Report of...

Compliance Emission Testing

performed for...

Lacks Enterprises, Inc.
Airlane South Plant

Kentwood, Michigan

on

Multiple Sources

March 10 and April 22, 2015

021.22

Network Environmental, Inc.
Grand Rapids, MI

I. INTRODUCTION

Network Environmental, Inc. was retained by Lacks Enterprises to perform compliance emission sampling on multiple sources located at their Airlane South facility in Kentwood, Michigan. The purpose of the study was to quantify the Nickel emissions from the nickel plating lines exhaust stack, 1,3-Dichloro-2-proponal (DCP) from the Conditioner (SVS-P15) exhaust and methanol and formaldehyde from the Electroless Copper (SVS-P13) exhaust. The testing was to document compliance with Michigan Department of Environmental Quality, Air Quality Division, Renewable Operating Permit MI-ROP-N0895-2012. Assisting in the study was Ms. Karen Baweja of Lacks Industries. Mr. David Patterson of the Michigan Department of Environmental Quality, Air Quality Division, was present to observe the testing and source operation.

The sampling was performed by R. Scott Cargill and Richard D. Eerdmans of Network Environmental, Inc. on March 10, 2015 and April 22, 2015 by employing the following test methods:

Nickel – U.S. EPA Reference Method 29
Formaldehyde – U.S. EPA Method SW-846 Method 0011
Methanol – U.S. EPA Reference Method 308
DCP – U.S. EPA Reference Method 308

II. PRESENTATION OF RESULTS

II.1 TABLE 1
NICKEL EMISSION RESULTS
NICKEL PLATING TANKS EXHAUST
LACKS ENTERPRISES
KENTWOOD, MICHIGAN
MARCH 10, 2015

Sample #	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
1	9:50-11:12	43,598	0.026	0.0042
2	12:13-13:37	44,572	0.016	0.0026
3	14:49-16:11	44,014	0.011	0.0018
Average		**44,061**	**0.018**	**0.0029**

II.2 TABLE 2
FORMALDEHYDE EMISSION RESULTS
ELECTROLESS COPPER (SVS-P13) EXHAUST
LACKS ENTERPRISES
KENTWOOD, MICHIGAN
APRIL 22, 2015

Sample	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
1	9:30-10:30	13,338	1.19	0.060
2	10:47-11:47	13,303	1.06	0.053
3	12:33-13:33	13,390	3.27	0.164
Average		**13,344**	**1.84**	**0.092**

II.3 TABLE 3
METHANOL EMISSION RESULTS
ELECTROLESS COPPER (SVS-P13) EXHAUST
LACKS ENTERPRISES
KENTWOOD, MICHIGAN
APRIL 22, 2015

Sample	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
1	9:30-10:30	13,338	73.24	3.657
2	10:47-11:47	13,303	78.15	3.892
3	12:33-13:33	13,390	83.31	4.177
Average		**13,344**	**78.23**	**3.909**

II.4 TABLE 4
DCP EMISSION RESULTS
CONDITIONER (SVS-P15) EXHAUST
LACKS ENTERPRISES
KENTWOOD, MICHIGAN
APRIL 22, 2015

Sample	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
1	9:30-10:30	1,912	5.18	0.037
2	10:47-11:47	1,871	6.93	0.049
3	12:33-13:33	1,892	6.30	0.045
Average		**1,892**	**6.14**	**0.044**

III. DISCUSSION OF RESULTS

The emission results are presented in Tables 1 through 4 (Section II.1 through II.4).

The emission limits for these sources are:

Nickel Tanks Exhaust = 0.0063 Lbs/Hr

SVS P13 Formaldehyde = 0.6458 Lbs/Hr

SVS P13 Methanol = 9.12 Lbs/Hr

SVS P15 DCP = 0.84 Lbs/Hr

IV. SAMPLING AND ANALYTICAL PROTOCOL

The sampling location was on the fifty-two (52) inch I.D. exhaust for the Nickel Stack, the forty-two (42) (42) inch I.D. exhaust for the Electroless Copper exhaust and on the thirteen and one half (13.5) inch I.D. exhaust of the Conditioner. Locations met the minimum test location requirements of U.S. EPA Reference Method 1. Twelve (12) sampling points per port were used for the testing (24 points total) on the nickel stack and eight (8) points per port were used (16 points total) for the Electroless Copper and the Conditioner stacks. The point dimensions can be seen in Appendix F.

IV.1 Nickel (Ni) - The nickel emission sampling was conducted in accordance with U.S. EPA Method 29 (multiple metals train). Figure 1 is a schematic diagram of the Method 29 sampling train. Each sample was sixty (60) minutes in duration and had a minimum sample volume of thirty (30) dry standard cubic feet. The samples were collected isokinetically on quartz filters, and in a nitric acid/hydrogen peroxide solution.

The samples were recovered and refrigerated until they were analyzed. The filters and nozzle/probe rinses (front half) were combined with the impinger catch of nitric acid/hydrogen peroxide solution and were analyzed for nickel by Inductively Coupled Argon Plasma (ICAP)/Mass Spectrometer (MS). All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

IV.2 DCP and Methanol - The methanol and DCP determinations were performed in accordance with EPA Method 308. Teflon probes were used to extract the exhaust gas from the exhausts. Silica Gel sorbent tubes were used to collect the methanol and DCP samples. The sampling trains were operated with vacuum pumps with calibrated critical orifices. Two midget impingers were used ahead of the tubes. The first impinger contained approximately 15mls of DI water. The second impinger was empty. One sample spike was run for each compound. The spikes were liquid and were added to the DI water impinger for the spike trains. The orifices were calibrated at approximately 1000 cc/min. Three, (3) sixty (60), minute samples will be collected from the exhausts for each compound.

The silica gel tubes and impinger contents were recovered and refrigerated until analyzed. The tubes were

desorbed and analyzed by GC/FID in accordance with the method for methanol or DCP. All quality assurance and quality control requirements specified in the method were incorporated in the sampling and analysis. In addition, a spiked duplicate train was run during one of the samples to document recovery efficiency for the two (2) compounds. Methanol recovery was 99.83% and DCP recovery was 129.24%.

IV.3 Formaldehyde - The formaldehyde sampling was performed in accordance with Method 0011. Method 0011 was modified to use midget impingers and sample at a constant rate. Samples were extracted from the exhaust of the Electroless Copper Tanks at approximately 1000 cc/per minute through a Teflon sample line and then through midget impingers with 15 mls of DNPH solution in each of the first two (2) impingers. The sampling system used a sampling pump equipped with a calibrated critical orifice.

The samples were analyzed by gas chromatography with a flame ionization detector (GC-FID) for formaldehyde. All the applicable quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis. In addition, a spiked duplicate train was run during one of the samples to document recovery efficiency for formaldehyde. Formaldehyde recovery was 82.86%.

IV.4 Exhaust Gas Parameters - The exhaust gas parameters (air flow rate, temperature, moisture, and density) were determined by employing U.S. EPA Reference Methods 1 through 4. All the quality control and quality assurance requirements listed in the methods were incorporated in the sampling and analysis.

This report was prepared by:

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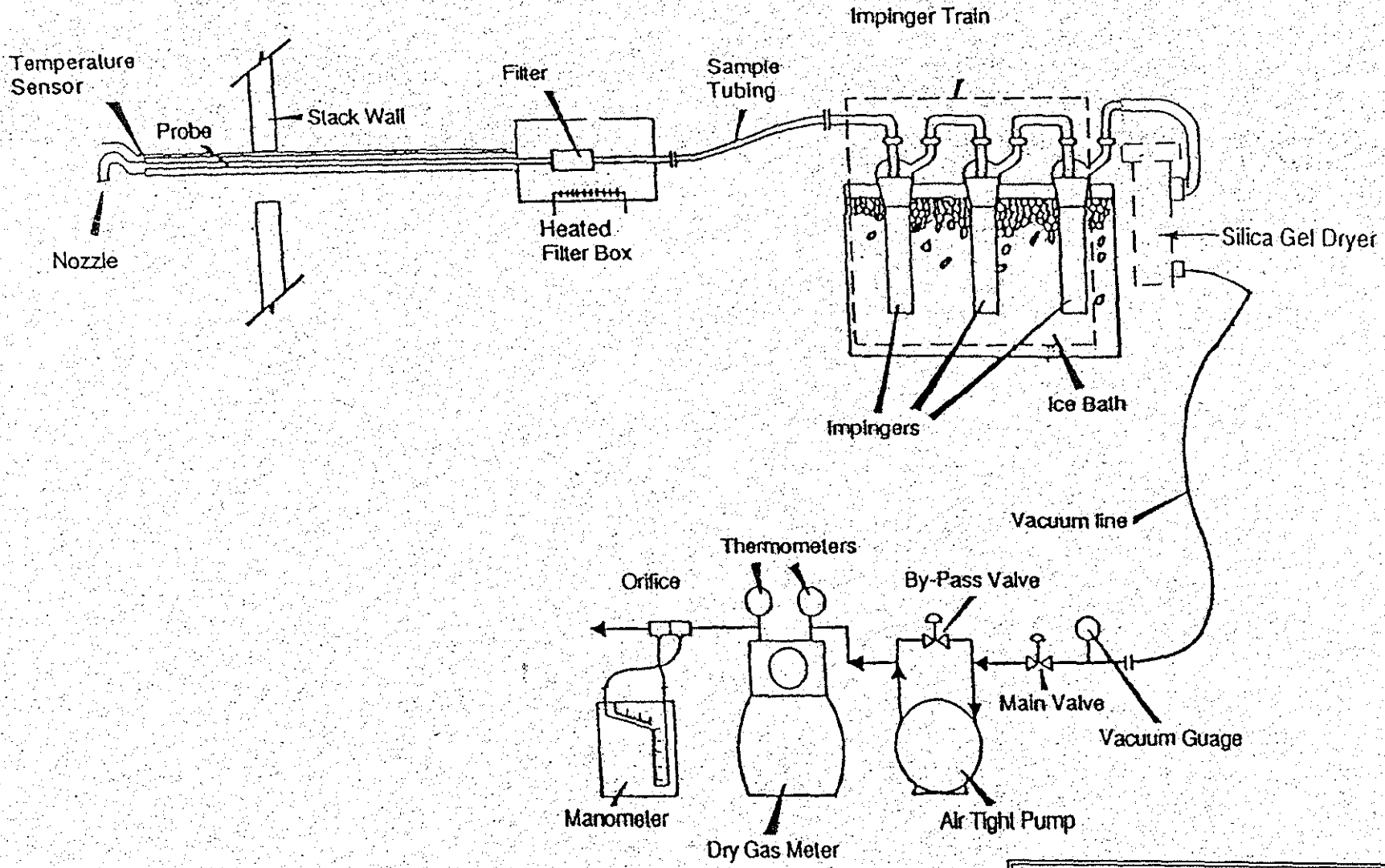

FIGURE 1

EPA METHOD 29
MULTIPLE METALS TRAIN

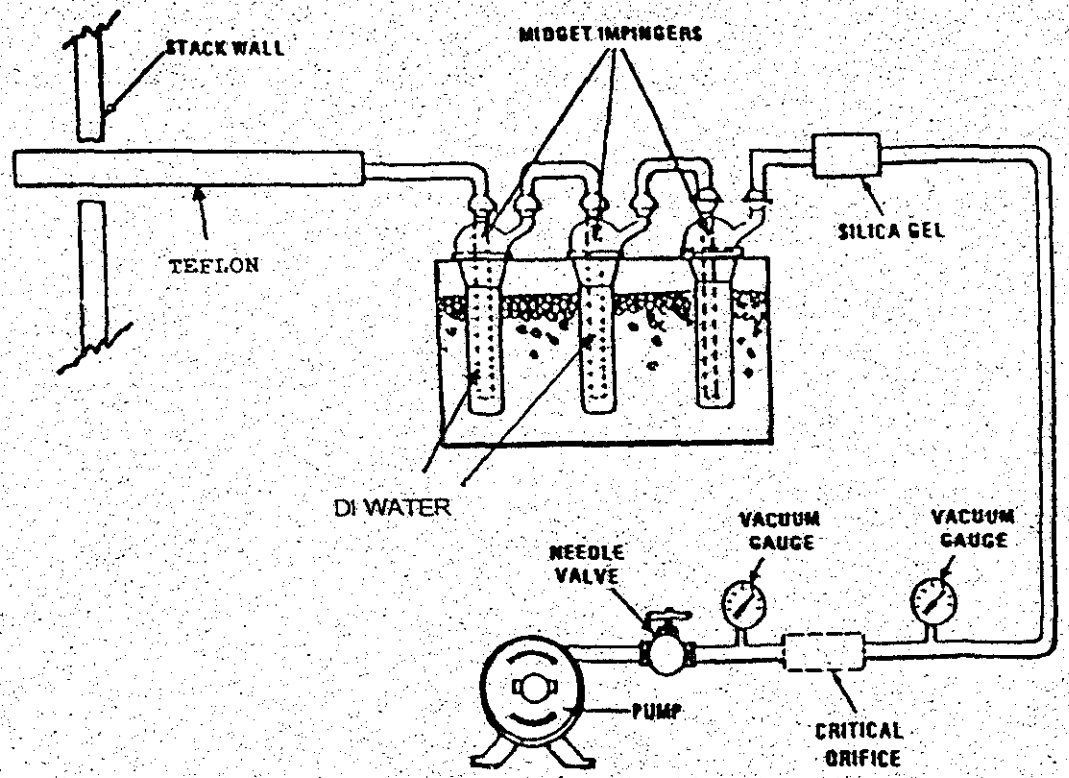

FIGURE 2

DCP & METHANOL SAMPLING TRAIN

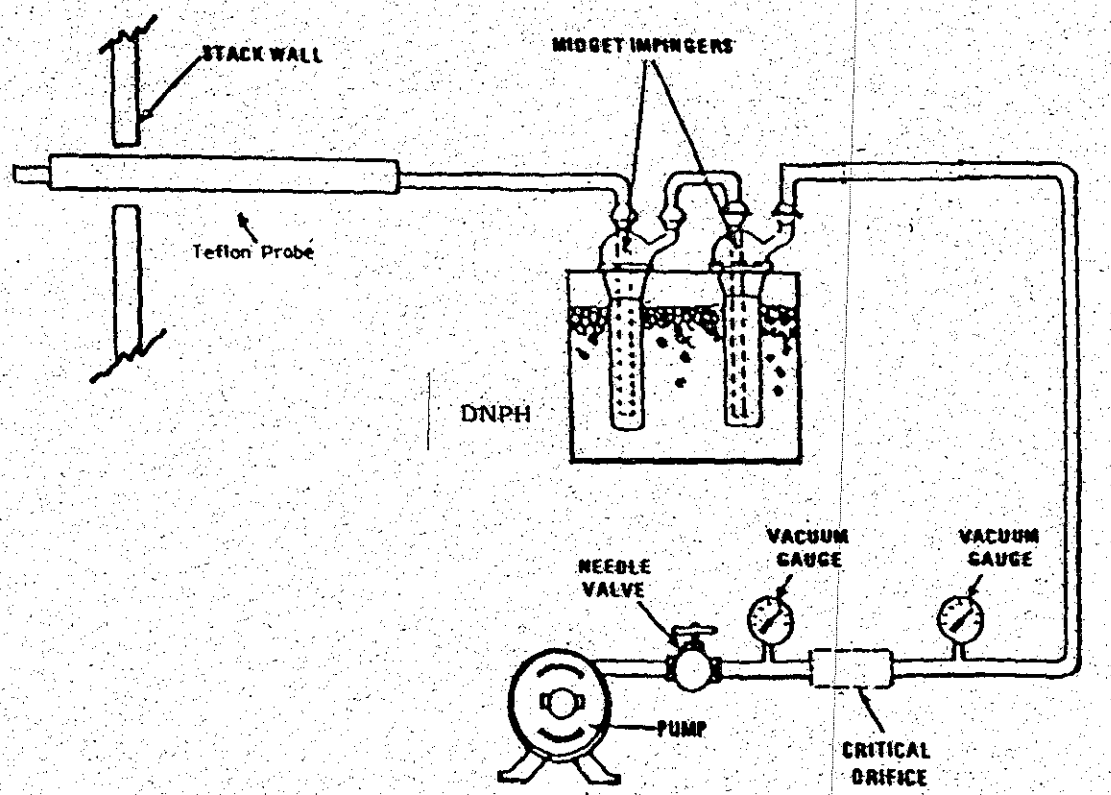

FIGURE 3

FORMALDEHYDE SAMPLING TRAIN