

Report of...

Compliance Emission Sampling

Performed for...

Sekisui Voltek, LLC
Coldwater, Michigan

On

Various Oven Exhausts

October 29-30, 2013

121.19

Network Environmental, Inc.
Grand Rapids, MI

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I. INTRODUCTION

Network Environmental, Inc. was retained by Fishbeck Thompson Carr & Huber, LLC (FTCH) of Kalamazoo, Michigan, to conduct an emission study at Sekisui Voltek, LLC of Coldwater, Michigan. The purpose of the study was to determine compliance with Michigan Department of Environmental Quality (MDEQ) – Air Quality Division ROP No. MI-ROP-B8786-2009. Four of eleven ovens were tested for Ammonia and VOC emissions.

ROP No. MI-ROP-B8786-2009 has established the following emission limits for the oven exhausts:

Pollutant	Emission Limit
Ammonia	0.10 Lbs/Hr
VOC	0.12 Lbs/Hr

The following reference test methods were employed to conduct the emission sampling:

- Ammonia – U.S. EPA CTM-027
- VOC – U.S. EPA Method 25A
- Exhaust Gas Parameters (air flow rate, temperature, moisture & density) – U.S. EPA Reference Methods 1 through 4.

The sampling was performed October 29-30, 2013 by Stephan K. Byrd, R. Scott Cargill, Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc. Assisting in the study was Mr. Samuel Johnson of Sekisui Voltek, LLC and Ms. Lynn Spurr and Ms. Valerie Vogan of FTCH. Mr. Dale Turton and Mr. Tom Gasloli of the Michigan Department of Environmental Quality (MDEQ) – Air Quality Division were present to observe the sampling and source operation.

II. PRESENTATION OF RESULTS

**II.1 TABLE 1
AMMONIA EMISSION RESULTS SUMMARY
OVEN #3
SEKISUI VOLTEK
COLDWATER, MICHIGAN
OCTOBER 29, 2013**

Sample	Time	Alr Flow Rate	Concentration	Mass Emission Rate
		DSCFM ⁽¹⁾	Mg/M ³⁽²⁾	Lbs/Hr ⁽³⁾
1	12:08-13:08	123	42.02	0.019
2	13:37-14:37	118	45.94	0.020
3	15:10-16:10	120	45.71	0.021
Average		120	44.56	0.020

- (1) DSCFM = Dry Standard Cubic Feet per Minute (STP = 68° F & 29.92 in. Hg)
 (2) Mg/M³ = Milligrams per dry standard cubic meter
 (3) Lbs/Hr = Pounds Per Hour

**II.2 TABLE 2
VOC EMISSION RESULTS SUMMARY
OVEN #3
SEKISUI VOLTEK
COLDWATER, MICHIGAN
OCTOBER 29, 2013**

Sample	Time	Alr Flow Rate	Concentration	Mass Emission Rate
		SCFM ⁽¹⁾	PPMV ⁽²⁾	Lbs/Hr ⁽³⁾
1	16:11-17:11	128	11.2	0.010
2	17:22-18:22	123	11.8	0.010
3	18:32-19:32	125	12.1	0.010
Average		125	11.7	0.010

- (1) DSCFM = Dry Standard Cubic Feet per Minute (STP = 68° F & 29.92 in. Hg)
 (2) PPMV = Parts per million by volume on an actual basis
 (3) Lbs/Hr = Pounds Per Hour

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**II.3 TABLE 3
AMMONIA EMISSION RESULTS SUMMARY
OVEN #7
SEKISUI VOLTEK
COLDWATER, MICHIGAN
OCTOBER 29, 2013**

Sample	Time	Air Flow Rate	Concentration	Mass Emission Rate
		DSCFM ⁽¹⁾	Mg/M ³ (²)	Lbs/Hr ⁽³⁾
1	11:34-12:34	487	134.0	0.244
2	13:09-14:09	499	239.0	0.447
3	14:33-15:33	505	190.3	0.360
Average		497	187.8	0.350

- (1) DSCFM = Dry Standard Cubic Feet per Minute (STP = 68° F & 29.92 In. Hg)
 (2) Mg/M³ = Milligrams per dry standard cubic meter
 (3) Lbs/Hr = Pounds Per Hour

**II.4 TABLE 4
VOC EMISSION RESULTS SUMMARY
OVEN #7
SEKISUI VOLTEK
COLDWATER, MICHIGAN
OCTOBER 29, 2013**

Sample	Time	Air Flow Rate	Concentration	Mass Emission Rate
		SCFM ⁽¹⁾	PPMV ⁽²⁾	Lbs/Hr ⁽³⁾
1	11:46-12:46	508	14.3	0.049
2	13:25-14:25	519	12.2	0.043
3	14:45-15:45	527	10.6	0.038
Average		518	12.4	0.044

- (1) DSCFM = Dry Standard Cubic Feet per Minute (STP = 68° F & 29.92 In. Hg)
 (2) PPMV = Parts per million by volume on an actual basis
 (3) Lbs/Hr = Pounds Per Hour

**II.5 TABLE 5
AMMONIA EMISSION RESULTS SUMMARY
OVEN #9
SEKISUI VOLTEK
COLDWATER, MICHIGAN
OCTOBER 30, 2013**

Sample	Time	Air Flow Rate	Concentration	Mass Emission Rate
		DSCFM ⁽¹⁾	Mg/M ³⁽²⁾	Lbs/Hr ⁽³⁾
1	09:38-10:38	368	210.9	0.291
2	11:02-12:02	328	244.2	0.300
3	12:33-13:33	324	257.5	0.312
Average		340	237.5	0.301

- (1) DSCFM = Dry Standard Cubic Feet per Minute (STP = 68° F & 29.92 in. Hg)
(2) Mg/M³ = Milligrams per dry standard cubic meter
(3) Lbs/Hr = Pounds Per Hour

**II.6 TABLE 6
VOC EMISSION RESULTS SUMMARY
OVEN #9
SEKISUI VOLTEK
COLDWATER, MICHIGAN
OCTOBER 30, 2013**

Sample	Time	Air Flow Rate	Concentration	Mass Emission Rate
		SCFM ⁽¹⁾	PPMV ⁽²⁾	Lbs/Hr ⁽³⁾
1	10:08-11:08	383	38.7	0.101
2	11:21-12:21	341	38.0	0.088
3	12:35-13:35	337	37.9	0.087
Average		354	38.2	0.092

- (1) DSCFM = Dry Standard Cubic Feet per Minute (STP = 68° F & 29.92 in. Hg)
(2) PPMV = Parts per million by volume on an actual basis
(3) Lbs/Hr = Pounds Per Hour

**II.7 TABLE 7
AMMONIA EMISSION RESULTS SUMMARY
OVEN #11
SEKISUI VOLTEK
COLDWATER, MICHIGAN
OCTOBER 30, 2013**

Sample	Time	Air Flow Rate	Concentration	Mass Emission Rate
		DSCFM ⁽¹⁾	Mg/M ³ (²)	Lbs/Hr ⁽³⁾
1	12:08-13:08	164	39.6	0.024
2	13:37-14:37	161	44.6	0.027
3	15:10-16:10	159	44.5	0.026
Average		161	42.9	0.026

- (1) DSCFM = Dry Standard Cubic Feet per Minute (STP = 68° F & 29.92 in. Hg)
 (2) Mg/M³ = Milligrams per dry standard cubic meter
 (3) Lbs/Hr = Pounds Per Hour

**II.8 TABLE 8
VOC EMISSION RESULTS SUMMARY
OVEN #11
SEKISUI VOLTEK
COLDWATER, MICHIGAN
OCTOBER 30, 2013**

Sample	Time	Air Flow Rate	Concentration	Mass Emission Rate
		SCFM ⁽¹⁾	PPMV ⁽²⁾	Lbs/Hr ⁽³⁾
1	13:53-14:53	170	33.2	0.038
2	16:35-17:35	168	35.3	0.040
3	17:45-18:45	167	34.5	0.039
Average		168	34.3	0.039

- (1) DSCFM = Dry Standard Cubic Feet per Minute (STP = 68° F & 29.92 in. Hg)
 (2) PPMV = Parts per million by volume on an actual basis.
 (3) Lbs/Hr = Pounds Per Hour.

III. DISCUSSION OF RESULTS

The results of the emission sampling are summarized in Tables 1 – 8 (Sections II.1 – II.8). The results are presented as follows:

III.1 Ammonia Emission Results Summary (Tables 1, 3, 5 and 7)

These tables summarize the ammonia emission results for the four ovens as follows:

- Sample
- Time
- Air Flow Rate (DSCFM) – Dry Standard Cubic Feet per Minute (STP = 68° F & 29.92 in. Hg)
- Concentration (Mg/M³) – Milligrams per dry standard meter cubed
- Mass Emission Rate (Lbs/Hr) – Pounds Per Hour

A more detailed breakdown of each individual ammonia sample can be found in Appendix A.

III.2 VOC Emission Results Summary (Tables 2, 4, 6, and 8)

These tables summarize the VOC emission results for the four ovens as follows:

- Sample
- Time
- Air Flow Rate (SCFM) – Standard Cubic Feet per Minute (STP = 68° F & 29.92 in. Hg)
- VOC Concentrations (PPM) – Parts Per Million (v/v) on an actual Basis As Propane
- VOC Mass Emission Rate (Lbs/Hr) – Pounds Per Hour As Propane

IV. SAMPLING AND ANALYTICAL PROTOCOL

The sampling locations for the four oven exhausts were on the 7 and 8 inch diameter exhausts at a location greater than eight duct diameters downstream and greater than 2 duct diameters upstream from the nearest disturbances. The sampling point dimensions were as follows:

<u>Sample Point</u>	<u>Dimension (Inches)</u>
1	0.54
2	2.00
3	6.00
4	7.46

Prior to the emission testing, preliminary velocity/cyclonic (turbulent) flow measurements/checks were conducted. The sampling location and flows passed the requirements of Methods 1 and 2.

IV.1 Ammonia – The ammonia sampling was conducted in accordance with U.S. EPA CTM-027, Method 027 is an in-stack filtration method using a modified Method 17 sampling train. The samples were collected isokinetically in impingers containing 100 ml of 0.1 N H₂SO₄. Three (3) samples were collected from each oven exhaust. Each sample was sixty (60) minutes in duration and was collected at one point.

The sample line rinses and impinger catch were recovered and analyzed by ion chromatography for ammonia. All the quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis. The ammonia sampling train is shown in Figure 1.

IV.2 VOC – The VOC sampling was conducted in accordance with U.S. EPA Method 25A. A J.U.M. Model 3-500 flame ionization detector (FID) analyzer was used to monitor each oven exhaust. Sample gas was extracted through a probe. A heated Teflon sample line was used to transport the exhaust gases to the analyzer. This produces instantaneous readouts of the total VOC concentrations (PPM). The analyzer was operated on the 0-100 PPM scale.

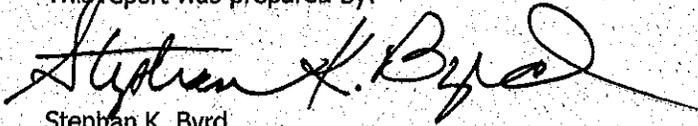
The analyzer was calibrated by system injection (from the back of the stack probe to the analyzer), prior to the testing, using propane calibration gases. A span gas of 85.78 PPM propane was used to establish the initial instrument calibration. Calibration gases of 30.37 PPM and 50.19 PPM propane were used to determine the calibration error of the analyzer. After each sample, a system zero and system injection of 30.37 PPM propane were performed to establish system drift and system bias during the test period. All calibration gases used were EPA Protocol Calibration Gases. Three (3) samples were collected from each oven exhaust. Each sample was sixty (60) minutes in duration.

The analyzer was calibrated to the output of the data acquisition system (DAS) used to collect the data from the exhaust. The analyzer averages were corrected for calibration error and drift using formula EQ.7E-5 from 40 CFR Part 60, Appendix A, Method 7E. Figure 2 is a diagram of the VOC sampling train.

IV.3 Exhaust Gas Parameters – The exhaust gas parameters (air flow rate, temperature, moisture and density) were determined in conjunction with the other sampling by employing U.S. EPA Methods 1 through 4. Flow measurements were taken before and after each ammonia sample, and averaged for each run.

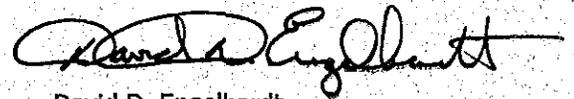
Temperatures and moistures were determined using the Method 17 sampling train. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

This report was prepared by:



Stephan K. Byrd
President

This report was reviewed by:



David D. Engelhardt
Vice President

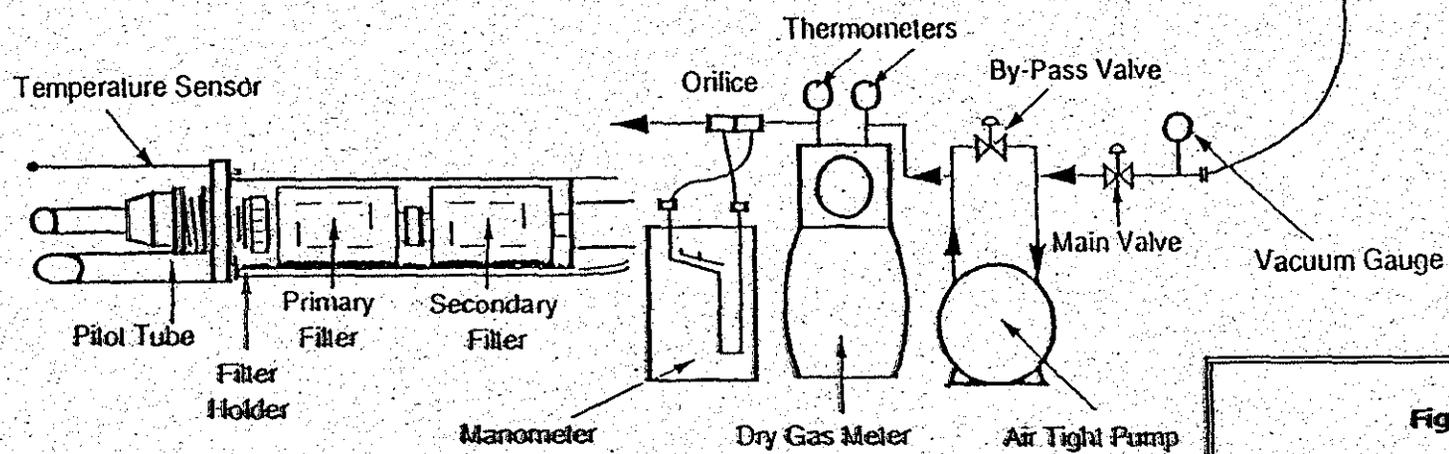
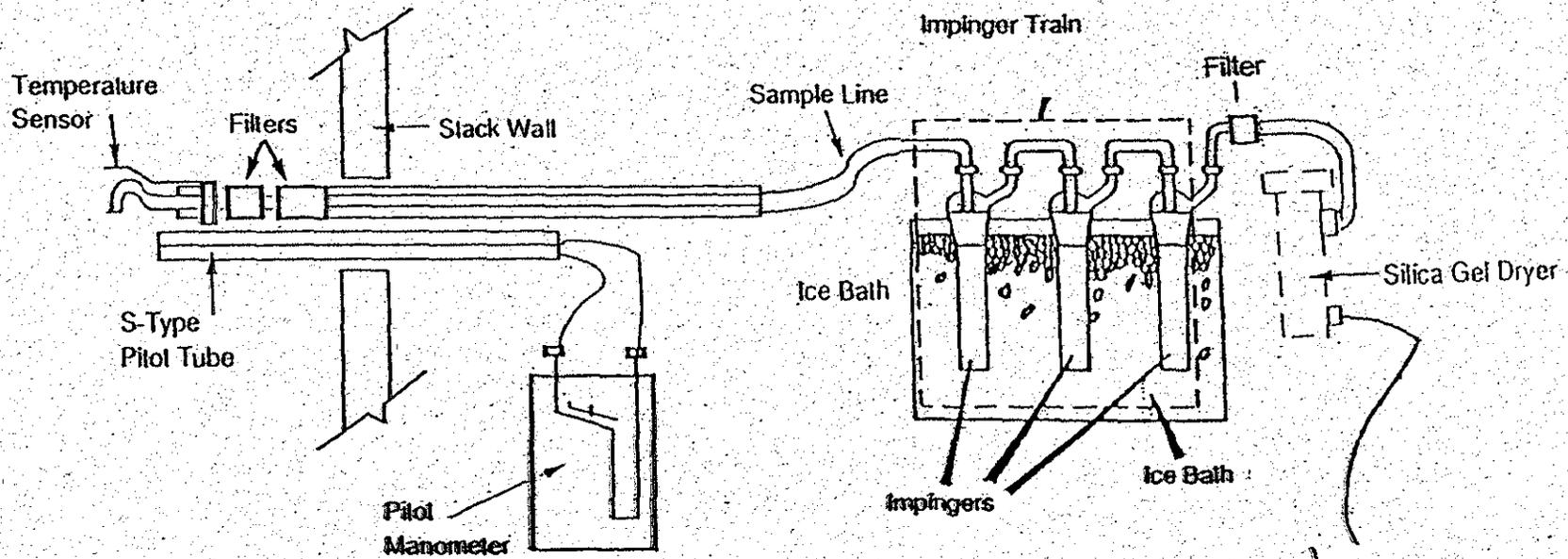


Figure 1
Ammonia Sampling Train

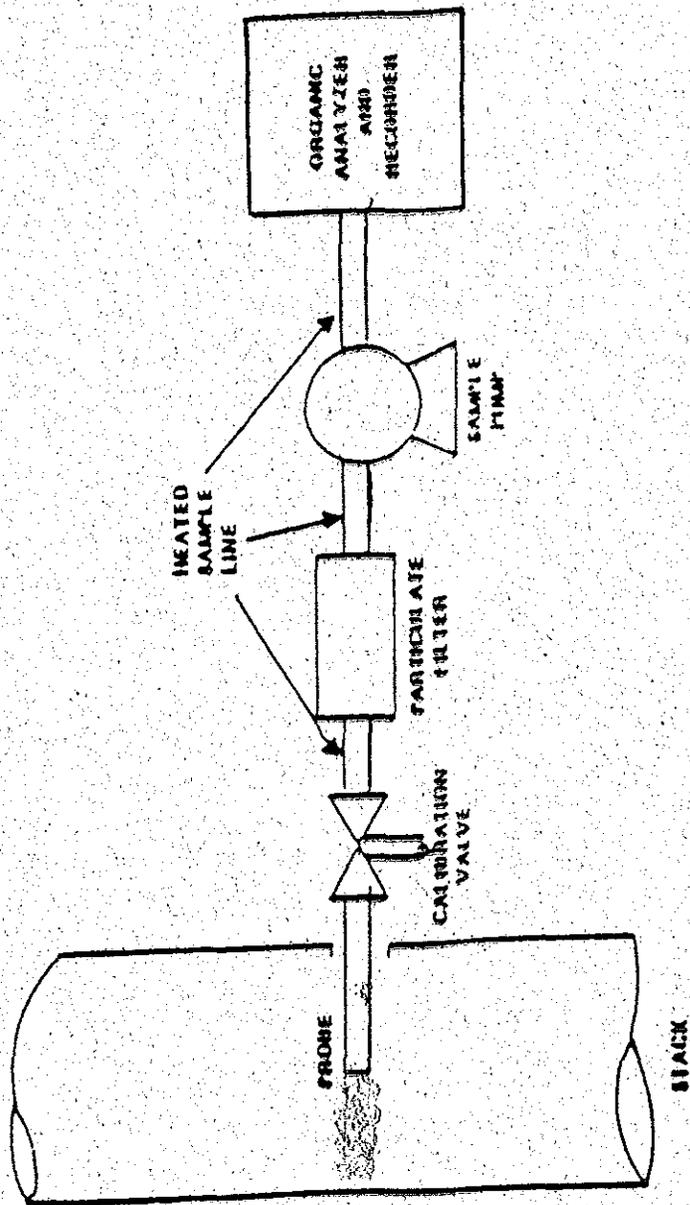


Figure 2

Method 25A Sampling Train

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