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environmental science & engineering

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March 20, 2015

Mr. Justin Dextradeur
Development Manager
c/o Summit Property Management
210 College Street, Suite 201
Burlington, VT 05401

RE: **Annual Building Sub-Slab Depressurization System Operations and Maintenance Report** – Packard Lofts, 237 North Avenue, Burlington, Vermont (SMS #2013-4350)

Dear Mr. Dextradeur:

This letter report contains a summary of inspection and testing of the sub-slab depressurization system at the referenced site. KAS has completed this work for Summit Property Management, which is responsible for the management of the property and the operation and maintenance of the system. The owner of the property is Hartland Group.

Background

Phase I and Phase II Environmental Site Assessments were completed at the property in preparation for the re-development of the site into a mixed commercial and residential use building known as Packard Lofts. Several Recognized Environmental Conditions (RECs) were identified and further investigated, including fuel oil, gasoline, and waste oil underground storage tanks (USTs), floor drains, and the historical use of the property for automobile sales and maintenance. These RECs were addressed through the implementation of a Corrective Action Plan (CAP), which included the implementation of an active soil depressurization (ASD) method known as a sub-slab depressurization (SSD) system below a part of the new building to mitigate potential residual soil vapor intrusion to the building.

The SSD system was installed below the western third of the building which is built upon a slab-on-grade foundation and has residential units on the ground floor. The SSD system consists of perforated piping installed in the sub-base aggregate below the slab that is piped to the roof of the building where an in-line exhaust fan is attached to the pipe at its discharge. A manometer is installed on the inlet side of the fan and readings are recorded with a data logger to facilitate monitoring of the system remotely. Four (4) vapor monitoring points have been installed horizontally through the foundation after the construction of the building had been completed for the purpose of

measuring the influence of the SSD (labeled VP-SE, VP-SC, VP-SW, and VP-NW on the attached annotated foundation plan).

Since the installation of the SSD and the vapor monitoring points, the system operator has not been able to measure an appreciable vacuum in the vapor monitoring points to demonstrate that the pressure field of the SSD extends throughout the sub-slab area. In an attempt to improve the influence of the SSD system, different fans have been utilized including a RadonAway model RP-265 fan (originally specified) and RadonAway model GP-501 fan.

The tasks and data presented in this report have been completed to comply with the August 28, 2013 Sub-Slab Depressurization System Operation and Monitoring (O&M) Plan prepared by Greatwood Engineering Management and a CAP approval letter from Ms. Patricia Coppolino of the Vermont Department of Environmental Conservation (VTDEC) Waste Management and Prevention Division dated September 17, 2013. In addition work has been completed to troubleshoot the existing SSD system and improve its performance or demonstrate that it is operating in a manner consistent with standards for vapor intrusion mitigation systems.

System Operation

The O&M Plan calls for a quarterly visual inspection of the fan to confirm proper operation. The VTDEC modified this task requiring the inspection frequency to be increased to monthly and to include specific operation checks as identified in the installation and operation manual of the fan: (1) Verify all connections are tight and leak-free, (2) ensure the fan and ducting is secure and vibration free, and (3) verify system vacuum pressure with manometer and that vacuum pressure is less than the maximum recommended operating pressure.

The system operation is monitored continuously by a manometer that is connected to a data logger that can be accessed remotely via a secure internet connection. By monitoring the vacuum of the system, it is possible to confirm that the system is operating and that it is operating within its design parameters. For the period of June to December 2014, the system maintained a consistent vacuum of about 0.64" WC (inches of water column) with the exception of fluctuations in August and November which are likely a result in weather changes and high winds creating a stack effect in the building. The minimum reading was 0.33" WC and the maximum was 0.75" WC, indicating that a sufficient vacuum was maintained during the entire period and did not

exceed the maximum recommended operating pressure for this fan which is 2.2" WC.

Due to the ability to monitor the SSD system operation remotely, physical visual inspections were completed by Redstone staff approximately every three (3) months. At each inspection the fan was observed operating and connections were tight and the system vibration free. Since the fan is located on the roof of the building just before the discharge, none of the system components located below or in the building are pressurized and therefore there is little to no risk associated with small leaks in the system components located within the building.

Vacuum Measurement

A KAS engineer completed a preliminary site visit and review of the SSD system components on September 11, 2014. At that time, the GP-501 fan was installed on the system. Vacuum pressure was measured on the four vapor monitoring points with a magnehelic pressure gauge. At that time a vacuum pressure of 0.06" WC was measured at VP-SC and no vacuum was measured on the remaining three.

On November 13, 2014, KAS returned to the site to complete an annual O&M inspection of the system which included measurement of vacuum pressure at the four vapor points with the use of a micro-manometer. At this time the RP-265 fan was installed on the system. No vacuum was measured at any of the four vapor points (0.00" WC). Since the vapor points were installed after the construction of the building, the condition and location of the ends of the vapor points (relative to the aggregate base below the slab) is unknown and several actions were taken to trouble-shoot the vapor monitoring points themselves, including the following.

- The sample tubes appeared to be clogged as it was not possible to force air into them manually. A compressor was brought to the site and each tube pressurized to blow out blockages that might be present. Although the resistance in the tube decreased, there was no increase in vacuum readings;
- Some of the vapor point tubes appeared to be loose in the penetrations through the foundation. The penetrations were re-sealed with excess putty in the penetration but it resulted in no increase in vacuum readings; and,

- Vacuum pressure measurements were taken relative to the atmosphere inside the building to determine whether the building HVAC system would cause a positive pressure differential with respect to the below the slab by extending the vapor point tubes through an exterior window to one of the first-floor apartments and then sealing the window. No differential in pressure was measured.

According to Appendix C of the VTDEC's Investigation and Remediation of Contaminated Properties (IROCP) Procedure, the recommended minimum vacuum pressure differential below the slab of an SSD should be 2 Pascals (0.008" WC) or greater.

Volatile Organic Compound (VOC) Monitoring

On November 11, 2014, KAS collected an air sample from the air extracted by the SSD system for analysis of volatile organic compounds (VOCs) by method TO-15. The sample was drawn from the vacuum side of the SSD system fan via a vinyl tube that was connected to the manometer sensor tube that continuously monitors the vacuum pressure of the SSD system. The sample was collected into a Summa canister through a flow controller over a four hour period of time. The Summa canister and flow controller were calibrated and provided by the by the laboratory, TestAmerica of Burlington, VT.

Photograph of the air sample collection apparatus

Detailed results of the analysis are provided in the attached analytical report with detections summarized in the following table.

Analyte	Result	Indoor Air Standard	Shallow Soil Gas Standard
n-Butane	5.3	N/A	N/A
Acetone	120	315	3,150
Methyl Ethyl Ketone	12	5,000	50,000
Chloroform	1.9	0.38	3.8
Toluene	5.0	300	300,00

Note: All results reported in micrograms per cubic meter ($\mu g/m^3$)

All compounds that were detected in the analysis were at concentrations well below the applicable standard which is the Shallow Soil Gas Standard. The Indoor Air Standard is provided in the table for reference and comparison purposes only.

KAS also measured the discharge from the fan for VOCs with the use of a Mini-RAE Lite photoionization detector (PID) at the beginning and end of the sample collection period. Both measurements resulted in a reading of 0.0 parts per million (ppm).

Recommendations

Based on KAS' observations obtained for the development of this O&M Report, all aspects of the SSD in operation at the Packard Lofts site appear to be functional and consistent with radon or other vapor intrusion mitigation system requirements, except that it could not be verified that the pressure field extends throughout the floor slab area. The operation of the RP-265 fan at around 0.6" WC would correspond to a flow rate of approximately 230 CFM which would indicate good flow through the aggregate in the sub-slab and therefore good communication through that material. It is likely that the vapor points terminate in soil below the aggregate base below the slab in material that is less permeable that the aggregate and therefore not influenced by the SSD system. A vacuum was measured in VP-SC when the GP-501 fan was installed which is rated for higher vacuum and lower flow, which would be expected if the VP was terminated in less permeable soil.

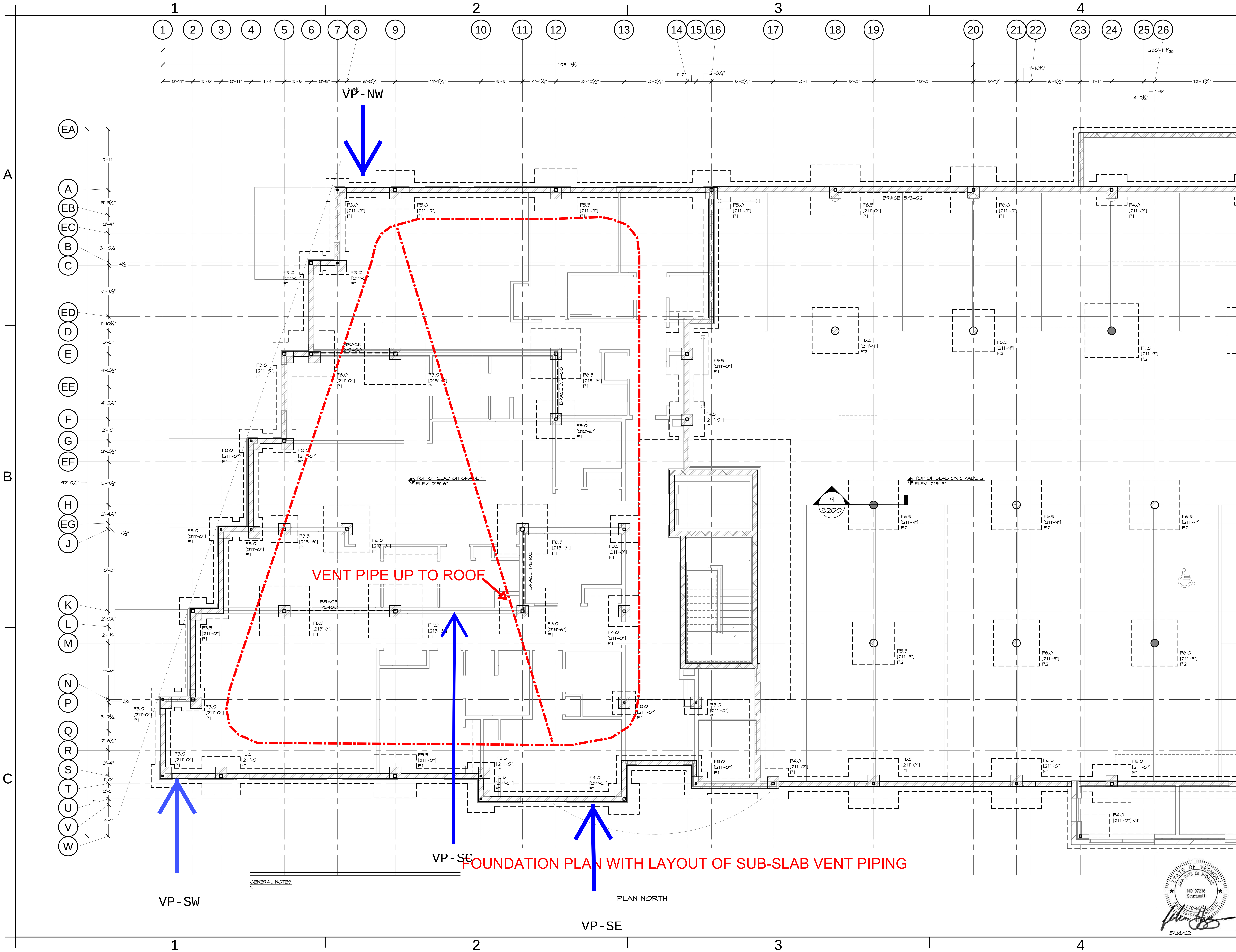
KAS recommends that the SSD system continue to operate with the RP-265 fan installed on the system. The system should be inspected again in the Fall of 2015 with a VOC sample collected and possible future actions re-evaluated at that time.

Sincerely,

Erik C.F. Sandblom, P.E.
Principal Engineer

Enclosure:
1) Annotated Foundation Plan
2) Analytical Reports
3) TO-15 Air Sampling Data Sheet
4) Packard OmniSense Report

c: Patricia Coppolino, VTDEC Brownfield Program
KAS Project #509140352



Artisan ENGINEERING

PROGRESS SET
APRIL 27, 2012
NOT FOR
CONSTRUCTION

SCOTT + PARTNERS
ARCHITECTS
20 main street essex junction vermont 05452
p. 802.879.5153 f. 802.872.2764
architecture
planning
interiors

project owner
HARTLAND DEVELOPMENT GROUP
BURLINGTON, VERMONT

project name
PACKARD LOFTS APARTMENTS

scale:	As Noted
project no.	artisan-12038
checked by:	Higgins
drawn by:	Johnson
date:	04-11-2012

date	revisions
4/24/12	Steel Clarification

sheet title:
West Building Foundation Plan

sheet no.
S100-W

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 200-25390-1

Job Description: Packard Lofts

For:
KAS, Inc.
PO BOX 787
368 Avenue D, Suite 15
Williston, VT 05495

Attention: Erik Sandblom

Approved for release.
Stephanie D Sanders
Project Manager I
11/26/2014 9:34 AM

Stephanie D Sanders, Project Manager I
30 Community Drive, South Burlington, VT, 05403
(303)736-0196
stephanie.sanders@testamericainc.com
11/26/2014

The test results in this report relate only to sample(s) as received by the laboratory. These test results were derived under a quality system that adheres to the requirements of NELAC. Pursuant to NELAC, this report may not be produced in full without written approval from the laboratory

Table of Contents

CASE NARRATIVE

Client: KAS, Inc.

Project: Packard Lofts

Report Number: 200-25390-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The sample was received on 11/14/2014; the sample arrived in good condition.

VOLATILE ORGANIC COMPOUNDS
Sample ACTIVE VENT #1 was analyzed for Volatile Organic Compounds in accordance with EPA Method TO-15. The sample was analyzed on 11/20/2014.

Sample ACTIVE VENT #1[1.5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

EXECUTIVE SUMMARY - Detections

Client: KAS, Inc. Job Number: 200-25390-1

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
200-25390-1	**ACTIVE VENT #1**					
n-Butane		2.2		0.75	ppb v/v	TO-15
n-Butane		5.3		1.8	ug/m3	TO-15
Acetone		52		7.5	ppb v/v	TO-15
Acetone		120		18	ug/m3	TO-15
Methyl Ethyl Ketone		4.1		0.75	ppb v/v	TO-15
Methyl Ethyl Ketone		12		2.2	ug/m3	TO-15
Chloroform		0.39		0.30	ppb v/v	TO-15
Chloroform		1.9		1.5	ug/m3	TO-15
Toluene		1.3		0.30	ppb v/v	TO-15
Toluene		5.0		1.1	ug/m3	TO-15

METHOD SUMMARY

Client: KAS, Inc. Job Number: 200-25390-1

Description	Lab Location	Method	Preparation Method
Matrix: Air			
Volatile Organic Compounds in Ambient Air	TAL BUR	EPA TO-15	
Collection via Summa Canister	TAL BUR		Summa Canister

Lab References:

TAL BUR = TestAmerica Burlington

Method References:

EPA = US Environmental Protection Agency

METHOD / ANALYST SUMMARY

Client: KAS, Inc. Job Number: 200-25390-1

Method	Analyst	Analyst ID
EPA TO-15	Desjardins, William R	WRD

SAMPLE SUMMARY

Client: KAS, Inc. Job Number: 200-25390-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
200-25390-1	ACTIVE VENT #1	Air	11/13/2014 1435	11/14/2014 1020

SAMPLE RESULTS

Client: KAS, Inc. Job Number: 200-25390-1

Client Sample ID: **ACTIVE VENT #1**

Lab Sample ID: 200-25390-1 Date Sampled: 11/13/2014 1435
Client Matrix: Air Date Received: 11/14/2014 1020

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	200-80845	Instrument ID:	CHX.i
Prep Method:	Summa Canister	Prep Batch:	N/A	Lab File ID:	10671-006.D
Dilution:	1.5			Initial Weight/Volume:	133 mL
Analysis Date:	11/20/2014 1337			Final Weight/Volume:	200 mL
Prep Date:	11/20/2014 1337			Injection Volume:	200 mL

Analyte	Result (ppb v/v)	Qualifier	RL	RL
Dichlorodifluoromethane	0.75	U	0.75	0.75
Freon 22	0.75	U	0.75	0.75
1,2-Dichlorotetrafluoroethane	0.30	U	0.30	0.30
Chloromethane	0.75	U	0.75	0.75
n-Butane	2.2		0.75	0.75
Vinyl chloride	0.30	U	0.30	0.30
1,3-Butadiene	0.30	U	0.30	0.30
Bromomethane	0.30	U	0.30	0.30
Chloroethane	0.75	U	0.75	0.75
Bromoethene(Vinyl Bromide)	0.30	U	0.30	0.30
Trichlorofluoromethane	0.30	U	0.30	0.30
Freon TF	0.30	U	0.30	0.30
1,1-Dichloroethene	0.30	U	0.30	0.30
Acetone	52		7.5	7.5
Isopropyl alcohol	7.5	U	7.5	7.5
Carbon disulfide	0.75	U	0.75	0.75
3-Chloropropene	0.75	U	0.75	0.75
Methylene Chloride	0.75	U	0.75	0.75
tert-Butyl alcohol	7.5	U	7.5	7.5
Methyl tert-butyl ether	0.30	U	0.30	0.30
trans-1,2-Dichloroethene	0.30	U	0.30	0.30
n-Hexane	0.30	U	0.30	0.30
1,1-Dichloroethane	0.30	U	0.30	0.30
Methyl Ethyl Ketone	4.1		0.75	0.75
cis-1,2-Dichloroethene	0.30	U	0.30	0.30
1,2-Dichloroethene, Total	0.30	U	0.30	0.30
Chloroform	0.39		0.30	0.30
Tetrahydrofuran	7.5	U	7.5	7.5
1,1,1-Trichloroethane	0.30	U	0.30	0.30
Cyclohexane	0.30	U	0.30	0.30
Carbon tetrachloride	0.30	U	0.30	0.30
2,2,4-Trimethylpentane	0.30	U	0.30	0.30
Benzene	0.30	U	0.30	0.30
1,2-Dichloroethane	0.30	U	0.30	0.30
n-Heptane	0.30	U	0.30	0.30
Trichloroethene	0.30	U	0.30	0.30
Methyl methacrylate	0.75	U	0.75	0.75
1,2-Dichloropropane	0.30	U	0.30	0.30
1,4-Dioxane	7.5	U	7.5	7.5
Bromodichloromethane	0.30	U	0.30	0.30
cis-1,3-Dichloropropene	0.30	U	0.30	0.30
methyl isobutyl ketone	0.75	U	0.75	0.75
Toluene	1.3		0.30	0.30
trans-1,3-Dichloropropene	0.30	U	0.30	0.30
1,1,2-Trichloroethane	0.30	U	0.30	0.30
Tetrachloroethene	0.30	U	0.30	0.30

Client: KAS, Inc. Job Number: 200-25390-1

Client Sample ID: **ACTIVE VENT #1**

Lab Sample ID: 200-25390-1 Date Sampled: 11/13/2014 1435
Client Matrix: Air Date Received: 11/14/2014 1020

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Analysis Date:	11/20/2014 1337			Final Weight/Volume:	200 mL
Prep Date:	11/20/2014 1337			Injection Volume:	200 mL

Analyte	Result (ppb v/v)	Qualifier	RL	RL
Methyl Butyl Ketone (2-Hexanone)	0.75	U	0.75	0.75
Dibromochloromethane	0.30	U	0.30	0.30
1,2-Dibromoethane	0.30	U	0.30	0.30
Chlorobenzene	0.30	U	0.30	0.30
Ethylbenzene	0.30	U	0.30	0.30
m,p-Xylene	0.75	U	0.75	0.75
Xylene, o-	0.30	U	0.30	0.30
Xylene (total)	0.30	U	0.30	0.30
Styrene	0.30	U	0.30	0.30
Bromoform	0.30	U	0.30	0.30
Cumene	0.30	U	0.30	0.30
1,1,2,2-Tetrachloroethane	0.30	U	0.30	0.30
n-Propylbenzene	0.30	U	0.30	0.30
4-Ethyltoluene	0.30	U	0.30	0.30
1,3,5-Trimethylbenzene	0.30	U	0.30	0.30
2-Chlorotoluene	0.30	U	0.30	0.30
tert-Butylbenzene	0.30	U	0.30	0.30
1,2,4-Trimethylbenzene	0.30	U	0.30	0.30
sec-Butylbenzene	0.30	U	0.30	0.30
4-Isopropyltoluene	0.30	U	0.30	0.30
1,3-Dichlorobenzene	0.30	U	0.30	0.30
1,4-Dichlorobenzene	0.30	U	0.30	0.30
Benzyl chloride	0.30	U	0.30	0.30
n-Butylbenzene	0.30	U	0.30	0.30
1,2-Dichlorobenzene	0.30	U	0.30	0.30
1,2,4-Trichlorobenzene	0.75	U	0.75	0.75
Hexachlorobutadiene	0.30	U	0.30	0.30
Naphthalene	0.75	U	0.75	0.75

Analyte	Result (ug/m3)	Qualifier	RL	RL
Dichlorodifluoromethane	3.7	U	3.7	3.7
Freon 22	2.7	U	2.7	2.7
1,2-Dichlorotetrafluoroethane	2.1	U	2.1	2.1
Chloromethane	1.5	U	1.5	1.5
n-Butane	5.3		1.8	1.8
Vinyl chloride	0.77	U	0.77	0.77
1,3-Butadiene	0.66	U	0.66	0.66
Bromomethane	1.2	U	1.2	1.2
Chloroethane	2.0	U	2.0	2.0
Bromoethene(Vinyl Bromide)	1.3	U	1.3	1.3
Trichlorofluoromethane	1.7	U	1.7	1.7
Freon TF	2.3	U	2.3	2.3
1,1-Dichloroethene	1.2	U	1.2	1.2
Acetone	120		18	18
Isopropyl alcohol	18	U	18	18
Carbon disulfide	2.3	U	2.3	2.3

Client: KAS, Inc. Job Number: 200-25390-1

Client Sample ID: **ACTIVE VENT #1**

Lab Sample ID: 200-25390-1 Date Sampled: 11/13/2014 1435
Client Matrix: Air Date Received: 11/14/2014 1020

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Analysis Date:	11/20/2014 1337			Final Weight/Volume:	200 mL
Prep Date:	11/20/2014 1337			Injection Volume:	200 mL

Analyte	Result (ug/m3)	Qualifier	RL	RL
3-Chloropropene	2.3	U	2.3	2.3
Methylene Chloride	2.6	U	2.6	2.6
tert-Butyl alcohol	23	U	23	23
Methyl tert-butyl ether	1.1	U	1.1	1.1
trans-1,2-Dichloroethene	1.2	U	1.2	1.2
n-Hexane	1.1	U	1.1	1.1
1,1-Dichloroethane	1.2	U	1.2	1.2
Methyl Ethyl Ketone	12		2.2	2.2
cis-1,2-Dichloroethene	1.2	U	1.2	1.2
1,2-Dichloroethene, Total	1.2	U	1.2	1.2
Chloroform	1.9		1.5	1.5
Tetrahydrofuran	22	U	22	22
1,1,1-Trichloroethane	1.6	U	1.6	1.6
Cyclohexane	1.0	U	1.0	1.0
Carbon tetrachloride	1.9	U	1.9	1.9
2,2,4-Trimethylpentane	1.4	U	1.4	1.4
Benzene	0.96	U	0.96	0.96
1,2-Dichloroethane	1.2	U	1.2	1.2
n-Heptane	1.2	U	1.2	1.2
Trichloroethene	1.6	U	1.6	1.6
Methyl methacrylate	3.1	U	3.1	3.1
1,2-Dichloropropane	1.4	U	1.4	1.4
1,4-Dioxane	27	U	27	27
Bromodichloromethane	2.0	U	2.0	2.0
cis-1,3-Dichloropropene	1.4	U	1.4	1.4
methyl isobutyl ketone	3.1	U	3.1	3.1
Toluene	5.0		1.1	1.1
trans-1,3-Dichloropropene	1.4	U	1.4	1.4
1,1,2-Trichloroethane	1.6	U	1.6	1.6
Tetrachloroethene	2.0	U	2.0	2.0
Methyl Butyl Ketone (2-Hexanone)	3.1	U	3.1	3.1
Dibromochloromethane	2.6	U	2.6	2.6
1,2-Dibromoethane	2.3	U	2.3	2.3
Chlorobenzene	1.4	U	1.4	1.4
Ethylbenzene	1.3	U	1.3	1.3
m,p-Xylene	3.3	U	3.3	3.3
Xylene, o-	1.3	U	1.3	1.3
Xylene (total)	1.3	U	1.3	1.3
Styrene	1.3	U	1.3	1.3
Bromoform	3.1	U	3.1	3.1
Cumene	1.5	U	1.5	1.5
1,1,2,2-Tetrachloroethane	2.1	U	2.1	2.1
n-Propylbenzene	1.5	U	1.5	1.5
4-Ethyltoluene	1.5	U	1.5	1.5
1,3,5-Trimethylbenzene	1.5	U	1.5	1.5
2-Chlorotoluene	1.6	U	1.6	1.6

Client: KAS, Inc. Job Number: 200-25390-1

Client Sample ID: **ACTIVE VENT #1**

Lab Sample ID: 200-25390-1 Date Sampled: 11/13/2014 1435
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Prep Date:	11/20/2014 1337			Injection Volume:	200 mL

Analyte	Result (ug/m3)	Qualifier	RL	RL
tert-Butylbenzene	1.6	U	1.6	1.6
1,2,4-Trimethylbenzene	1.5	U	1.5	1.5
sec-Butylbenzene	1.6	U	1.6	1.6
4-Isopropyltoluene	1.6	U	1.6	1.6
1,3-Dichlorobenzene	1.8	U	1.8	1.8
1,4-Dichlorobenzene	1.8	U	1.8	1.8
Benzyl chloride	1.6	U	1.6	1.6
n-Butylbenzene	1.6	U	1.6	1.6
1,2-Dichlorobenzene	1.8	U	1.8	1.8
1,2,4-Trichlorobenzene	5.6	U	5.6	5.6
Hexachlorobutadiene	3.2	U	3.2	3.2
Naphthalene	3.9	U	3.9	3.9

DATA REPORTING QUALIFIERS

Client: KAS, Inc. Job Number: 200-25390-1

Lab Section	Qualifier	Description
Air - GC/MS VOA		
	U	Indicates the analyte was analyzed for but not detected.

QUALITY CONTROL RESULTS

Client: KAS, Inc. Job Number: 200-25390-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Air - GC/MS VOA					
Analysis Batch:200-80845					
LCS 200-80845/3	Lab Control Sample	T	Air	TO-15	
MB 200-80845/4	Method Blank	T	Air	TO-15	
200-25390-1	ACTIVE VENT #1	T	Air	TO-15	

Report Basis
T = Total

Client: KAS, Inc. Job Number: 200-25390-1

Method Blank - Batch: 200-80845

Method: TO-15
Preparation: Summa Canister

Lab Sample ID:	MB 200-80845/4	Analysis Batch:	200-80845	Instrument ID:	CHX.i
Client Matrix:	Air	Prep Batch:	N/A	Lab File ID:	10671-004.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	200 mL
Analysis Date:	11/20/2014 1205	Units:	ppb v/v	Final Weight/Volume:	200 mL
Prep Date:	11/20/2014 1205			Injection Volume:	200 mL
Leach Date:	N/A				

Analyte	Result	Qual	RL	RL
Dichlorodifluoromethane	0.50	U	0.50	0.50
Freon 22	0.50	U	0.50	0.50
1,2-Dichlorotetrafluoroethane	0.20	U	0.20	0.20
Chloromethane	0.50	U	0.50	0.50
n-Butane	0.50	U	0.50	0.50
Vinyl chloride	0.20	U	0.20	0.20
1,3-Butadiene	0.20	U	0.20	0.20
Bromomethane	0.20	U	0.20	0.20
Chloroethane	0.50	U	0.50	0.50
Bromoethene(Vinyl Bromide)	0.20	U	0.20	0.20
Trichlorofluoromethane	0.20	U	0.20	0.20
Freon TF	0.20	U	0.20	0.20
1,1-Dichloroethene	0.20	U	0.20	0.20
Acetone	5.0	U	5.0	5.0
Isopropyl alcohol	5.0	U	5.0	5.0
Carbon disulfide	0.50	U	0.50	0.50
3-Chloropropene	0.50	U	0.50	0.50
Methylene Chloride	0.50	U	0.50	0.50
tert-Butyl alcohol	5.0	U	5.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	0.20
trans-1,2-Dichloroethene	0.20	U	0.20	0.20
n-Hexane	0.20	U	0.20	0.20
1,1-Dichloroethane	0.20	U	0.20	0.20
Methyl Ethyl Ketone	0.50	U	0.50	0.50
cis-1,2-Dichloroethene	0.20	U	0.20	0.20
1,2-Dichloroethene, Total	0.20	U	0.20	0.20
Chloroform	0.20	U	0.20	0.20
Tetrahydrofuran	5.0	U	5.0	5.0
1,1,1-Trichloroethane	0.20	U	0.20	0.20
Cyclohexane	0.20	U	0.20	0.20
Carbon tetrachloride	0.20	U	0.20	0.20
2,2,4-Trimethylpentane	0.20	U	0.20	0.20
Benzene	0.20	U	0.20	0.20
1,2-Dichloroethane	0.20	U	0.20	0.20
n-Heptane	0.20	U	0.20	0.20
Trichloroethene	0.20	U	0.20	0.20
Methyl methacrylate	0.50	U	0.50	0.50
1,2-Dichloropropane	0.20	U	0.20	0.20
1,4-Dioxane	5.0	U	5.0	5.0
Bromodichloromethane	0.20	U	0.20	0.20
cis-1,3-Dichloropropene	0.20	U	0.20	0.20
methyl isobutyl ketone	0.50	U	0.50	0.50
Toluene	0.20	U	0.20	0.20
trans-1,3-Dichloropropene	0.20	U	0.20	0.20
1,1,2-Trichloroethane	0.20	U	0.20	0.20

Client: KAS, Inc. Job Number: 200-25390-1

Method Blank - Batch: 200-80845

Method: TO-15
Preparation: Summa Canister

Lab Sample ID:	MB 200-80845/4	Analysis Batch:	200-80845	Instrument ID:	CHX.i
Client Matrix:	Air	Prep Batch:	N/A	Lab File ID:	10671-004.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	200 mL
Analysis Date:	11/20/2014 1205	Units:	ppb v/v	Final Weight/Volume:	200 mL
Prep Date:	11/20/2014 1205			Injection Volume:	200 mL
Leach Date:	N/A				

Analyte	Result	Qual	RL	RL
Tetrachloroethene	0.20	U	0.20	0.20
Methyl Butyl Ketone (2-Hexanone)	0.50	U	0.50	0.50
Dibromochloromethane	0.20	U	0.20	0.20
1,2-Dibromoethane	0.20	U	0.20	0.20
Chlorobenzene	0.20	U	0.20	0.20
Ethylbenzene	0.20	U	0.20	0.20
m,p-Xylene	0.50	U	0.50	0.50
Xylene, o-	0.20	U	0.20	0.20
Xylene (total)	0.20	U	0.20	0.20
Styrene	0.20	U	0.20	0.20
Bromoform	0.20	U	0.20	0.20
Cumene	0.20	U	0.20	0.20
1,1,2,2-Tetrachloroethane	0.20	U	0.20	0.20
n-Propylbenzene	0.20	U	0.20	0.20
4-Ethyltoluene	0.20	U	0.20	0.20
1,3,5-Trimethylbenzene	0.20	U	0.20	0.20
2-Chlorotoluene	0.20	U	0.20	0.20
tert-Butylbenzene	0.20	U	0.20	0.20
1,2,4-Trimethylbenzene	0.20	U	0.20	0.20
sec-Butylbenzene	0.20	U	0.20	0.20
4-Isopropyltoluene	0.20	U	0.20	0.20
1,3-Dichlorobenzene	0.20	U	0.20	0.20
1,4-Dichlorobenzene	0.20	U	0.20	0.20
Benzyl chloride	0.20	U	0.20	0.20
n-Butylbenzene	0.20	U	0.20	0.20
1,2-Dichlorobenzene	0.20	U	0.20	0.20
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50
Hexachlorobutadiene	0.20	U	0.20	0.20
Naphthalene	0.50	U	0.50	0.50

Client: KAS, Inc. Job Number: 200-25390-1

Method Blank - Batch: 200-80845

Method: TO-15
Preparation: Summa Canister

Lab Sample ID:	MB 200-80845/4	Analysis Batch:	200-80845	Instrument ID:	CHX.i
Client Matrix:	Air	Prep Batch:	N/A	Lab File ID:	10671-004.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	200 mL
Analysis Date:	11/20/2014 1205	Units:	ug/m3	Final Weight/Volume:	200 mL
Prep Date:	11/20/2014 1205			Injection Volume:	200 mL
Leach Date:	N/A				

Analyte	Result	Qual	RL	RL
Dichlorodifluoromethane	2.5	U	2.5	2.5
Freon 22	1.8	U	1.8	1.8
1,2-Dichlorotetrafluoroethane	1.4	U	1.4	1.4
Chloromethane	1.0	U	1.0	1.0
n-Butane	1.2	U	1.2	1.2
Vinyl chloride	0.51	U	0.51	0.51
1,3-Butadiene	0.44	U	0.44	0.44
Bromomethane	0.78	U	0.78	0.78
Chloroethane	1.3	U	1.3	1.3
Bromoethene(Vinyl Bromide)	0.87	U	0.87	0.87
Trichlorofluoromethane	1.1	U	1.1	1.1
Freon TF	1.5	U	1.5	1.5
1,1-Dichloroethene	0.79	U	0.79	0.79
Acetone	12	U	12	12
Isopropyl alcohol	12	U	12	12
Carbon disulfide	1.6	U	1.6	1.6
3-Chloropropene	1.6	U	1.6	1.6
Methylene Chloride	1.7	U	1.7	1.7
tert-Butyl alcohol	15	U	15	15
Methyl tert-butyl ether	0.72	U	0.72	0.72
trans-1,2-Dichloroethene	0.79	U	0.79	0.79
n-Hexane	0.70	U	0.70	0.70
1,1-Dichloroethane	0.81	U	0.81	0.81
Methyl Ethyl Ketone	1.5	U	1.5	1.5
cis-1,2-Dichloroethene	0.79	U	0.79	0.79
1,2-Dichloroethene, Total	0.79	U	0.79	0.79
Chloroform	0.98	U	0.98	0.98
Tetrahydrofuran	15	U	15	15
1,1,1-Trichloroethane	1.1	U	1.1	1.1
Cyclohexane	0.69	U	0.69	0.69
Carbon tetrachloride	1.3	U	1.3	1.3
2,2,4-Trimethylpentane	0.93	U	0.93	0.93
Benzene	0.64	U	0.64	0.64
1,2-Dichloroethane	0.81	U	0.81	0.81
n-Heptane	0.82	U	0.82	0.82
Trichloroethene	1.1	U	1.1	1.1
Methyl methacrylate	2.0	U	2.0	2.0
1,2-Dichloropropane	0.92	U	0.92	0.92
1,4-Dioxane	18	U	18	18
Bromodichloromethane	1.3	U	1.3	1.3
cis-1,3-Dichloropropene	0.91	U	0.91	0.91
methyl isobutyl ketone	2.0	U	2.0	2.0
Toluene	0.75	U	0.75	0.75
trans-1,3-Dichloropropene	0.91	U	0.91	0.91
1,1,2-Trichloroethane	1.1	U	1.1	1.1

Client: KAS, Inc. Job Number: 200-25390-1

Method Blank - Batch: 200-80845

Method: TO-15
Preparation: Summa Canister

Lab Sample ID:	MB 200-80845/4	Analysis Batch:	200-80845	Instrument ID:	CHX.i
Client Matrix:	Air	Prep Batch:	N/A	Lab File ID:	10671-004.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	200 mL
Analysis Date:	11/20/2014 1205	Units:	ug/m3	Final Weight/Volume:	200 mL
Prep Date:	11/20/2014 1205			Injection Volume:	200 mL
Leach Date:	N/A				

Analyte	Result	Qual	RL	RL
Tetrachloroethene	1.4	U	1.4	1.4
Methyl Butyl Ketone (2-Hexanone)	2.0	U	2.0	2.0
Dibromochloromethane	1.7	U	1.7	1.7
1,2-Dibromoethane	1.5	U	1.5	1.5
Chlorobenzene	0.92	U	0.92	0.92
Ethylbenzene	0.87	U	0.87	0.87
m,p-Xylene	2.2	U	2.2	2.2
Xylene, o-	0.87	U	0.87	0.87
Xylene (total)	0.87	U	0.87	0.87
Styrene	0.85	U	0.85	0.85
Bromoform	2.1	U	2.1	2.1
Cumene	0.98	U	0.98	0.98
1,1,2,2-Tetrachloroethane	1.4	U	1.4	1.4
n-Propylbenzene	0.98	U	0.98	0.98
4-Ethyltoluene	0.98	U	0.98	0.98
1,3,5-Trimethylbenzene	0.98	U	0.98	0.98
2-Chlorotoluene	1.0	U	1.0	1.0
tert-Butylbenzene	1.1	U	1.1	1.1
1,2,4-Trimethylbenzene	0.98	U	0.98	0.98
sec-Butylbenzene	1.1	U	1.1	1.1
4-Isopropyltoluene	1.1	U	1.1	1.1
1,3-Dichlorobenzene	1.2	U	1.2	1.2
1,4-Dichlorobenzene	1.2	U	1.2	1.2
Benzyl chloride	1.0	U	1.0	1.0
n-Butylbenzene	1.1	U	1.1	1.1
1,2-Dichlorobenzene	1.2	U	1.2	1.2
1,2,4-Trichlorobenzene	3.7	U	3.7	3.7
Hexachlorobutadiene	2.1	U	2.1	2.1
Naphthalene	2.6	U	2.6	2.6

Client: KAS, Inc. Job Number: 200-25390-1

Lab Control Sample - Batch: 200-80845

Method: TO-15
Preparation: Summa Canister

Lab Sample ID:	LCS 200-80845/3	Analysis Batch:	200-80845	Instrument ID:	CHX.i
Client Matrix:	Air	Prep Batch:	N/A	Lab File ID:	10671-003.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	200 mL
Analysis Date:	11/20/2014 1119	Units:	ppb v/v	Final Weight/Volume:	200 mL
Prep Date:	11/20/2014 1119			Injection Volume:	200 mL
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Dichlorodifluoromethane	10.0	9.51	95	70 - 130	
Freon 22	10.0	9.27	93	70 - 130	
1,2-Dichlorotetrafluoroethane	10.0	10.4	104	70 - 130	
Chloromethane	10.0	8.90	89	70 - 130	
n-Butane	10.0	9.24	92	70 - 130	
Vinyl chloride	10.0	8.94	89	70 - 130	
1,3-Butadiene	10.0	9.06	91	70 - 130	
Bromomethane	10.0	9.17	92	70 - 130	
Chloroethane	10.0	9.23	92	70 - 130	
Bromoethene(Vinyl Bromide)	10.0	9.38	94	70 - 130	
Trichlorofluoromethane	10.0	9.57	96	70 - 130	
Freon TF	10.0	9.53	95	70 - 130	
1,1-Dichloroethene	10.0	9.53	95	70 - 130	
Acetone	10.0	9.48	95	70 - 130	
Isopropyl alcohol	10.0	8.43	84	70 - 130	
Carbon disulfide	10.0	10.4	104	70 - 130	
3-Chloropropene	10.0	9.22	92	70 - 130	
Methylene Chloride	10.0	9.01	90	70 - 130	
tert-Butyl alcohol	10.0	9.12	91	70 - 130	
Methyl tert-butyl ether	10.0	10.1	101	70 - 130	
trans-1,2-Dichloroethene	10.0	10.3	103	70 - 130	
n-Hexane	10.0	10.6	106	70 - 130	
1,1-Dichloroethane	10.0	9.79	98	70 - 130	
Methyl Ethyl Ketone	10.0	8.93	89	70 - 130	
cis-1,2-Dichloroethene	10.0	9.70	97	70 - 130	
Chloroform	10.0	9.96	100	70 - 130	
Tetrahydrofuran	10.0	9.76	98	70 - 130	
1,1,1-Trichloroethane	10.0	9.77	98	70 - 130	
Cyclohexane	10.0	9.90	99	70 - 130	
Carbon tetrachloride	10.0	9.74	97	70 - 130	
2,2,4-Trimethylpentane	10.0	10.1	101	70 - 130	
Benzene	10.0	9.65	97	70 - 130	
1,2-Dichloroethane	10.0	9.89	99	70 - 130	
n-Heptane	10.0	10.1	101	70 - 130	
Trichloroethene	10.0	9.98	100	70 - 130	
Methyl methacrylate	10.0	10.3	103	70 - 130	
1,2-Dichloropropane	10.0	10.0	100	70 - 130	
1,4-Dioxane	10.0	8.87	89	70 - 130	
Bromodichloromethane	10.0	9.98	100	70 - 130	
cis-1,3-Dichloropropene	10.0	10.4	104	70 - 130	
methyl isobutyl ketone	10.0	10.1	101	70 - 130	

Client: KAS, Inc.

Job Number: 200-25390-1

Lab Control Sample - Batch: 200-80845

Method: TO-15
Preparation: Summa Canister

Lab Sample ID:	LCS 200-80845/3	Analysis Batch:	200-80845	Instrument ID:	CHX.i
Client Matrix:	Air	Prep Batch:	N/A	Lab File ID:	10671-003.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	200 mL
Analysis Date:	11/20/2014 1119	Units:	ppb v/v	Final Weight/Volume:	200 mL
Prep Date:	11/20/2014 1119			Injection Volume:	200 mL
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Toluene	10.0	9.93	99	70 - 130	
trans-1,3-Dichloropropene	10.0	9.71	97	70 - 130	
1,1,2-Trichloroethane	10.0	9.83	98	70 - 130	
Tetrachloroethene	10.0	9.76	98	70 - 130	
Methyl Butyl Ketone (2-Hexanone)	10.0	9.76	98	70 - 130	
Dibromochloromethane	10.0	9.52	95	70 - 130	
1,2-Dibromoethane	10.0	9.72	97	70 - 130	
Chlorobenzene	10.0	9.43	94	70 - 130	
Ethylbenzene	10.0	9.91	99	70 - 130	
m,p-Xylene	20.0	19.5	97	70 - 130	
Xylene, o-	10.0	9.90	99	70 - 130	
Styrene	10.0	9.85	99	70 - 130	
Bromoform	10.0	9.58	96	70 - 130	
Cumene	10.0	9.87	99	70 - 130	
1,1,2,2-Tetrachloroethane	10.0	9.66	97	70 - 130	
n-Propylbenzene	10.0	9.64	96	70 - 130	
4-Ethyltoluene	10.0	9.79	98	70 - 130	
1,3,5-Trimethylbenzene	10.0	9.71	97	70 - 130	
2-Chlorotoluene	10.0	9.43	94	70 - 130	
tert-Butylbenzene	10.0	9.69	97	70 - 130	
1,2,4-Trimethylbenzene	10.0	9.62	96	70 - 130	
sec-Butylbenzene	10.0	9.62	96	70 - 130	
4-Isopropyltoluene	10.0	9.69	97	70 - 130	
1,3-Dichlorobenzene	10.0	9.06	91	70 - 130	
1,4-Dichlorobenzene	10.0	9.00	90	70 - 130	
Benzyl chloride	10.0	7.89	79	70 - 130	
n-Butylbenzene	10.0	9.49	95	70 - 130	
1,2-Dichlorobenzene	10.0	9.19	92	70 - 130	
1,2,4-Trichlorobenzene	10.0	8.72	87	70 - 130	
Hexachlorobutadiene	10.0	9.73	97	70 - 130	
Naphthalene	10.0	8.67	87	70 - 130	

TestAmerica Burlington
30 Community Drive
Suite 11
South Burlington, VT 05403
phone 802-660-1990 fax 802-660-1919

Canister Samples Chain of Custody Record

TestAmerica Analytical Testing Corp. assumes no liability with respect to the collection and shipment of these samples.

Client Contact Information	Project Manager: ERIK SANDBLOM	Samples Collected By: ERIK SANDBLOM
Company: KAS, Inc.	Phone: 802-383-0486	1 of 1 COCs
Address: PO Box 787	Email: pr.KS@kas-consulting.com	
City/State/Zip: WILLISTON VT 05495	Site Contact:	
Phone: 802-383-0486	TA Contact:	
FAX: 802-383-0490	**Analysis Turnaround Time**	
Project Name: PACKARD LOFTS	Standard (Specify) 14 days	
Site: 2013-4350	Rush (Specify)	
PO # 5091403572		

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	TO-15	MA-APH	EPA 3C	EPA 25C	ASTM D-1946	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
ACTIVE VENT #1	11/13/14	1035	1435	-29	-5	4030	4550	X											

Temperature (Fahrenheit)	Interior	Ambient
Start	N/A	39°F
Stop	N/A	41°F

Pressure (inches of Hg)	Interior	Ambient
Start	N/A	30.08" Hg
Stop	N/A	30.00" Hg

200-25390 Chain of Custody

Special Instructions/QC Requirements & Comments:

Samples Shipped by: KAS, Inc	Date/Time: 11/13/14 17:01	Samples Received by: 11/14/14 1020	TABUR
Samples Relinquished by:	Date/Time:	Received by:	
Relinquished by:	Date/Time:	Received by:	

Lab Use Only Shipper Name: Opened by: Condition:

11/26/2014

Login Sample Receipt Checklist

Client: KAS, Inc.

Job Number: 200-25390-1

Login Number: 25390

List Source: TestAmerica Burlington

List Number: 1

Creator: Young, Joseph W

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	Not present
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	AMBIENT
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

TO-15 AIR SAMPLING DATA SHEET

KAS Job #	509140352 Packard Lofts
Date:	11/13/2014
Job Location:	237 North Avenue, Burlington,
Field Personnel:	Erik Sandblom
Sampling I.D. / Location:	Active Vent #1
Start Temperature:	39 deg F
Start Relative Humidity:	43%
Start Atmospheric Pressure:	30.08” Hg
Start PID Reading (ppm):	0.0 ppm
Regulator’s sampling duration:	4 hours
Sampling start time:	10:35
Sampling end time:	14:35
Canister vacuum level at start:	-29” Hg
Canister vacuum level at finish:	-5 – 6” Hg
Finish Temperature:	41 deg F
Finish Relative Humidity:	47%
Finish Atmospheric Pressure:	30.00” Hg
Finish PID Reading (ppm):	0.0 ppm

Comments and Notes:

Sample was drawn from vacuum side of the fan via a vinyl tube that fit perfectly into the manometer sensor tube.

Photo of setup taken

TO Can #4550 6L

Flow controller 4030

Batch Cert ID # 415810397

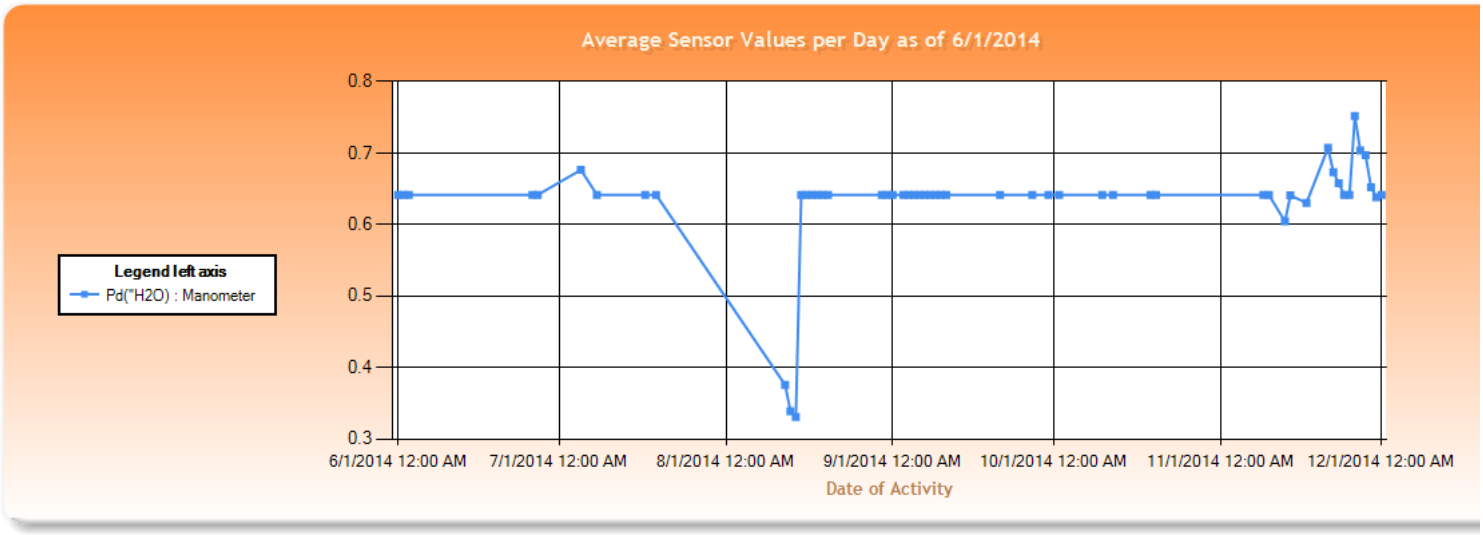
OmniSense Sensor Activity Analysis

| Detail | Summary | Activity | Thresholds | Alarms | Errors | Close Window |

Company: Packard Lofts LLC **Site:** Packard Lofts **Time Zone:** Eastern Standard Time

Time Span: ○ Last Hour ○ Last Day ○ Last Week ○ Last Month ○ Last 3 Months ◉ Last 6 Months ○ Last Year ○ All Readings

Time Interval: 6 Months (daily avg) ▼ **Start Date:** 6/1/2014 16 : 07 ☐ Show values ☐ Enable Recenter ☐ Enable Tool Tips Refresh



	Pd("H2O) : Manometer
min	0.3312
max	0.7519

☐ Automatic Refresh

19570103:0 Manometer ☐ Pd(Pa) ☑ Pd("H2O) ☐ Vbatt(Vdc)