Report of...

Compliance Emission Testing

performed for...

Lacks Enterprises, Inc.
Barden Street Plant

Kentwood, Michigan

on

Multiple Sources

May 22 -25, 2017

021.30

Network Environmental, Inc.
Grand Rapids, MI

I. INTRODUCTION

Network Environmental, Inc. was retained by Lacks Industries to perform compliance emission sampling on multiple sources located at their Barden Avenue facility in Kentwood, Michigan. The purpose of the study was to document compliance with Michigan Department of Environmental Quality, Air Quality Division, Renewable Operating Permit MI-ROP-N2079-2012 and Source-Wide Permit to Install MI-PTI-N2079-2012.

The following is a list of the sources, applicable emission limits and the compounds tested:

Stack ID	Emission Limits	Compound Sampled
SVK1*	DCP : 0.48 Lbs/Hr	1,3 Dichloro-2-propanol
SVK2	Total Cr: 0.0025 Lbs/Hr and 0.012 Mg/M^3	Total Chromium
SVK4	Formaldehyde:2.97 Lbs/Hr Methanol: 12.2 Lbs/Hr	Methanol, Formaldehyde
SVK6	Nickel: 0.028 Lbs/Hr	Nickel
SVK7	Nickel: 0.028 Lbs/Hr	Nickel
SVK8	Total Cr: 0.0006 Lbs/Hr and 0.005 Mg/M^3	Total Chromium

*Source SVK-1 is the conditioner stack and was not tested at this time due to stack construction.

The sampling was performed by Stephan K. Byrd, R. Scott Cargill, Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc. over the period of May 22-25, 2017. Assisting in the study was Ms. Karen Baweja of Lacks Industries and the operating staff of the facility. Mr. Tom Gasloli and Ms. April Lazzaro of the Michigan Department of Environmental Quality, Air Quality Division, were present to observe the testing and source operation.

The following test methods were used to conduct the testing:

Nickel – U.S. EPA Reference Method 29

Formaldehyde – U.S. EPA Method SW-846 Method 0011

Total Chrome – U.S. EPA Reference Method 306

Methanol – U.S. EPA Reference Method 308

II. PRESENTATION OF RESULTS

II.1 TABLE 1
NICKEL EMISSION RESULTS
SEMI BRIGHT (SVK6) & BRIGHT (SVK7) EXHAUSTS
BARDEN FACILITY
KENTWOOD, MICHIGAN
MAY 22 and 25, 2017

Semi Bright (SVK6) 5/25/17 Sample #	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
1	8:55-10:02	31,231	0.0226	0.0026
2	10:47-11:53	31,460	0.0232	0.0027
3	12:28-13:44	32,001	0.0248	0.0030
Average		**31,564**	**0.0235**	**0.0028**
Bright (SVK7) 5/22/17 Sample #				
1	9:42-10:53	22,964	0.0129	0.0011
2	11:39-12:43	22,429	0.0133	0.0011
3	13:24-14:31	22,189	0.0139	0.0012
Average		**22,527**	**0.0134**	**0.0011**

II.2 TABLE 2
FORMALDEHYDE EMISSION RESULTS
ELECTROLESS COPPPER (SVK-4) EXHAUST
BARDEN FACILITY
KENTWOOD, MICHIGAN
MAY 25, 2017

Source	Date	Sample #	Time	Air Flow Rate DSCFM	Mass Emission Rate Lbs/Hr
Electroless Copper (SVK4)	5/25/17	1	8:34-9:34	32,229	0.0792
		2	9:42-10:42		0.0279
		3	10:48-11:48		0.0906
Average					**0.0659**

II.3 TABLE 3
METHANOL EMISSION RESULTS
ELECTROLESS COPPER (SVK4) EXHAUST
BARDEN FACILITY
KENTWOOD, MICHIGAN
MAY 25, 2017

Sample	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
1	8:34-9:34	32,229	19.5674	2.3612
2	9:42-10:42		21.4426	2.5874
3	10:48-11:48		23.8190	2.8742
Average			**21.6097**	**2.6076**

II.4 TABLE 4
TOTAL CHROME EMISSION RESULTS
CHROME PLATE (SVK-8) EXHAUST & CHROME ETCH (SVK-2) EXHAUST
BARDEN FACILITY
KENTWOOD, MICHIGAN
MAY 23-24, 2017

Source	Sample	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
Chrome Plate	1	8:15-10:19	29,330	0.0049	0.00054
	2	10:34-12:37	31,312	0.0047	0.00056
	3	12:55-14:59	29,224	0.0034	0.00037
Average			**29,955**	**0.0043**	**0.00049**
Chrome Etch	1	8:13-10:18	51,700	0.0070	0.0014
	2	10:37-12:40	51,250	0.0092	0.0018
	3	12:56-15:03	52,160	0.0050	0.00098
Average			**51,703**	**0.0071**	**0.0014**

III. DISCUSSION OF RESULTS

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

IV. SAMPLING AND ANALYTICAL PROTOCOL

All of the sampling locations met the minimum requirements of U.S. EPA Reference 1. All exhaust stack dimensions and all of the point locations can be seen in Appendix F. Twenty-four points (twelve per port) were used for all of the isokinetic sampling.

IV.1 Nickel - 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 Methanol - The methanol 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. The sampling trains were operated with vacuum pumps with calibrated critical orifices. Three midget impingers were used ahead of the tubes. The first two impingers contained approximately 15mls of DI water and the third impinger was empty. One sample spike was run for each compound. The spike was liquid and was added to the DI water impinger for the spiked train. The orifices were calibrated at approximately 1000 cc/min. Three (3), sixty (60), minute samples were collected from the exhaust for the compound. Figure 2 is a schematic diagram of the Methanol sampling train.

The silica gel tubes and impinger contents were recovered and refrigerated until analyzed. The tubes were desorbed and the impinger contents and tubes were analyzed by GC/FID in accordance with the method for methanol. 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 compound. Methanol recovery was 94.32%.

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 (SVK-4) exhaust 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. Figure 3 is a schematic diagram of the formaldehyde sampling train.

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 101.12%.

IV.4 Total Chrome - The Cr emission sampling was conducted in accordance with U.S. EPA Method 306. Three (3) samples, 120 minutes in duration each, were collected from the exhausts. The samples were collected isokinetically in 0.1N Sodium Bicarbonate as outlined in the method.

The samples were recovered and analyzed for total chromium by inductively coupled argon plasma/mass spectrophotometry (ICP/MS). All the quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis. Figure 4 is a schematic diagram of the total chrome sampling train.

IV.5 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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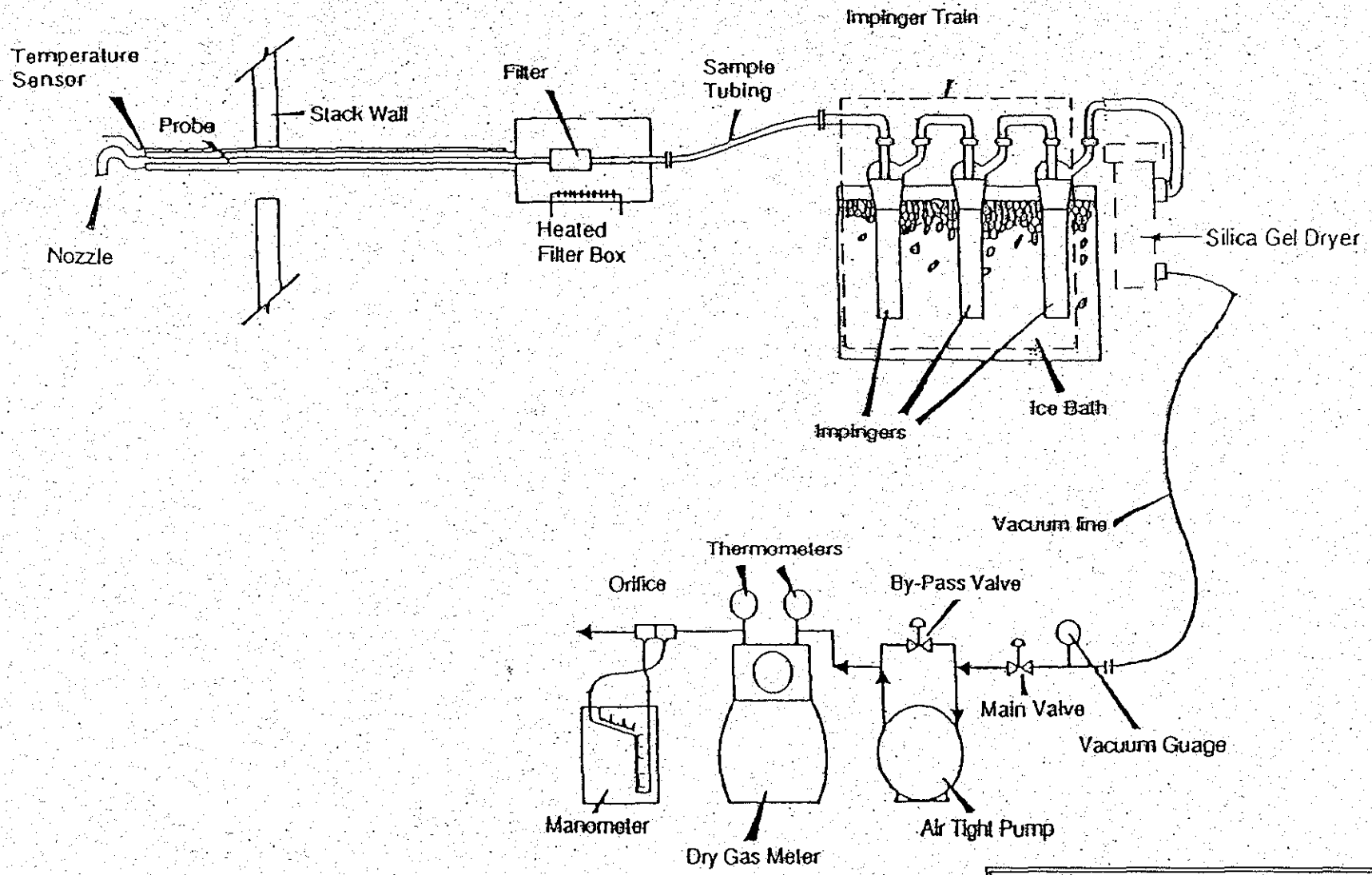

FIGURE 1

EPA METHOD 29
MULTIPLE METALS TRAIN

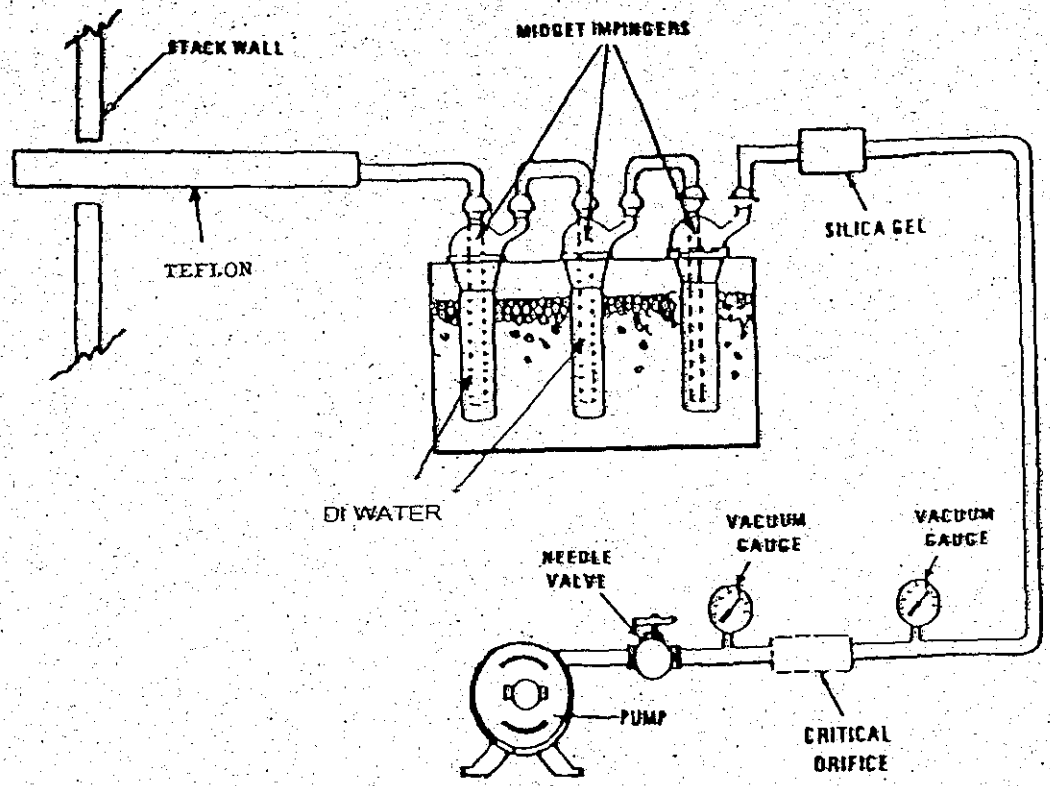

FIGURE 2

METHANOL SAMPLING TRAIN

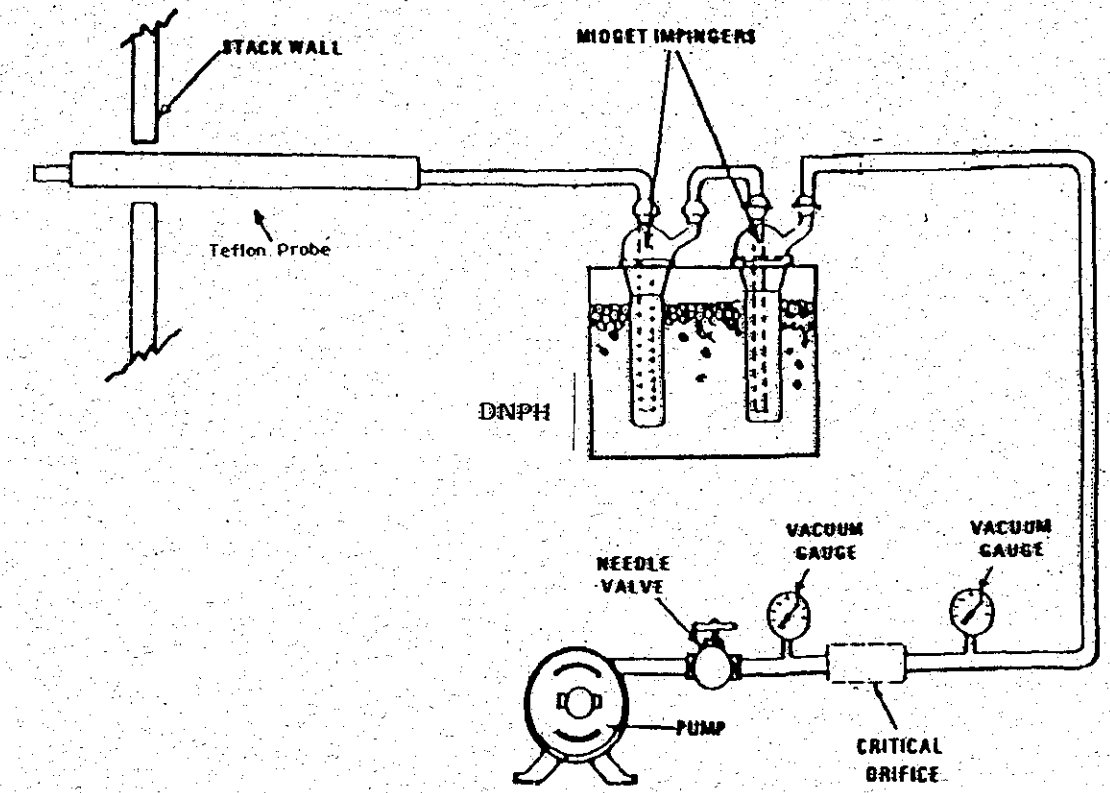

FIGURE 3

FORMALDEHYDE SAMPLING TRAIN

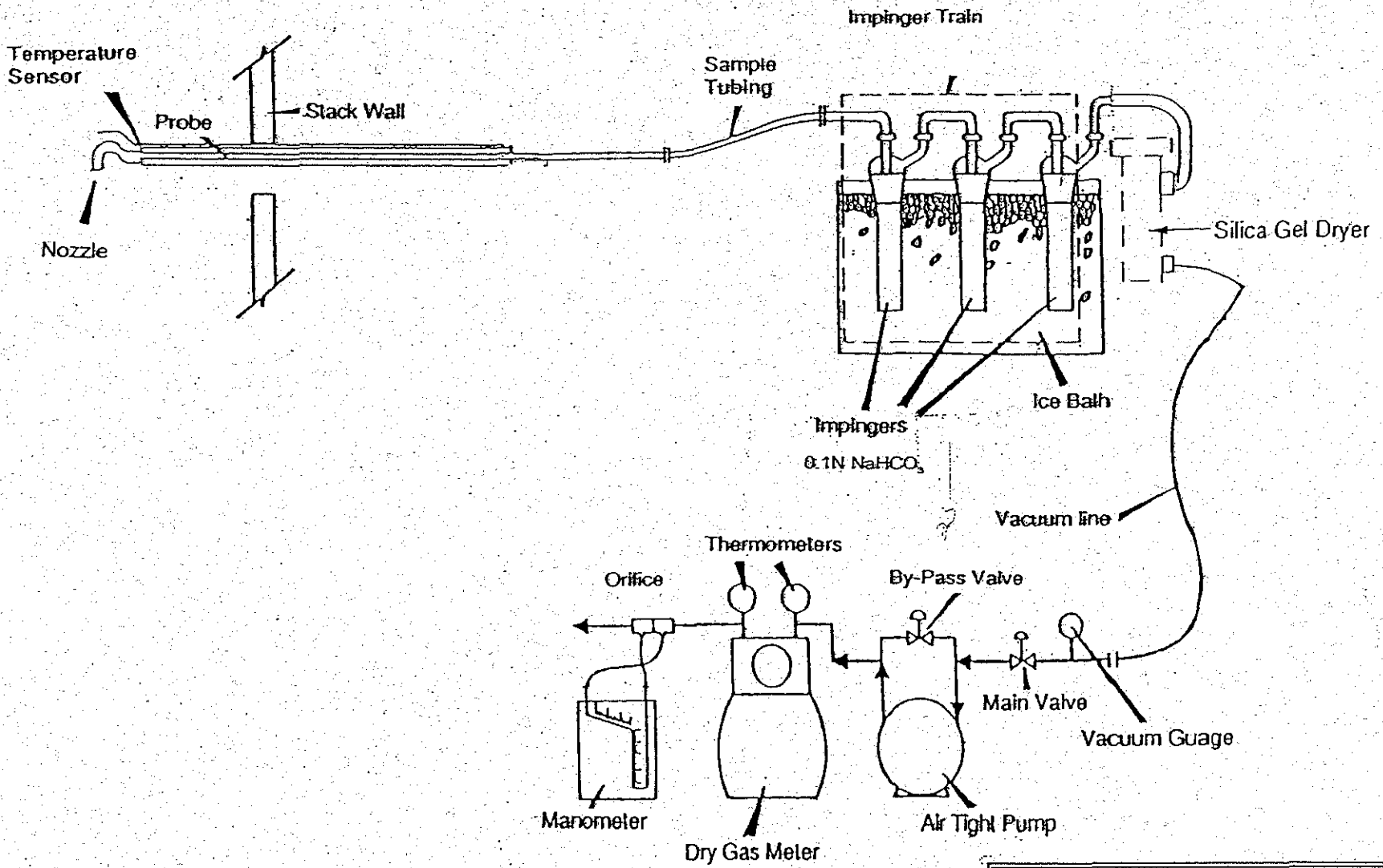

FIGURE 4

TOTAL CHROME SAMPLING TRAIN