to the customer upon request.

Caprolactam was analyzed by thermal desorption GC/MS following U.S. EPA Compendium Method TO-17. Caprolactam was quantified using a multi-point (4 or more points) calibration curve prepared with a pure standard.

MDL and LOQ – A Method Detection Limit (MDL) for caprolactam of 2.3 ng was determined from the analysis of three replicates of a low level standard spiked onto multi-sorbent air sampling tubes. The practical lower limit of quantitation (LOQ) is three times the MDL.

Uncertainty – The laboratory uses the ISO GUM method to estimate the uncertainties associated with the measurement of VOCs. The expanded uncertainty is equal to two times the relative standard deviation. For 2015, the expanded uncertainty estimated for caprolactam was about 11%.

All test methods used in this project are contained in the scope of Berkeley Analytical's ISO/IEC 17025 accreditation (TL-383, International Accreditation Service, Inc.).



Results, Caprolactam

Table 1. Quantitative analysis of Caprolactam (CAS # 105-60-2).

Sample No.	Sample Name	Volume (L)	Mass (ng)	Conc (µg/m ³)	Conc* (ppb)
1C	1	7.29	26.6	3.6	0.8
2C	2	7.7	27.4	3.6	0.8
3C	3	7.3	26.4	3.6	0.8
4C	4	7.6	12.3	1.6	0.3
5C	5	7.4	7.3	1.0	0.2
6C	6	7.5	17.5	2.3	0.5
7C	7	7.4	19.6	2.7	0.6
8C	8	7.4	17.8	2.4	0.5
9C	9	7.3	20.8	2.9	0.6
10C	10	7.5	14.4	1.9	0.4
11C	11	7.5	22.0	2.9	0.6
12C	12	7.4	16.8	2.3	0.5
13C	13	7.3	18.5	2.5	0.5
14C	14	7.5	29.7	4.0	0.9
15C	15	7.3	18.4	2.5	0.5
16C	16	7.4	24.4	3.3	0.7
17C	17	7.5	MDL	--	--

*Concentration in ppb calculated assuming standard conditions of 25° C and 101.3 kPa.

END OF REPORT

Test Measurement and Averages for Airborne Levels of Carbon Monoxide Gas

Objective Measuring of Carbon Monoxide over an 8-hour period.

Method: Carbon monoxide measurements were electronically recorded with a calibrated instrument containing an electrochemical sensor meeting EPA IP-3C standards.

No.	Location	CO Average (ppm)	CO Outdoors Average (ppm)
1	1F South Central Yerba Buena Conference Room 107/109	0.4	0.6
2	1F East Central Building Engineering Office 130	0.5	0.6
3	2F East Central Open Offices 242C	0.4	0.6
4	2F Northeast Lab XRF 234	0.4	0.6
5	2F East Interior Office 218	0.5	0.6
6	6F South Central Conference Room 6206	0.6	0.8
7	6F East Central Office 6344	0.6	0.8
8	6F Southwest Office 6213	0.4	0.8
9	6F Northwest Office 6124	0.7	0.8
10	6F Northeast Office 6326	0.7	0.8
11	7F Northeast Cube Area 7312	0.8	0.8
12	7F Southwest Cube Area 7215	0.8	0.8
13	7F Northwest Office 7115	0.7	0.8
14	8F Northeast Office 8316	0.8	0.8
15	8F South Central Work Room 8358	0.8	0.8
16	8F Southwest Office 8224	0.8	0.8

Conclusions:

The results from the carbon monoxide testing are no more than 0.8ppm, well below the recommended acceptable upper limit for carbon monoxide of 9 ppm, or 2 ppm above the outdoor level.

Test Measurement and Averages for Airborne Levels of Ozone

Objective Measuring of Ozone over an 8-hour period.

Method: Ozone measurements were electronically recorded with a calibrated instrument containing an electrochemical sensor meeting ASTM D5149-02 standards.

No.	Location	Ozone Average (ppm)
1	1F South Central Yerba Buena Conference Room 107/109	< 0.02
2	1F East Central Building Engineering Office 130	< 0.02
3	2F East Central Open Offices 242C	< 0.02
4	2F Northeast Lab XRF 234	< 0.02
5	2F East Interior Office 218	< 0.02
6	6F South Central Conference Room 6206	< 0.02
7	6F East Central Office 6344	< 0.02
8	6F Southwest Office 6213	< 0.02
9	6F Northwest Office 6124	< 0.02
10	6F Northeast Office 6326	< 0.02
11	7F Northeast Cube Area 7312	< 0.02
12	7F Southwest Cube Area 7215	< 0.02
13	7F Northwest Office 7115	< 0.02
14	8F Northeast Office 8316	< 0.02
15	8F South Central Work Room 8358	< 0.02
16	8F Southwest Office 8224	< 0.02

Conclusions:

The results from the ozone testing are no more than < 0.02 ppm, well below the recommended acceptable upper limit for ozone of 0.075 ppm.

Glossary of Technical Terms

Carbon dioxide (CO ₂)	A byproduct of respiration and normal constituent of the atmosphere. Measurement of carbon dioxide can provide an indication of ventilation rates in a building and/or a threshold of comfort
Carbon monoxide (CO)	A toxic byproduct of fuel combustion. While odorless, carbon monoxide gas is often accompanied by other odorous combustion products (aldehydes, oxides of nitrogen, etc.)
Counts per cubic meter of air (count/m ³)	A calculated unit of measurement for quantifying airborne mold spores per unit volume of air
Formaldehyde (HCHO)	A pungent, organic compound associated with certain new furnishings, glues, pressed woods, vehicle exhaust and tobacco smoke. Reacts in the atmosphere to become a component of smog
Hydrogen Sulfide (H ₂ S)	Or sewer gas. A toxic and flammable gas associated with rotten egg odor from the bacterial breakdown or organic matter. Detectable by the human sense of smell at extremely low concentration.
Hyphae	A long branching filamentous cell of a fungi or “root” structures. Their presence often indicates active growth
Infrared Thermography	The science of detecting radiation in the infrared range. As radiation increases with temperature, thermography allows one to detect the variation in temperature allowing building diagnosticians to “see” moisture accumulation or potential air leakage not otherwise visible.
Micrograms per cubic meter (µg/m ³)	A unit of concentration common to particles and gases which describes the weight or mass of the contaminant per unit volume of air. A microgram is 1/1,000,000th of a gram.
Micrometer (µm)	A common unit of measurement for microscopic particles. Unit of measure that is 1/1,000,000th the length of a meter
Moisture meter	An instrument capable of measuring the moisture content of porous and semi-porous materials; used in the assessment of moisture and a metric for potential mold growth
Mold	Include all species of microscopic fungi that grow in the form of multicellular filaments called hyphae; common consequence to moisture damaged material
Nitrogen Dioxide (NO ₂)	A toxic and pungent gas common to internal combustion engines and power plants. Reaction products include ozone.
Relative humidity	The amount of water vapor that exists in a gaseous mixture of air and water relative to temperature. Measured in %.
Respirable Suspended Particulate	A classification of dust which describes a particle size range averaging less than 10 micrometers (um) in diameter. Excessive particles in the respirable range are more likely to be implicated in respiratory distress
Spores	The reproductive structure of mold (fungi) adapted for dispersal. Typically, 1-20 micrometers in diameter. Have been implicated in allergy-like symptoms and rare cases of infection
Sulfur Dioxide (SO ₂)	A toxic gas associated common to coal burning, power plants, and the incomplete combustion of lower grade fuels.
Tape Lift	A technique to collect surface molds or settled particles for microscopic analysis
Temperature	A physical property of air describing heat or cold measured in degrees Fahrenheit
Total Volatile Organic Compounds (TVOCs)	An aggregate measure of volatile organic compounds in air expressed in ppm or µg/m ³ .
Ultrafine Particles	A classification of airborne particles with diameters in the range of 0.02 – 1.0 micrometers characterized by their ability to reach the gas exchange regions of the lung; under considerable investigation as a trigger for respiratory distress
Volatile Organic Compounds	Classes of organic chemical compounds (containing carbon) with high enough vapor pressures to exist as gases under normal temperature and pressure conditions. Odors common to fuels, paints, new furnishings, etc.