Report of...

# Compliance Emission Testing

performed for...

# Lacks Enterprises, Inc.
# Airlane North Plant

Kentwood, Michigan



on the

## Various Sources

October 24 and 25, 2017

021.26

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 North facility in Kentwood, Michigan. The purpose of the study was to quantify the Nickel emissions from the semi-bright nickel (SVN-1A) and bright nickel (SVN-1B) exhausts, Formaldehyde and Methanol from the Electroless Copper exhaust (SVN-4), and 1,3-Dichloro-2-proponal (DCP) from the Conditioner (SVN-7) 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. Jeremy Howe and Ms. April Lazzaro of the Michigan Department of Environmental Quality, Air Quality Division, were present to observe the testing and source operation. The sampling was performed by Stephan K. Byrd, R. Scott Cargill, Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc. on October 24 and 25, 2017 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**
**SEMI BRIGHT (SVN-1A) & BRIGHT (SVN-1B) EXHAUSTS**
**LACKS ENTERPRISES**
**KENTWOOD, MICHIGAN**
**OCTOBER 24, 2017**

| Semi Bright (SVN-1A) Sample # | Time | Air Flow Rate DSCFM | Concentration $Mg/M^3$ | Mass Emission Rate Lbs/Hr |
|---|---|---|---|---|
| 1 | 10:14-11:21 | 37,983 | 0.030 | 0.0042 |
| 2 | 13:03-14:09 | 37,649 | 0.048 | 0.0067 |
| 3 | 15:11-16:16 | 37,780 | 0.036 | 0.0051 |
| **Average** | | **37,804** | **0.038** | **0.0053** |
| Bright (SVN-1B) Sample # | | | | |
| 4 | 10:14-11:21 | 19,721 | 0.022 | 0.0016 |
| 5 | 13:03-14:09 | 20,151 | 0.019 | 0.0015 |
| 6 | 15:11-16:16 | 20,086 | 0.020 | 0.0015 |
| **Average** | | **19,986** | **0.020** | **0.0015** |
| **TOTAL AVERAGE FOR BOTH EXHAUSTS** | | | | **0.0068 Lbs/Hr(1)** |

**II.2 TABLE 2**
**FORMALDEHYDE EMISSION RESULTS**
**ELECTROLESS COPPER (SVN-4) EXHAUST**
**LACKS ENTERPRISES**
**KENTWOOD, MICHIGAN**
**OCTOBER 25, 2017**

| Sample | Time | Air Flow Rate DSCFM | Concentration $Mg/M^3$ | Mass Emission Rate Lbs/Hr |
|---|---|---|---|---|
| 1 | 9:29-10:29 | 12,503 | 0.655 | 0.031 |
| 2 | 10:41-11:41 | 12,500 | 0.824 | 0.039 |
| 3 | 11:48-12:48 | 12,481 | 0.946 | 0.044 |
| **Average** | | **12,495** | **0.808** | **0.038** |

**II.3 TABLE 3**
**METHANOL EMISSION RESULTS**
**ELECTROLESS COPPER (SVN-4) EXHAUST**
**LACKS ENTERPRISES**
**KENTWOOD, MICHIGAN**
**OCTOBER 25, 2017**

| Sample | Time | Air Flow Rate DSCFM | Concentration $Mg/M^3$ | Mass Emission Rate Lbs/Hr |
|---|---|---|---|---|
| 1 | 9:29-10:29 | 12,503 | 134.948 | 6.317 |
| 2 | 10:41-11:41 | 12,500 | 126.773 | 5.933 |
| 3 | 11:48-12:48 | 12,481 | 125.969 | 5.887 |
| **Average** | | **12,495** | **129.23** | **6.046** |

**II.4 TABLE 4**
**DCP EMISSION RESULTS**
**CONDITIONER (SVN-7) EXHAUST**
**LACKS ENTERPRISES**
**KENTWOOD, MICHIGAN**
**OCTOBER 25, 2017**

| Sample | Time | Air Flow Rate DSCFM | Concentration $Mg/M^3$ | Mass Emission Rate Lbs/Hr |
|---|---|---|---|---|
| 1 | 9:29-10:29 | 3,250 | 3.183 | 0.039 |
| 2 | 10:41-11:41 | 3,264 | 5.077 | 0.062 |
| 3 | 11:48-12:48 | 3,233 | 4.336 | 0.052 |
| **Average** | | **3,249** | **4.199** | **0.051** |

## III. DISCUSSION OF RESULTS

The emission results are presented in Tables 1 through 5 (Section II.1 through II.5).

The emission limits for these sources are;

SVN 1A and SVN 1B Nickel = 0.0598 Lbs/Hr (This is a combined limit)

SVN-4 Formaldehyde = 2.72 Lbs/Hr

SVN-4 Methanol = 8.3 Lbs/Hr

SVN-7 DCP = 0.84 Lbs/Hr

## IV. SAMPLING AND ANALYTICAL PROTOCOL

The sampling location was on the sixty (60) inch I.D. exhaust for the Semi Bright Stack and on the forty two (42) inch I.D. exhaust for the Bright Nickel Stack. Both 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). The point dimensions can be seen in Appendix F. The sampling for the Electroless Copper Stack was done on the thirty two (32) inch I.D. exhaust at a location that met the minimum test requirements of U.S. EPA Reference Method 1. The sampling for the Conditioner Stack was done on the thirty two (32) inch I.D. exhaust at a location that met the minimum test requirements of U.S. EPA Reference Method 1. Twelve (12) traverse points per port were used for the air flow determinations (24 points total) on both of these 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. Each impinger containing approximately 20mls of DI water. 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 will be 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 92.05% and DCP recovery was 116.58%.

**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 85.81%.

**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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This report was reviewed by:

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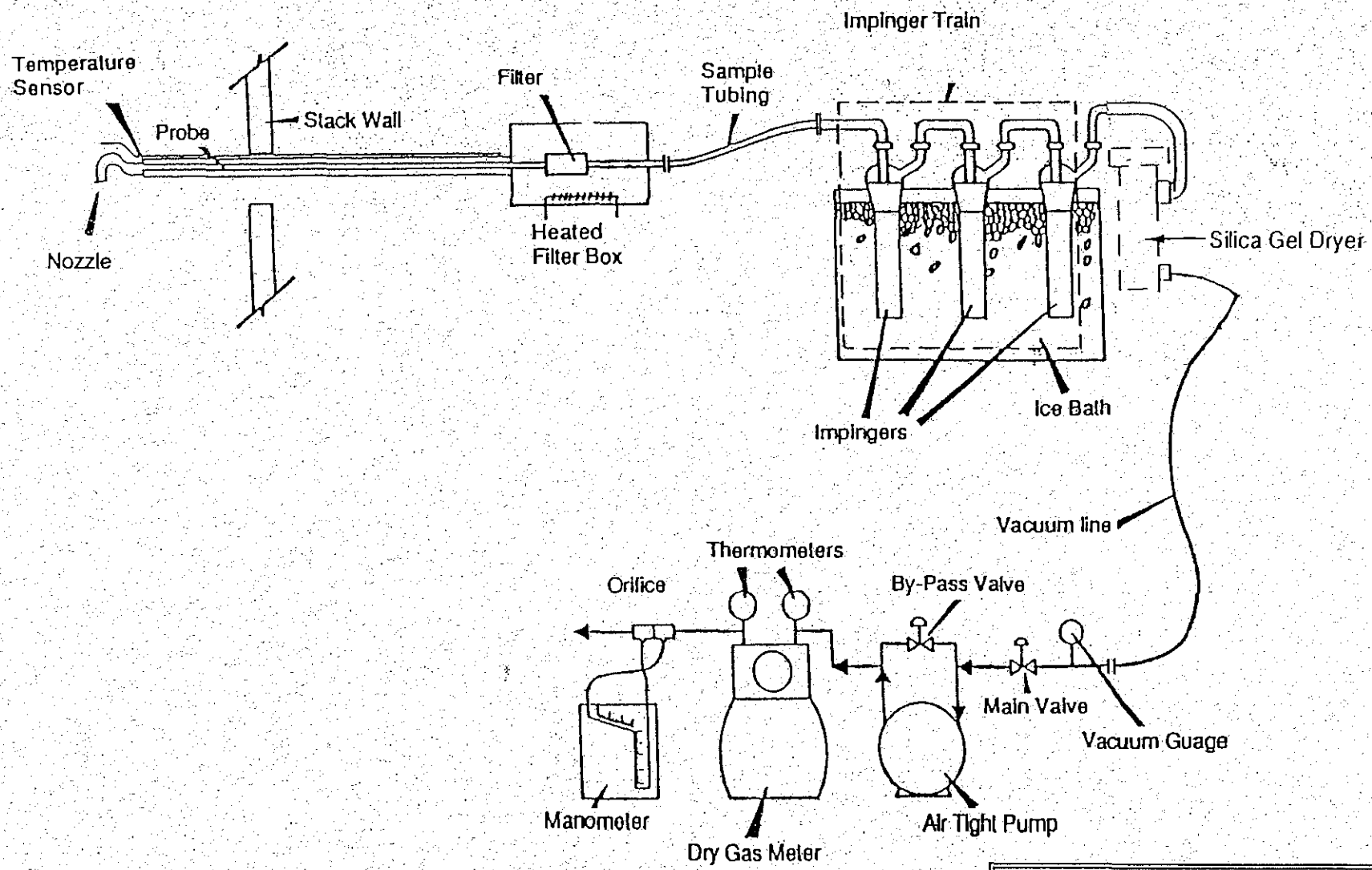


**FIGURE 1**

**EPA METHOD 29**
**MULTIPLE METALS TRAIN**

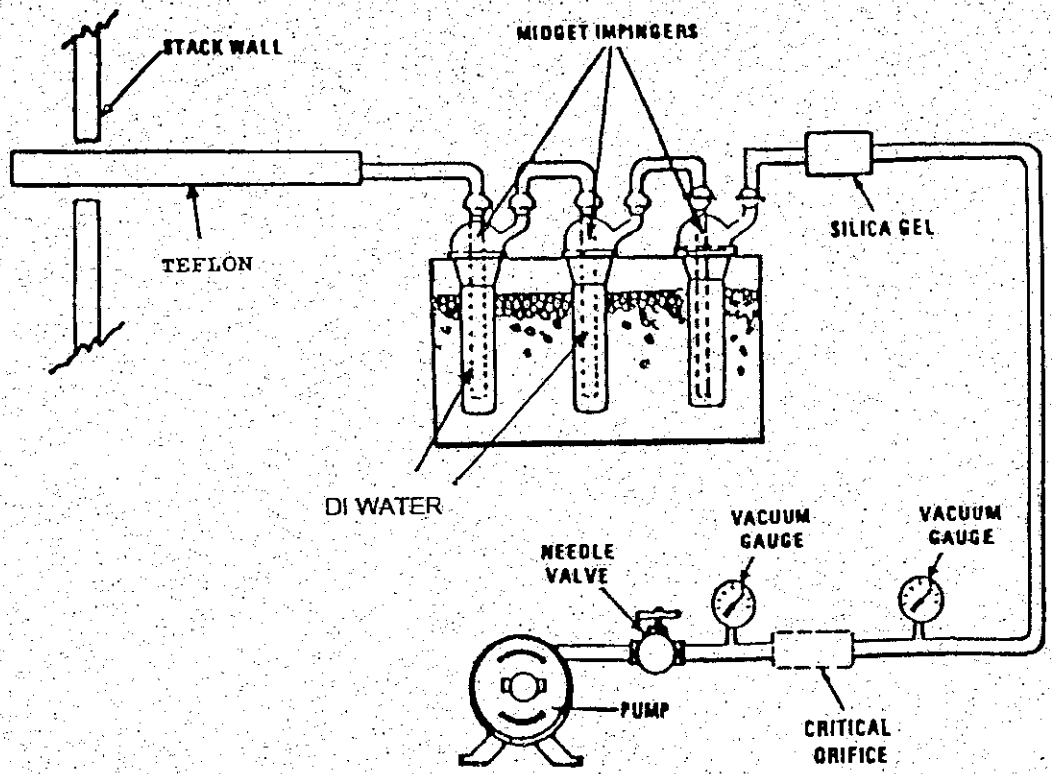


FIGURE 2

DCP & METHANOL SAMPLING TRAIN

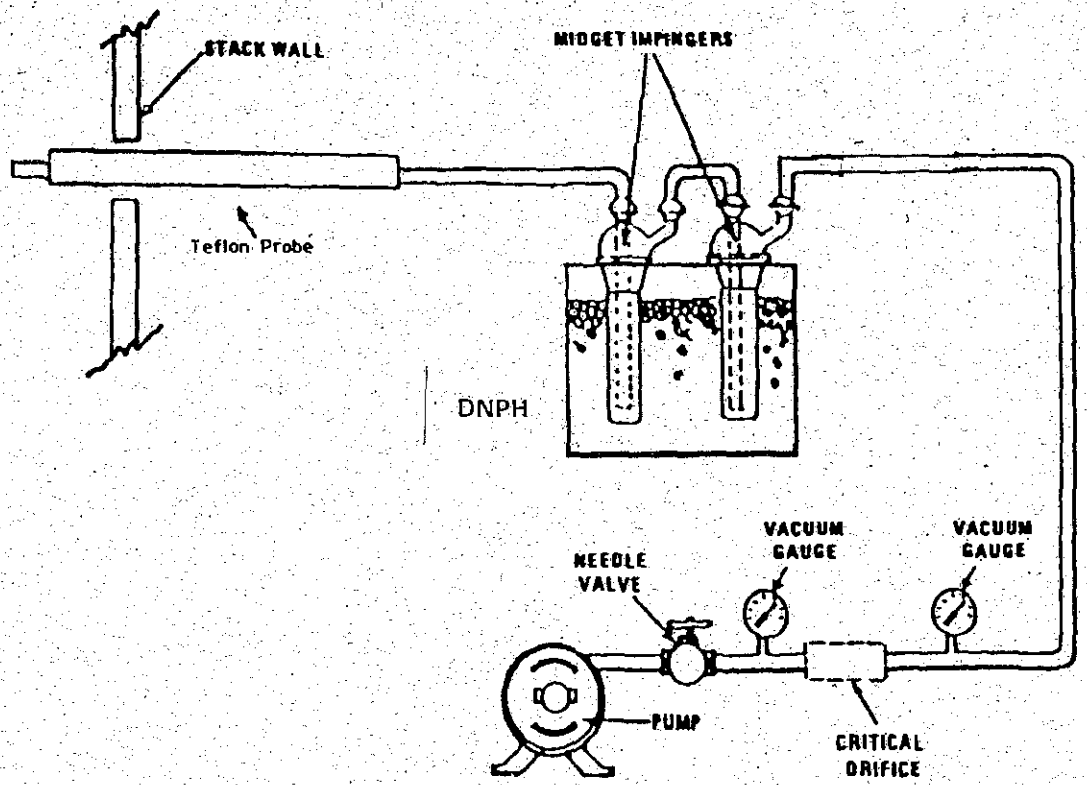


FIGURE 3

FORMALDEHYDE SAMPLING TRAIN