I. INTRODUCTION

Network Environmental, Inc. was retained by Plastic Plate, LLC to perform compliance emission sampling on multiple sources located at their Kraft Avenue facility in Kentwood, Michigan. The purpose of the study was to document compliance with Michigan Department of Environment, Great Lakes and Energy (EGLE), Air Quality Division, Renewable Operating Permit MI-ROP-N7374-2020.

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

Stack ID	Emission Limits	Compound Sampled
SVK4	Methanol: 9.0 Lbs/Hr Formaldehyde: 1.1 Lbs/Hr NaOH: 0.22 Lbs/Hr	Methanol, Formaldehyde & Sodium Hydroxide
SVK6	Nickel: 0.19 Lbs/Hr Formaldehyde: 0.04 Lbs/Hr	Nickel & Formaldehyde
SVK7	Nickel: 0.19 Lbs/Hr Formaldehyde: 0.04 Lbs/Hr NaOH: 0.33 Lbs/Hr	Nickel, Formaldehyde & Sodium Hydroxide
SVK8	Total Cr: 0.003 Lbs/Hr and 0.006 Mg/M^3	Total Chromium

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 April 6-9, 2021. Assisting in the study was Ms. Karen Baweja of Lacks Industries and the operating staff of the facility. Ms April Lazzaro, Ms. Lindsey Wells and Mr. Trevor Drost of the Michigan Department of Environment, Great Lakes and Energy (EGLE), 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 0011

Total Chrome – U.S. EPA Reference Method 306

Methanol – U.S. EPA Reference Method 308

Sodium Hydroxide – U.S. EPA Reference Method 308

II. PRESENTATION OF RESULTS

II.1 TABLE 1
NICKEL EMISSION RESULTS
SEMI BRIGHT (SVK6) & BRIGHT (SVK7) EXHAUSTS
PLASTIC PLATE, LLC
KENTWOOD, MICHIGAN
APRIL 7 and 8, 2021

Semi Bright (SVK6) Sample #	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
1 (4/7/21)	9:12-10:25	30,914	0.0207	0.0024
2 (4/7/21)	11:20-12:27	30,620	0.0216	0.0025
3 (4/7/21)	14:08-15:16	30,138	0.0187	0.0021
Average		**30,557**	**0.0203**	**0.0023**
Bright (SVK7) Sample #				
1 (4/8/21)	9:18-10:35	29,957	0.0378	0.0042
2 (4/8/21)	11:16-12:45	30,007	0.0142	0.0016
3 (4/8/21)	13:36-15:02	29,954	0.0180	0.0020
Average		**29,937**	**0.0233**	**0.0026**

II.2 TABLE 2
FORMALDEHYDE EMISSION RESULTS
PLASTIC PLATE, LLC
KENTWOOD, MICHIGAN
APRIL 7-9, 2021

Source	Date	Sample #	Time	Air Flow Rate DSCFM	Mass Emission Rate Lbs/Hr
Electroless Copper (SVK4)	4/9/21	1	9:00-10:00	26,829	0.0660
		2	10:23-11:23	26,709	0.0758
		3	11:55-12:55	26,728	0.1650
Average				**26,755**	**0.1023**
Semi-Brite Nickel (SVK6)	4/7/21	1	8:40-9:40	30,914	0.0232
		2	12:15-13:15	30,620	0.0554
		3	13:31-14:31	30,138	0.0204
Average				**30,557**	**0.0330**
Brite Nickel (SVK7)	4/8/21	1	8:50-9:50	29,957	0.0351
		2	12:11-13:11	30,007	0.0154
		3	13:31-14:31	29,954	0.0147
Average				**29,973**	**0.0217**

II.3 TABLE 3
METHANOL EMISSION RESULTS
ELECTROLESS COPPER (SVK4) EXHAUST
PLASTIC PLATE, LLC
KENTWOOD, MICHIGAN
APRIL 9, 2021

Sample	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
1	9:00-10:00	26,829	59.80	6.01
2	10:23-11:23	26,709	57.38	5.74
3	11:55-12:55	26,728	57.36	5.74
Average		**26,755**	**58.18**	**5.83**

II.4 TABLE 4
SODIUM HYDROXIDE EMISSION RESULTS
PLASTIC PLATE, LLC
KENTWOOD, MICHIGAN
APRIL 8-9, 2021

Source	Date	Sample #	Time	Air Flow Rate DSCFM	Mass Emission Rate Lbs/Hr
Electroless Copper (SVK4)	4/9/21	1	9:00-10:00	26,829	0.0174
		2	10:23-11:23	26,709	0.0180
		3	11:55-12:55	26,728	0.0282
Average				**26,755**	**0.0212**
Brite Nickel (SVK7)	4/8/21	1	8:50-9:50	29,957	0.0596
		2	12:11-13:11	30,007	0.0614
		3	13:31-14:31	29,954	0.0305
Average				**29,973**	**0.0505**

II.5 TABLE 5
TOTAL CHROME EMISSION RESULTS
PLASTIC PLATE, LLC
KENTWOOD, MICHIGAN
APRIL 6, 2021

Source	Sample	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
Chrome Plate Exhaust	1	8:03-10:07	35,973	0.0026	0.00035
	2	10:35-12:40	35,825	0.0010	0.00014
	3	13:01-15:04	35,894	0.0010	0.00014
Average			**35,897**	**0.0015**	**0.00021**

III. DISCUSSION OF RESULTS

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

IV. SAMPLING AND ANALYTICAL PROTOCOL

All of the sampling locations met the optimum requirements of U.S. EPA Reference 1. All exhaust stack dimensions and all of the point locations can be seen in Appendix F. Twelve points (six per port) were used for all of the air flows and 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. Figure 1 is a schematic diagram of the Metals sampling train

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 samples. The sampling trains were operated with vacuum pumps with calibrated critical orifices. Two midget impingers were used ahead of the tubes. Each impinger containined approximately 15mls of DI water. One sample spike was run for each source tested. The spikes consisted of a liquid spike and a tube spike. The orifices were calibrated at approximately 1000 cc/min. Three (3), sixty (60), minute samples were collected from the exhausts for each 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. Methanol recovery was 83.63%.

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 exhausts of the Electroless Copper, Semi-Brite Nickel and Brite Nickel 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. Figure 3 is a schematic diagram of the formaldehyde sampling train.

The samples were analyzed by HPLC. 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 (one for each source) was run during one of the samples to document recovery efficiency for formaldehyde. Formaldehyde recovery was 92.44% for SVK-4, 93.29% for SVK-6 and 88.06% for SVK-7.

IV.4 Sodium Hydroxide - The Sodium Hydroxide determinations were performed using a modified version of Method 308. NaOH was captured in deionized/distilled water and analyzed by ion chromatography. Teflon probes were used to extract the exhaust gas from the exhaust. Deionized/distilled water was used to collect the samples. The sampling trains were operated with vacuum pumps with calibrated critical orifices. The orifices were calibrated at approximately 1000 cc/min. Three sixty (60) minute samples were collected from the exhausts. Figure 4 is a schematic diagram of the sodium hydroxide sampling train.

The samples were recovered and refrigerated until they were analyzed. All quality assurance and quality control requirements specified in the method were incorporated in the sampling and analysis. The Sodium Hydroxide recovery was 89.28% for SVK-4 and 100.97% for SVK-7.

IV.5 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 exhaust. 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 5 is a schematic diagram of the total chrome sampling train.

IV.6 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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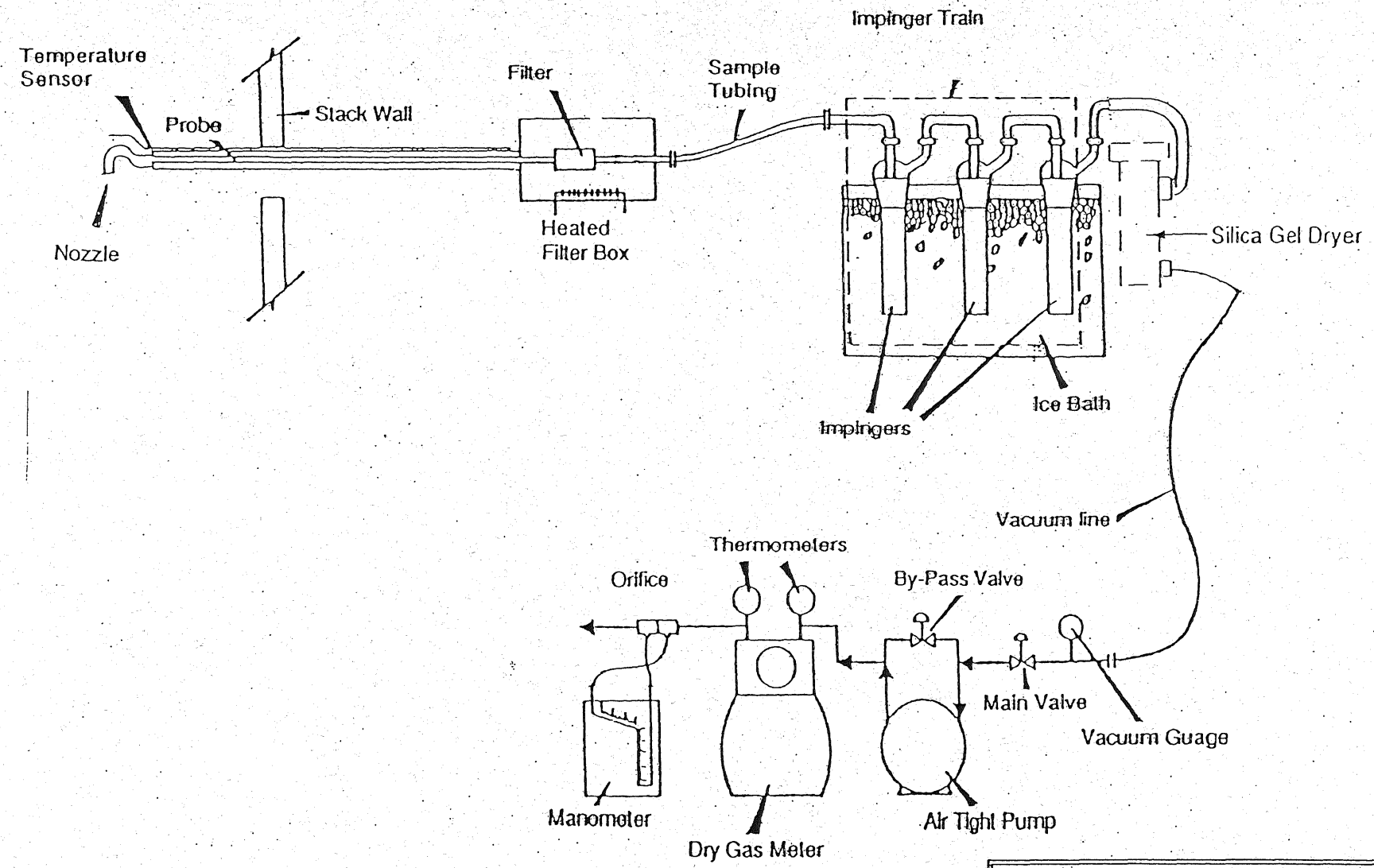

FIGURE 1

EPA METHOD 29
MULTIPLE METALS TRAIN

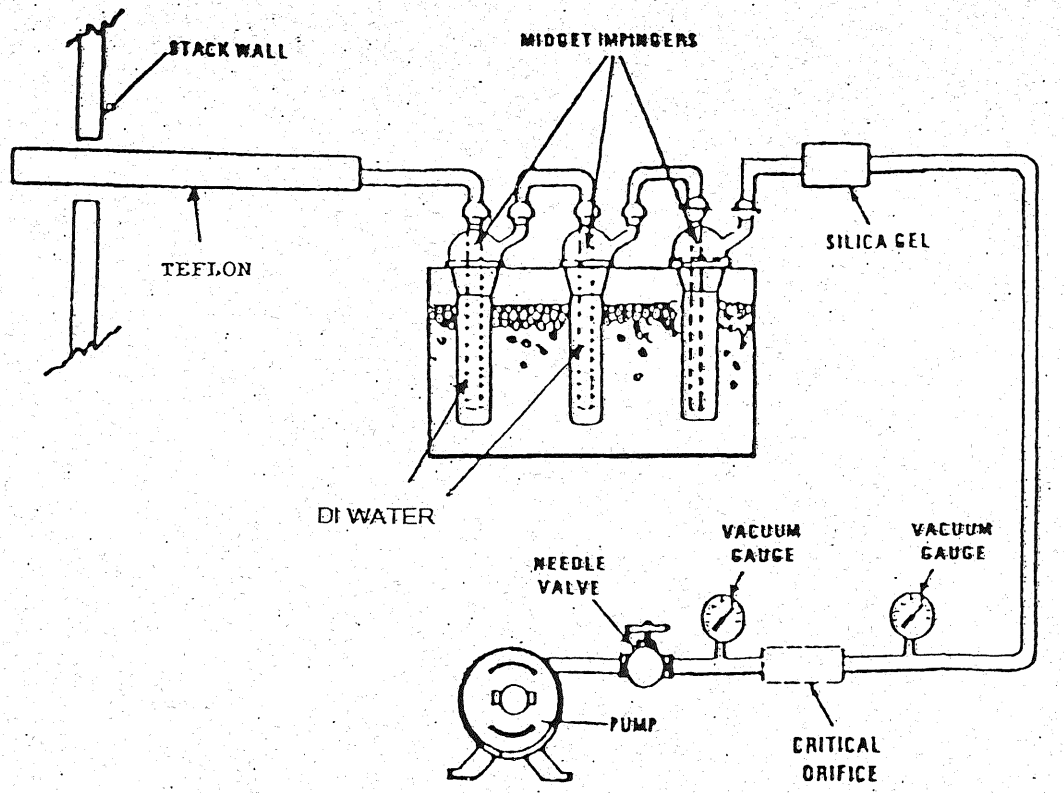

FIGURE 2

METHANOL SAMPLING TRAIN

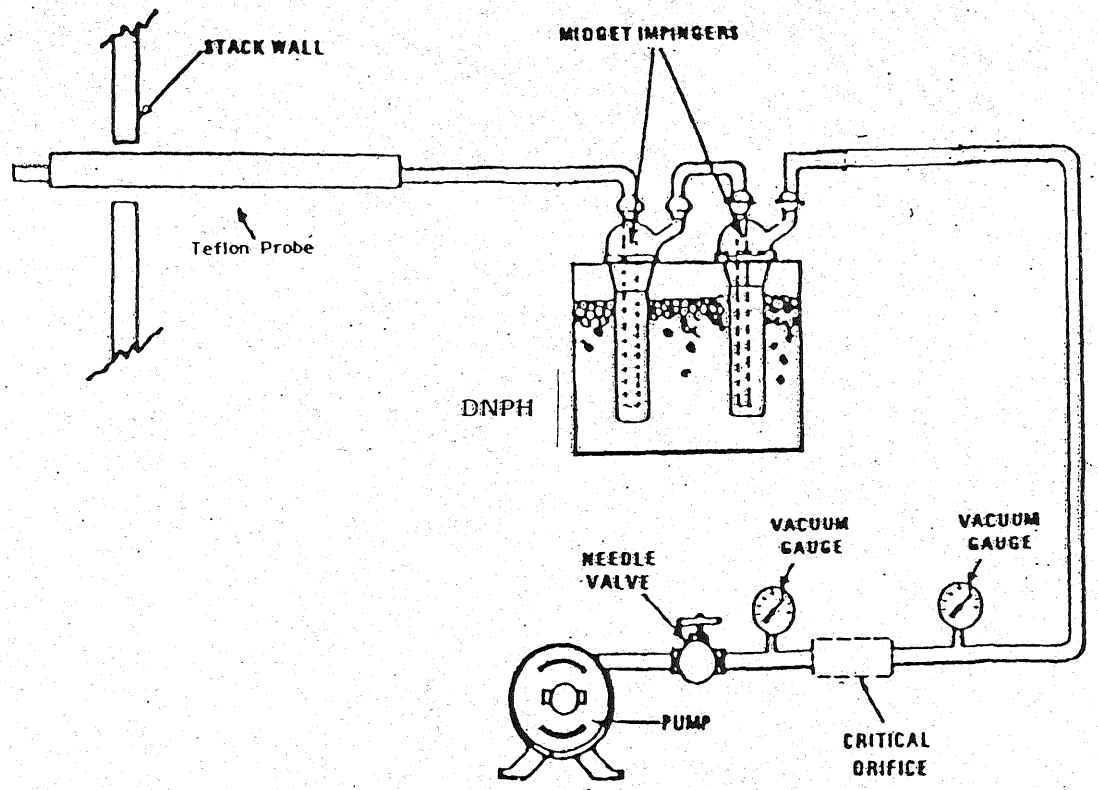

FIGURE 3

FORMALDEHYDE SAMPLING TRAIN

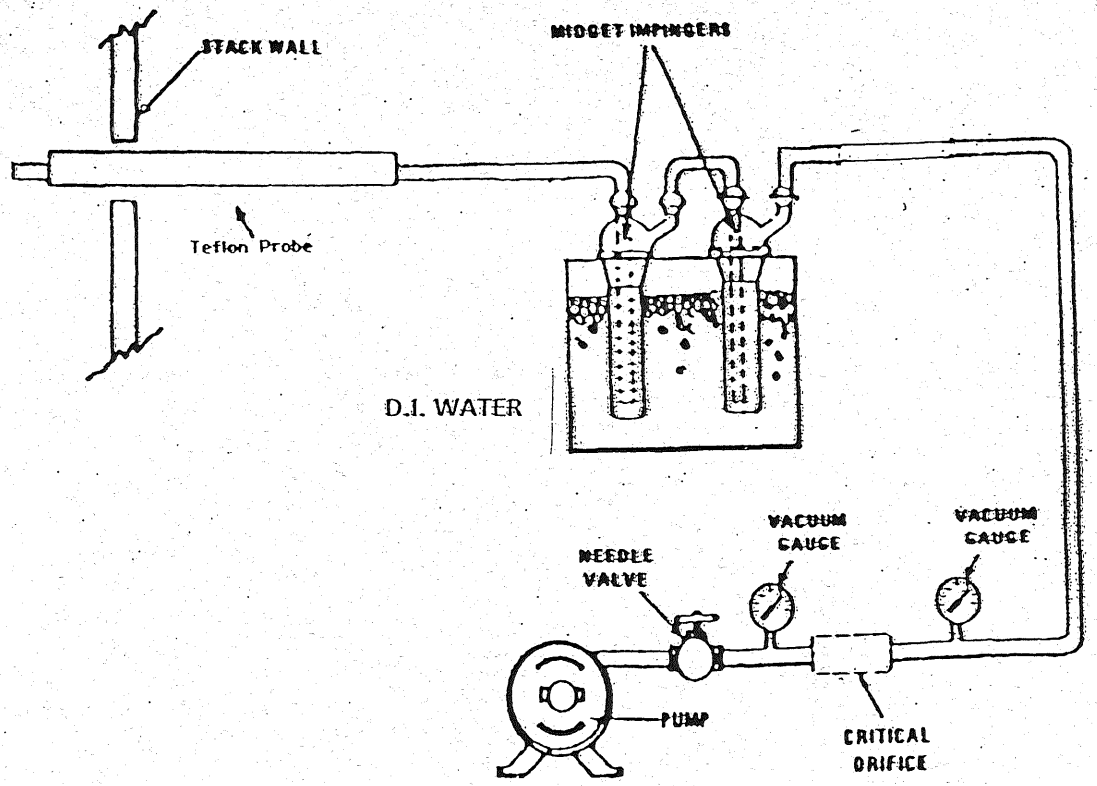

FIGURE 4

SODIUM HYDROXIDE

SAMPLING TRAIN

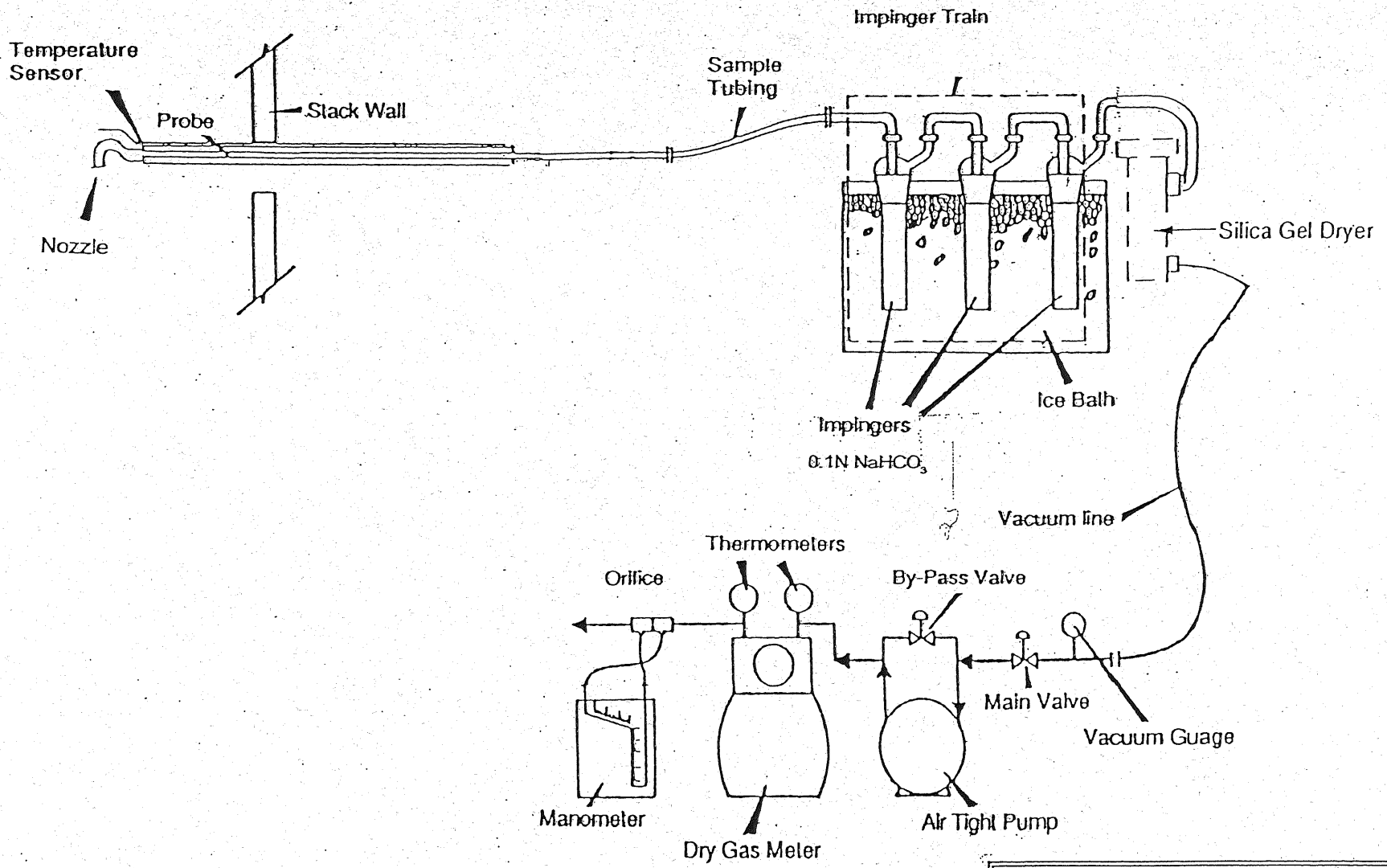

FIGURE 5

TOTAL CHROME SAMPLING TRAIN