Background Report Reference

AP-42 Section Number: 9.13.2

Background Chapter: 4

Reference Number: 2

Title: Final Report for an Emission Compliance Test Program at Nestle Company, Inc., Freehold, NJ

York Services Corporation

York Services Corporation

April 1987

AP-42 Section 9.13.2
Reference —
Report Sect. 4
Reference 2

FINAL REPORT

FOR AN

EMISSION COMPLIANCE TEST PROGRAM

AT

NESTLE COMPANY, INC.
FREEHOLD, NEW JERSEY

PREPARED BY

JIM LEHMANN
ENVIRONMENTAL ENGINEER

YORK SERVICES CORPORATION
ONE RESEARCH DRIVE
STAMFORD, CONNECTICUT 06906

* * * * * * * * *

YORK PROJECT NO. 01-4629-00

APRIL 6, 1987

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

York Services Corporation (YSC) was contracted by the Nestle Company, Inc. to conduct an emission compliance test program on their MEC dryer located in Freehold, New Jersey. The purpose of the test program was to demonstrate compliance with applicable State of New Jersey Department of Environmental Protection regulations for particulate emissions. The test program was conducted during the week of March 23, 1987 and was witnessed by the New Jersey DEP officials.

2.0 SUMMARY AND DISCUSSION OF TEST RESULTS

The results of the emission compliance test program conducted on the MEC dryer are presented in this section. All sampling and analyses were conducted in accordance with methods outlined in 40 CFR 60, Appendix A, Methods 1-5.

Emission Results

Table 2-1 summarizes the particulate emission results. A total of three samples was collected for particulate emission analysis.

3.0 SAMPLING LOCATION

All emission tests and flue gas samples were conducted in the stack which vents the exhaust gases from the unit to the atmosphere. The test ports are located at a point in the stack in accordance with guidelines outlined in EPA Method 1.

The stack is 42 inches in diameter at the test location. The ports are 20 feet, 6 inches (5.8 stack diameters) downstream of the breeching and 84.5 inches (2.0 stack diameters) upstream of the stack exit. At this location, EPA Method 1 requires that 24 traverse points be used to extract a representative sample (Figure 3-1).

4.0 SAMPLING AND ANALYTICAL PROCEDURES

Measurement procedures, sample recovery, handling techniques and laboratory analytical procedures were conducted in accordance with United States Environmental Protection Agency (USEPA) guidelines 1,2,3,5.

TABLE 2-1

SUMMARY OF PARTICULATE TEST RESULTS
MEC DRYER
THE NESTLE COMPANY
FREEHOLD, NEW JERSEY

RUN:	1	2	3	AVERAGE
General Data				
Date	3/25/87	3/25/87	3/25/87	-
Time	10:10-11:27	12:30-1:48	2:45-4:01	
Isokinetic Ratio, %	98.5	103.1	102.2	101.3
Water, % v/v	8.2	8.9	10.8	9.3
Stack Parameters				
Temperature, ^{O}F	108	108	108	108
Average Velocity, ft/sec	56.31	53.27	53.87	54.48
Volumetric Flow Rate				
ACFM	32,507	30,753	33,981	32,414
SCFMd	27,830	26,118	28,283	27,411
Gas Composition (dry)				
CO_2, % v/v	ND*	ND	ND	ND
O_2, % v/v	20.9	20.9	20.9	20.9
N_2, % v/v	79.1	79.1	79.1	79.1
Particulates				
Concentration, gr/SCFd	0.0117	0.0127	0.0148	0.0131
Mass Emission Rate: lb/hr	2.78	2.85	3.58	3.07

* None Detected

York Research Corporation

ONE RESEARCH DRIVE, STAMFORD, CONNECTICUT 06906

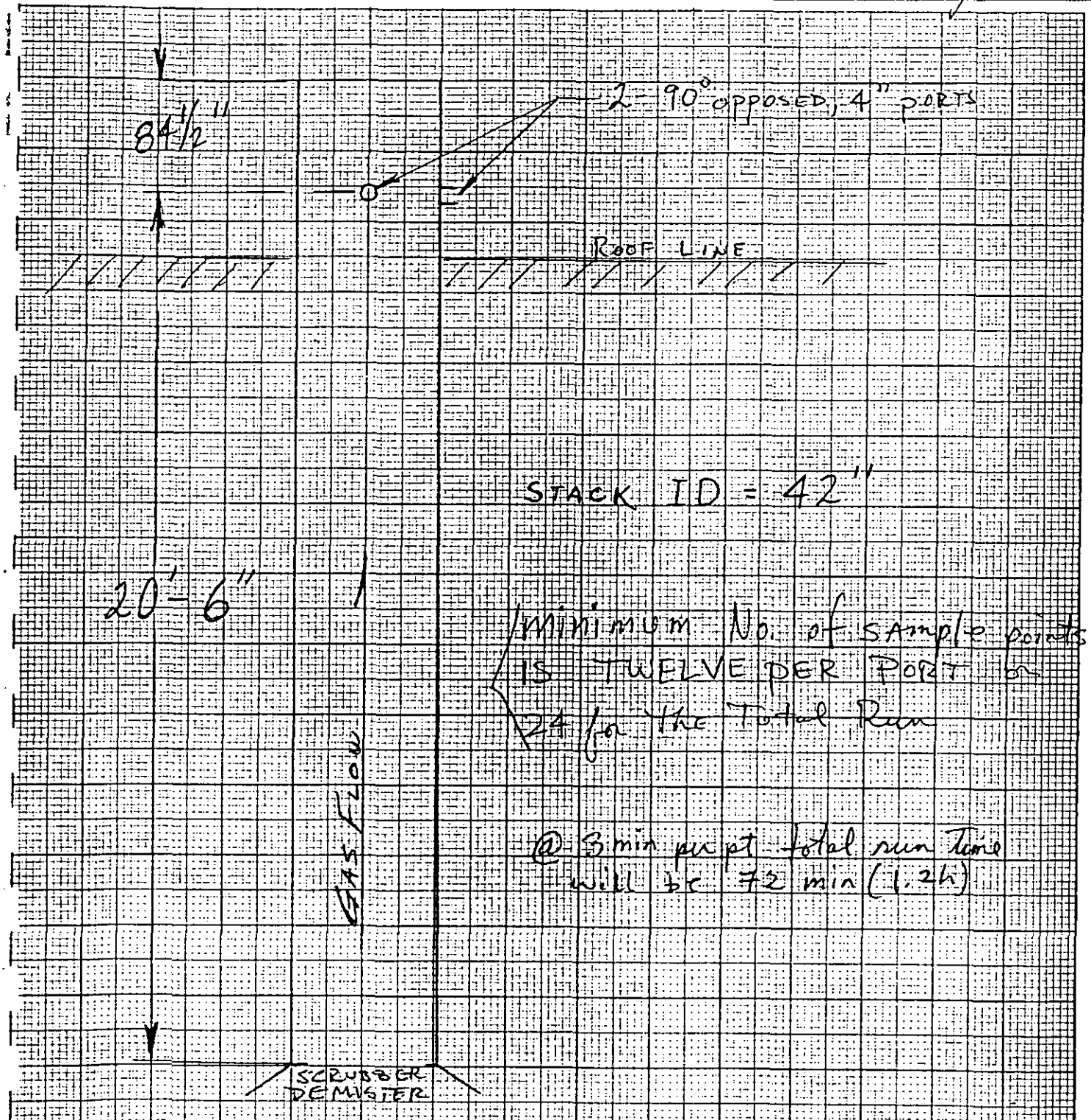
WORK PLANNING FORM

ROJECT # Y-_____

CLIENT: NESTLE

LOCATION: MEC DRYER OUTLET

SUBJECT: NO SCALE / J.L.



Minimum No. of sample points is TWELVE PER PORT or 24 for the Total Run

@ 5 min per pt total run time will be 72 min (1.2h)

FIGURE 3-1

4.1 PRELIMINARY VELOCITY MEASUREMENTS

Preliminary velocity and temperature measurements were performed. Gas velocity and temperatures were measured in accordance with guidelines outlined in EPA Method 2. Cyclonic flow determinations were conducted as delineated in EPA Method 1, Section 2.4.

4.2 FLUE GAS CONCENTRATIONS

The gas composition was determined in accordance with EPA Method 3. A gas sample was collected during each particulate test. A sample line was attached to the sampling probe. A gas sample was drawn by a vacuum pump into an evacuated Tedlar bag at a rate proportonal to the stack velocity. The contents of the bag were analyzed for O_2 and CO_2 with an Orsat Analyzer® after collection. Figure 4-1 illustrates the sampling train and analyzer.

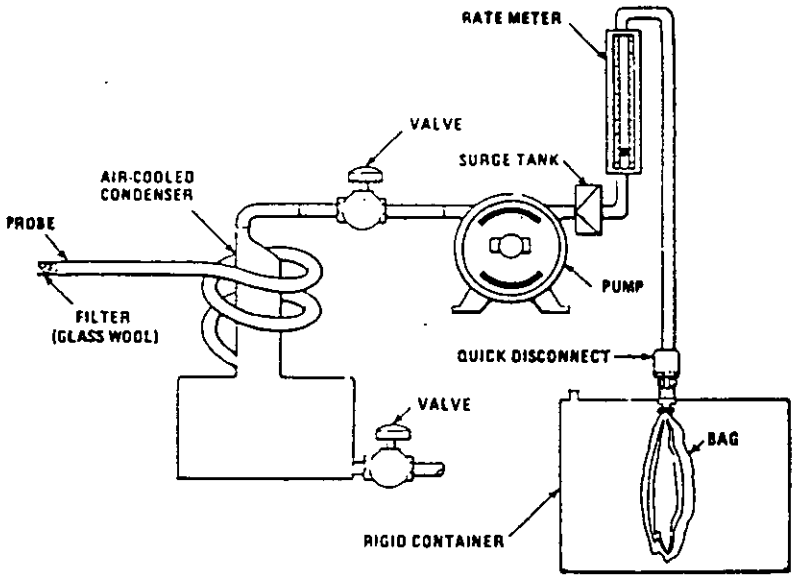
4.3 PARTICULATE CONCENTRATIONS

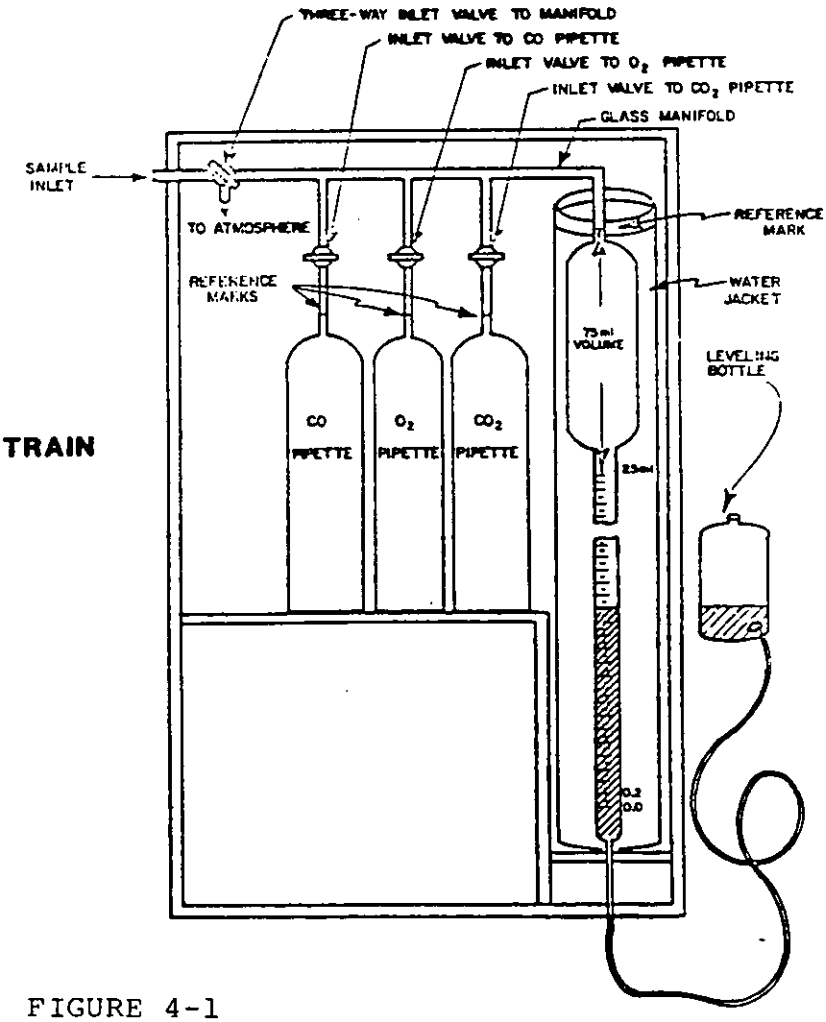
Particulate concentrations were determined in accordance with EPA Method 5. This method calls for isokinetic sampling of the flue gas to ensure a representative particulate sample.

Sampling Apparatus

The particulate sampling apparatus consisted of a probe, pitot tube, filter holder, four impingers, dry gas meter, vacuum pump and flow meter, as shown in Figure 4-2. A calibrated nozzle was attached to the sampling end of the probe which had a heated borosilicate glass liner. After passing through the nozzle and probe, the sample was drawn through the tared fiberglass filter which was encased in an oven to maintain a temperature not to exceed 225°F. The sample then passed through the impinger system which was contained in an ice bath.

The first and second impingers were initially filled with a total of 200 ml of distilled water. The third impinger was left dry and the fourth impinger contained 300 g of indicating type silica gel. The temperature at the exit of the last impinger was monitored with a thermometer that measured to the nearest 1°F. A sample line connected the last impingers to the meter box.





INTEGRATED GAS SAMPLING TRAIN
and
ORSAT ANALYZER

FIGURE 4-1

PARTICULATE SAMPLING TRAIN
(Without Cyclone)

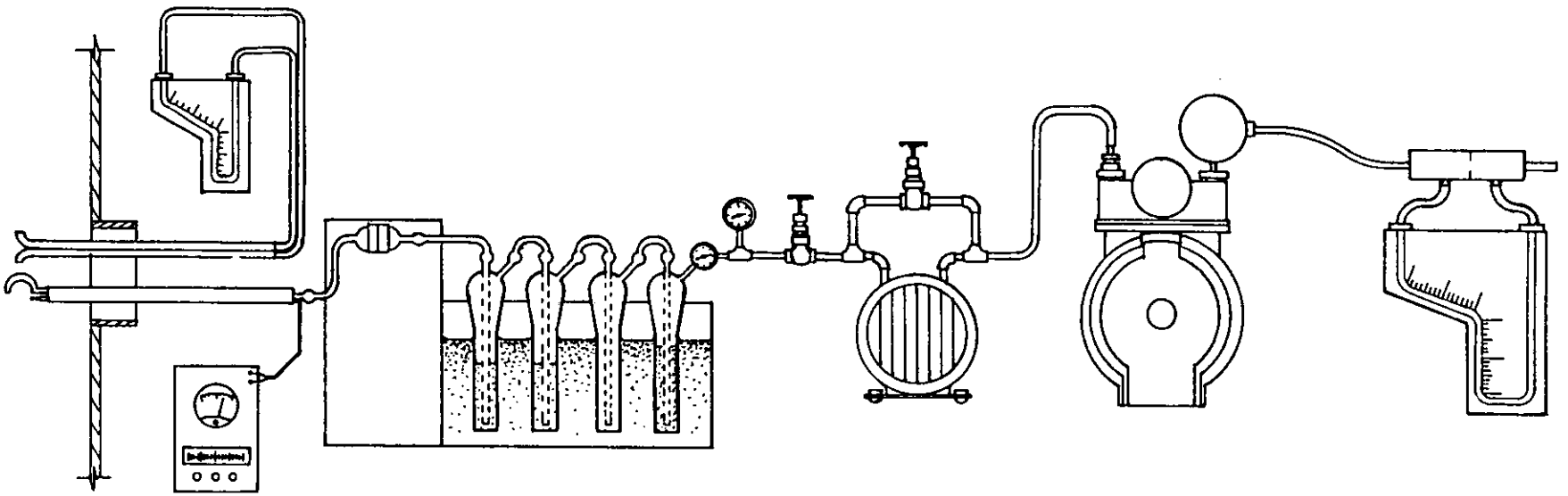


FIGURE 4-2

Sampling Procedures

Initial and final leak checks were performed on each sampling train to confirm the presence of a leak-free system (leakage rates did not exceed 0.02 cfm per EPA Standards prior to the runs).

The proper nozzle size was determined using data obtained from the preliminary tests. The probe and filter assemblies were heated to approximately 180°F to prevent condensation.

A programmable calculator was used to correlate all variables such that a direct relationship between Δp and ΔH was made. The sampling rate could then quickly be adjusted when the gas temperature and/or velocity pressure changed.

During the test, the following data were recorded for each traverse point:

- Point designation
- Sampling time (min)
- Clock time sampling commenced at each port
- Dry gas meter reading (V_m, ft^3)
- Δp (in H_2O)
- Actual ΔH (in H_2O)
- Stack temperature (t_s, °F)
- Dry gas meter temperature at inlet and outlet (t_m, °F)
- Vacuum gauge reading (in Hg)
- Probe temperature, °F
- Filter exit temperature, °F
- Dry gas temperature at exit of last impinger (°F)

Sample Recovery

At the completion of each run, the samples were recovered in the following manner:

Container No. 1 - The probe and nozzle were brushed and rinsed until clean with nanograde acetone from a polyethylene squeeze bottle. This sample was sealed in a glass sample jar.

Container No. 2 - The filter holder inlet was covered with aluminum foil and transported to the laboratory. In the lab, the front half of the filter holder was brushed and rinsed with acetone into Container 1. The filter was placed in a petri dish for weighing.

Container No. 3 - The silica gel from the fourth impinger was weighed to the nearest 0.1 gram. The net weight was recorded on the field data sheet.

Container No. 4 - A sample of acetone from the field supply (squeeze bottle) was collected in a glass jar.

Additionally, the impinger fluids were grossly examined, the total volume measured and the difference from 200 ml (the initial volume) recorded on the field data sheet. The fluids were discarded.

All glass sample jars had teflon-lined lids. Each sample container was labled with the date, contents and test number and sealed with tape.

Sample Analysis

Each sample was analyzed in the following manner:

Filter - The filter was removed from its sealed container and placed in a petri dish, heated overnight at 100°C and then desiccated over anhydrous $CaSO_4$ until cool. Filters were then weighed. The weight was recorded to the nearest 0.1 mg.

Front-half Acetone - The acetone was transferred to a tared beaker. The acetone was evaporated at ambient temperature and pressure, then dried at 60°C for overnight. The beaker was desiccated until cool and weighed. The weight was recorded to the nearest 0.1 mg.

PROJECT NO. 01-4629-00

REVIEW REPORT FORM

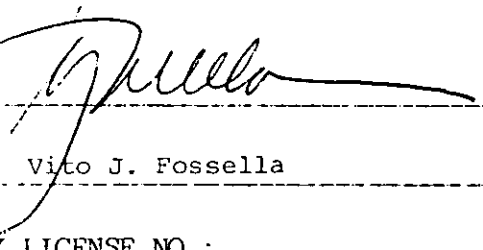
PREPARED BY: _____
JIM LEHMANN
SENIOR PROJECT MANAGER

REVIEWED BY: _____
ROGER A. KNISKERN
MANAGER EMISSIONS MEASUREMENT

APPROVED BY: _____
ABRAHAM J. KURTZ
VICE PRESIDENT

Certification of Test Report

I have reviewed the procedures and results of York Services Corporation Test Report No. 01-4629-00 and certify as to its correctness.

SIGNATURE: 

NAME: Vito J. Fossella

NEW JERSEY LICENSE NO.: NJ-16005

DATE: April 23, 1987

Seal

5.0 APPENDIX

5.1 FIELD DATA SHEETS

5.1.1 PRELIMINARY TRAVERSE

PRELIMINARY VELOCITY TRAVERSE

JOB NO. 4629

PLANT Nestlé

DATE March 24, 1987

LOCATION Freehold, NJ

OPERATOR J.L. K.P.

STACK I.D.

DISTANCE TO DISTURBANCE:

UPSTREAM

DOWNSTREAM

BAROMETRIC PRESSURE, in.Hg. 29.90

STACK PRESSURE, in.Hg.

METER BOX I.D.

PROBE I.D.

cp FACTOR

METER TEMPERATURE

YSC

21 % O_2

0 % CO_2

Schematic of Port Locations
(Indicate North, Label Ports A,B etc.)

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMPERATURE (T_s), °F
B-1	1.5	
B-2	1.4	
B-3	1.4	120.
B-4	1.5	
B-5	1.5	
B-6	1.5	
B-7	1.2	
B-8	.91	
B-9	.91	
B-10	.88	
B-11	.82	
B-12	.55	
A-12	.43	
A-1	1.2	
A-2	1.3	
A-3	1.4	
A-4	1.4	120.
A-5	1.4	
A-6	1.4	
A-7	1.2	
A-8	.96	
A-9	.94	
A-10	.84	
A-11	.66	
AVERAGE	1.057	

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMPERATURE (T_s), °F
~~A-12~~	~~.43~~	
AVERAGE		

5.1.2 CYCLONIC FLOW MEASUREMENT

FREEHOLD, NT
NESTLE

YSC

4629

CHECK for CYCLONIC FLOW

METHOD 1, Section 2.4

4PM
24MAR87

TW 115°F

TD 116°F

~10% V/V H_2O

VISIBLE H_2O droplet in stack, liquid H_2O running down stack walls. JL

	TRAVERSE POINT	ANGLE where Δp=0
PORT	A-1	0
	2	0
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0
	9	0
	10	0
	11	0
	12	0
PORT	B-1	0
	2	0
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0
	9	0
	10	0
	11	0
	12	0
	AVERAGE	0

TRAVERSE POINT	ANGLE where Δp=0
AVERAGE	

5.1.3 PARTICULATE

YCC Environmental Consultants

LEAK Rate B4 Run = 0.016 @ 20" VAC   1.19 @ [illegible]

1.22 x ΔP = ΔH @ 105°F / 70°F   LEAK RATE AFTER Run = 0.02 cfm @ 2" Hg VAC

JIM LEHMANN
Environmental Engineer

STACK ANALYSIS

Page 1 Of 1

2096 RAC Box

Plant: NESTLE
Location: Scrubber outlet
Run No.: ONE
Date: 25 MAR 87

Notes: P_{bar} = 29.48" Hg
stack P = 0.4" +
d_n = 0.1933

758.7
3.6743.5
15.2 gm
64 net imp In/Out

start 10:51 am

METER BASE	NUMBER OF POINTS	DRY GAS METER CORRECTION	ORIFICE METER FACTOR
22.20	24.	0.976	1.967

File 64326

TIME (MIN)	DRY GAS METER (FT³)	PITOT RDG. ("H₂O)	ORIFICE RDG. ("H₂O)	TEMP. GAS METER IN (°F)	TEMP. GAS METER OUT (°F)	TRAIN VAC. ("Hg)	TEMP. LAST IMPINGER (°F)	STACK PRESSURE ("H₂O)	STACK TEMP. (°F)	OVEN BOX TEMP. (°F)	Probe	Pt
3.	24.12	1.1	1.31	64.	64.	64 N.D.	48.	+ 0.45	118.	224/224.	179.	A1 - IK≈1.01
3.	26.00	1.15	[illegible]	70.	65.	67.5 "	46.		101.	194/192.	167.	2
3.	28.70	1.15	1.37	73.	65.	69 "	44.		101.	192/185.	174.	3
3.	30.08	1.25	1.57	75.	64.	69.5 "			102.	198./196.	169.	4
3.	32.12	1.2	1.5	78.	66.	72 "	45		105.	223./217.	172.	5
3	34.19	1.2	1.5	80.	68.	74 "			108.	224./216.	174	6
3.	36.08	0.95	1.15	83.	70.	76.5 "	48.		109.	186./181.	177.	7
3.	37.92	0.94	1.15	83.	70.	76.5 "			112.	160./164.	180.	8 - IK≈0.94
3.	39.74	0.90	1.1	84.	71.	77.5 "	49.		113.	224./[illegible]	177.	9
3.	41.45	0.84	1.0	83.	71.	77 "	49.		110.	187./177.	186.	10
3.	42.73	0.47	0.56	83.	72.	77.5 "			109.	152./154.	189.	11
3.	44.06	0.43	0.54	82.	76.	76.5 "	49.		[illegible]	167./154.	189.	12
3.	45.75	0.83	1.0	75.	72.	73.5 "	51.		110.	157./155.	208.	B-1
3.	47.68	1.3	1.56	78.	71.	74.5 "	51.		110.	222./193.	195.	2 - IK≈0.967
3.	49.64	1.3	1.56	80.	71	75.5 "	51.	+0.60	110.	209/212.	188.	3
3.	[illegible]	1.3	1.56	82.	72	77 "	49.		110.	219./208.	185.	4
3.	53.88	1.2	1.45	83.	72.	77.5 "	48.		112.	194./183	189.	5
3.	56.00	1.15	1.4	84.	72.	78 "	48.		112.	225./213.	175.	6
3.	58.00	1.05	1.30	86.	73	79.5 "	48.		113.	178./176.	177.	7
3.	59.95	1.05	1.3	86.	73.	79.5 "	52.		112.	210./204	172.	8 - IK≈0.984
3.	61.80	0.91	1.1	86.	73.	79.5 "	52.		113.	199./178.	174.	9
3.	63.65	0.97	1.15	86.	74.	80 "	55.		112.	190./170.	181.	10
3.	65.38	0.85	1.0	86.	74.	80 "	57.		109.	190./176.	183.	11
	66.02	0.09	0.10	86.	75.	80.5 "			101.	192/166.	186.	12
	V_m = 43.82	.948	1.19			75.5			108			

64327
64328

YSC Environmental Consulta

JIM LEHMANN
Environmental Engineer

Leak rate B4 run 0.014 CFM @ 17" VAC
Leak rate after test @ 2" VAC = 0.01 CFM

STACK ANALYSIS

Page 1 Of 1

Plant: NESTLE
Location: Outlet
Run No.: TWO
Date: 25MAR87

RAC Box 2096

Notes: In/Phase all line
72 ml Imp. J.L.
12.4 gm wt S.G.

METER BASE	NUMBER OF POINTS	DRY GAS METER CORRECTION	ORIFICE METER FACTOR
67.40	24.	0.976	1.967

Start Port B @ 12:30PM

In/Out probe

TIME (MIN)	DRY GAS METER (FT³)	PITOT RDG. ("H₂O)	ORIFICE RDG. ("H₂O)	TEMP. GAS METER IN (°F)	TEMP. GAS METER OUT (°F)	TRAIN VAC. ("Hg)	TEMP. LAST IMPINGER (°F)	STACK PRESSURE ("H₂O)	STACK TEMP. (°F)	OVEN BOX TEMP. (°F)		
3.0	69.44	1.2	1.45	81.	76.	78.5 N.D.	48.	+0.65	113.	200/187	197.	B-1
3.0	71.65	1.2	1.45	82.	70.	79 "			112.	200/190.	200	2
3.0	73.71	1.2	1.45	87.	77.	82 "	48.		111.	163./154.	190.	3
3.0	75.88	1.3	1.55	90.	78.	84 "			106.	191./174.	180.	4
3.0	77.94	1.1	1.32	92.	79.	85.5 "	47.		106.	175./162.	170.	5
3.0	79.92	1.05	1.25	93.	80.	86.5 "			105.	158./131.	183.	6
3.0	81.86	1.02	1.20	93.	81.	87 "	48.		105.	165./148.	185.	7
3.0	83.77	0.95	1.20	93.	81.	87 "			109.	194/177.	189.	8
3.0	85.68	0.95	1.20	93.	81.	87 "	48.		109.	188./168.	196.	9
3.0	87.40	0.78	0.47	93.	81.	87 "			110.	192./170.	192.	10
3.0	88.96	0.62	0.79	93.	82.	87.5 "	49.		105.	184./172.	190.	11
3.0	89.41.	0.18	~~0.16~~ 0.22	92.	83.	87.5 "	50.		101.	186./177.	190.	12
3.0	91.86	1.1	1.32	88.	84.	86 "	51. ICE		107.	179./150.	229.	A1 CHIP
3.0	93.90	1.1	1.32	90.	84	87 "	50.		111.	219./187.	195.	2
3.0	95.95	1.1	1.32	91.	84.	87.5 "	50.		113.	208./170.	190.	3
3.0	98.10	1.2	1.50	92.	84.	88 "	50.		113.	178./158.	189.	4
3.0	100.24	1.2	1.50	92.	83.	87.5 "	50. ICE.		111.	202./195.	189	5
3.0	102.31	1.1	1.38	91.	83.	87 "	47.		108.	200./171.	172.	6
3.0	104.23	0.99	1.25	91.	82.	86.5 "	48.		109.	173./158.	178.	7
3.0	106.08	0.90	1.10	90.	81.	85.5 "	49.		111.	211./197.	172.	8
3.0	107.90	0.87	1.08	90.	81.	85.5 "	49.		113.	206/177.	176	9
3.0	109.32	0.57	0.70	90.	81.	85.5 "	49.		105.	209/192.	193.	10
3.0	110.93	0.30	0.38	88.	80.	84 "	53.		105.	214/181.	185.	11
3.0	111.75	0.16	0.20	86	80.	83 "	53.		103.	206/163.	195.	12
	44.35	.92	1.20			85.5			108.4			

Filter 64329
Orsat 64330
Probe 64321

YCC Environmental [illegible]nsult

JIM LEHMANN
Environmental Engineer

0.0274H CFM < LEAK rate 0.07 — 18" Hg vac ; 0.005 @ 2" Hg vac after Run

STACK ANALYSIS

Page 1 Of 1

Plant: NESTLE / Freehold NJ
Location: Outlet
Run No.: 3
Date: 25MAR87

Notes: 99 ml Imp net ✓ ; 14.3 gm on S.G ; 113.3

METER BASE	NUMBER OF POINTS	DRY GAS METER CORRECTION	ORIFICE METER FACTOR
0 12.30	24.	0.976	1.967

TIME (MIN)	DRY GAS METER (FT³)	PITOT RDG. ("H₂O)	ORIFICE RDG. ("H₂O)	TEMP. GAS METER IN (°F)	TEMP. GAS METER OUT (°F)	TRAIN VAC. ("Hg)	TEMP. LAST IMPINGER (°F)	STACK PRESSURE ("H₂O)	STACK TEMP. (°F)	OVEN BOX TEMP. (°F)	In/out Probe	pt
3.0	14.28	1.1	1.32	76.	74.	75 N.D.	48.	+0.60	114.	218./214.	202.	A-1 (2:45 START)
3.0	16.19	1.2	1.44	78.	76.	77 "	46.		113.	210./170	208.	2
3.0	18.24	1.2	1.50	84.	76.	80 "	46.		114.	206./188.	200.	3
3.0	20.30	1.2	1.50	85.	76.	80.5 "	46.		115.	187./189.	199.	4
3.0	22.38	1.25	1.52	86.	76.	81 "	45.		115.	173./171.	200.	5
3.0	24.46	1.25	1.55	87.	77	82 "	45.		113.	178./175.	198.	6
3.0	26.44	1.05	1.30	86.	77.	81.5 "	45. ICE		114.	191./188.	199.	7
3.0	28.31	0.92	1.15	86.	77.	81.5 "	44.		113.	163./164.	192.	8
3.0	30.16	0.92	1.10	86.	77.	81.5 "	44.		111.	176./190.	193.	9
3.0	31.90	0.88	1.06	86.	76.	81 "	43.		110.	220./216.	188.	10
3.0	33.59	0.75	0.93	86.	75.	80.5 "	43.		103.	205./198.	188.	11
3.0	35.02	0.50	0.62	86.	74.	80 "	42.		101.	209./201.	190.	12
3.0	37.05 (2.03)	1.2	1.46	80.	76.	78 "	48.		116.	186./197.	210.	B-1 (3:25 P.M.)
3.0	39.07	1.2	1.46	81.	77	79 "	48.		115.	211./214.	202	2
3.0	41.29 (2.2)	1.4	1.73	83.	77.	80 <1.0	48.		114.	184./176.	198.	3
3.0	43.49 (2.12)	1.3	1.61	83.	77.	80 N.D.	49.		111.	186./172.	190.	4
3.0	45.73	1.4	1.73	83.	77.	80 "	50.		110.	176./168.	183.	5
3.0	47.95	1.35	1.68	83.	77.	80 "	52.		108	181./186.	185.	6
3.0	49.94 (1.95)	1.1	1.35	84.	76.	80 "	53.		112.	203./211.	178.	7
3.0	51.94 (1.95)	1.1	1.35	84.	76.	80 "	53.		114.	198./185	186	8
3.0	53.86 (1.95)	1.0	1.25	84.	76.	80 "	53.		116.	194./206.	191.	9
3.0	55.76	1.0	1.25	84.	76.	80 "	53.		116.	180./176.	183.	10
3.0	57.51	0.83	1.03	84.	76.	80 "	53.		105.	179./186.	187.	11
3.0	59.40	0.83	1.03	84.	74.	81 "	53.		101.	186./179.	191.	12
	47.100	1.07	1.33			80.0			111.4			

Filter 64322 — 64323 Back — Front 64324

5.1.4 ORSAT

DRY MOLECULAR WEIGHT DETERMINATION

YSC

PLANT NESTLÉ@ FREEHOLD, N.J
DATE 25 MAR 87
SAMPLING TIME (24-hr CLOCK) START ~11:02 A
SAMPLING LOCATION Outlet MEC DRYER
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
ANALYTICAL METHOD ORSAT
AMBIENT TEMPERATURE ~70°F
OPERATOR Q.F.

COMMENTS: Run 1

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	N D	—	N.D.	—	N.D	—	—	44/100	—
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	20.9	20.9	20.9	20.9	20.9	20.9	20.9	32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	20.9	—	20.9	—	20.4	—	—	28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)	79.1	79.1	79.1	79.1	79.1	79.1	79.1	28/100	
								TOTAL	28.99

ES-043

64327 ORSAT OUTLET 1

Run 2.

DRY MOLECULAR WEIGHT DETERMINATION

YSC

PLANT Nestlé @ Fairfield, NJ
DATE 25MAR87
SAMPLING TIME (24-hr CLOCK) Start ~ 1:15PM
SAMPLING LOCATION Outlet of MEC dryer
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE ~ 70°F
OPERATOR J.L.

COMMENTS:

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	—	—	—	—	—	—	—	44/100	—
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	21.0	—	21.0	—	21.0	—	—	28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)	79.0	79.0	79.0	79.0	79.0	79.0	79.0	28/100	
								TOTAL	29.00

ES-043 : 64330 Orsat | Outlet | R-2 ;

DRY MOLECULAR WEIGHT DETERMINATION

YSC

PLANT Mettler @ Brookfield, N.J.
DATE 25 March 87
SAMPLING TIME (24-hr CLOCK) 3:30 Start
SAMPLING LOCATION Methylene Out.
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE ~70°F
OPERATOR J.L.

COMMENTS: Run 3

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	—	—	—	—	—	—	—	44/100	
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	20.9	20.9	20.9	20.9	20.9	20.9	20.9	32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	20.9	—	20.9	—	20.9	—	20.9	28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)	79.1	79.1	79.1	79.1	79.1	79.1	79.1	28/100	
								TOTAL	28.99

64323 ORSAT Out. B-3

ES-043

5.2 COMPLETE EMISSION CALCULATIONS

5.2.2 PARTICULATE

HP-41 DATA ENTRY FORM

PROGRAM 'STACK'

Job Number	4629
Plant	NESTLE
Unit	MEC DRYER
Test Location	FREEHOLD, NJ
Test Condition	NORMAL
Test Date	25MAR87
Test Number	ONE
Test Engineer	J. LEHMANN
Barometric Pressure (in. Hg)	29.98
ΔH (in. H_2O)	1.19
Dry Gas Meter Volume (cf)	* 43.272
Meter Temp (^oF)	75.52
Meter Y Factor	0.976
Volume of Water Condensed (ml)	79.2
Stack Temp (^oF)	107.96
Average $\sqrt{\Delta p}$	0.9934
Nozzle Diameter (in.)	0.1933
CO_2 (%)	< 0.01
O_2 (%)	20.9
N_2 (%)	79.1
Pitot Tube C_p	0.806
Elapsed Time (min.)	72.0
Static Pressure (in. H_2O)	0.575
Type of Stack	CIRCULAR
Stack Diameter (ft.)	3.5
Stack Lenght (ft.)	N/A
Stack Width (ft.)	N/A
Total Particulate (mg)	31.7
F-Factor	N/A

* Corrected for leak rate in excess of 0.02 CFM

PARTICULATE EMISSIONS
(EPA METHOD 5)

JOB NUMBER:
CLR
4629 RUN
PLANT:
NESTLE RUN
UNIT:
MEC DRYER RUN
TEST LOCATION:
FREEHOLD,NJ RUN
TEST CONDITION:
NORMAL RUN
TEST DATE:
25MAR87 RUN
TEST NO.:
ONE RUN
TEST ENGINEER:
J. LEHMANN RUN

DATA ENTRY

BAROMETRIC
Pb (IN HG) =
29.98 RUN
DELTA H
DH (IN H2O) =
1.19 RUN
METER VOL. Corrected for LEAK RATE
AVH (FT3) =
43.272 RUN
METER TEMP.
TM (DEGREE F) =
75.52 RUN
METER Y
FCTR YM =
0.976 RUN
VOL OF H2O
VW (ML-GM) =
79.20 RUN
STACK TEMP.
TS (DEGREE F) =
107.96 RUN
SQRT AVG.
DELTA P =
.00 CLX
0.9934 RUN
NOZZLE
DIAMETER (IN) =
0.1933 RUN
% CO2 =
0.01 RUN
% O2 =
20.90 RUN
% N2 =
79.10 RUN
PITOT FCTR
CP =
0.806 RUN
ELAPSED
TIME (MIN) =
72.00 RUN
STATIC PRESS.
(IN H2O) =
0.575 RUN

STACK DIAMETER

SELECT OE OF THE
FOLLOWING CODES:

CIRCULAR=1
RECTANGULAR=2

CODE?
1.00 RUN

STK DIA, FT?
3.50 RUN

CALCULATIONS

METER TEMP (R)=535.52
VOL STD=41.83
STACK TEMP (R)=567.96
%MOISTURE=8.18
MW(DRY)=28.84
MW(WET)=27.95
STAK PRESS.=30.02
VELOCITY (FPS)=56.31
STK AREA (FT2)=9.62
ISOKINETIC (%)=98.53
ACFM=32,586.71
SCFM=27,830.46

DATA ENTRY

PARTICULATE
TOTAL (MG)=
31.70 RUN
F FACTOR-Fd=
0.00 RUN

CALCULATIONS
* NOT APPLICABLE
GR/SCF=0.0117
GR/SCF CORECTED
TO 12% CO2=14.0050 *
GR/ACF=0.0100
LB/HR=2.7840
LB/SCF=1.6673E-6

HP-41 DATA ENTRY FORM

PROGRAM 'STACK'

Job Number	4629
Plant	NESTLÉ
Unit	MEC DRYER
Test Location	Freehold, NJ
Test Condition	Normal
Test Date	25MAR87
Test Number	TWO
Test Engineer	J. Lehmann
Barometric Pressure (in. Hg)	29.98
ΔH (in. H_2O)	1.13
Dry Gas Meter Volume (cf)	43285
Meter Temp (^oF)	85.48
Meter Y Factor	0.976
Volume of Water Condensed (ml)	84.9
Stack Temp (^oF)	108.38
Average $\sqrt{\Delta P}$	0.9383
Nozzle Diameter (in.)	0.1933
CO_2 (%)	<0.01
O_2 (%)	20.9
N_2 (%)	79.1
Pitot Tube C_p	0.806
Elapsed Time (min.)	72.0
Static Pressure (in. H_2O)	0.65
Type of Stack	CIRCULAR
Stack Diameter (ft.)	3.50
Stack Lenght (ft.)	N/A
Stack Width (ft.)	N/A
Total Particulate (mg)	34.0
F-Factor	N/A

PARTICULATE EMISSIONS
(EPA METHOD 5)

JOB NUMBER:
4629
PLANT:
NESTLE
UNIT:
MEC DRYER
TEST LOCATION:
FREEHOLD
TEST CONDITION:
NORM.
TEST DATE:
25MAR87
TEST NO.:
TWO
TEST ENGINEER:
J. LEHMANN

DATA ENTRY

BAROMETRIC
Pb (IN HG) =
29.98
DELTA H
DH (IN H2O) =
1.13
METER VOL.
AVM (FT3) =
43.285
METER TEMP.
TM (DEGREE F) =
85.48
METER Y
FCTR YM =
0.976
VOL OF H2O
VW (ML-GM) =
84.90
STACK TEMP.
TS (DEGREE F) =
108.38
SQRT AVG.
DELTA P =
0.9383
NOZZLE
DIAMETER (IN) =
0.1933
% CO2 =
0.01
% O2 =
20.90
% N2 =
79.10

PITOT FCTR
CP =
0.806 RUN
ELAPSED
TIME (MIN) =
72.00 RUN
STATIC PRESS.
(IN H2O) =
0.65 RUN

STACK DIAMETER

SELECT OE OF THE
FOLLOWING CODES:

CIRCULAR=1
RECTANGULAR=2

CODE?
1.00 RUN

STK DIA, FT?
3.500 RUN

CALCULATIONS

METER TEMP (R)=545.48
VOL STD=41.07
STACK TEMP (R)=568.38
%MOISTURE=8.87
MW(DRY)=28.84
MW(WET)=27.88
STAK PRESS.=30.03
VELOCITY (FPS)=53.27
STK AREA (FT2)=9.62
ISOKINETIC (%)=103.08
ACFM=30,753.85
SCFM=26,118.37

DATA ENTRY

PARTICULATE
TOTAL (MG)=
34.00 RUN
F FACTOR-Fd=
0.00 RUN

CALCULATIONS
* NOT APPLICABLE
GR/SCF=0.0127
GR/SCF CORECTED
TO 12% CO2=15.2982 *
GR/ACF=0.0108
LB/HR=2.8548
LB/SCF=1.8212E-6

HP-41 DATA ENTRY FORM

PROGRAM 'STACK'

Job Number	4629
Plant	NESTLÉ
Unit	MEC DRYER
Test Location	Freehold, NJ
Test Condition	NORMAL
Test Date	25MAR87
Test Number	THREE
Test Engineer	J. LEHMANN
Barometric Pressure (in. Hg)	29.98
$\triangle$H (in. H_2O)	1.38
Dry Gas Meter Volume (cf)	45.970
Meter Temp (^oF)	79.98
Meter Y Factor	0.976
Volume of Water Condensed (ml)	113.3
Stack Temp (^oF)	107.67
Average $\sqrt{\triangle p}$	1.0335
Nozzle Diameter (in.)	0.1933
CO_2 (%)	< 0.01
O_2 (%)	20.9
N_2 (%)	79.1
Pitot Tube C_p	0.806
Elapsed Time (min.)	72.0
Static Pressure (in. H_2O)	0.60
Type of Stack	CIRCULAR
Stack Diameter (ft.)	3.50
Stack Lenght (ft.)	N/A
Stack Width (ft.)	N/A
Total Particulate (mg)	42.3
F-Factor	N/A

PARTICULATE EMISSIONS
(EPA METHOD 5)

JOB NUMBER:
4629
PLANT:
NESTLE
UNIT:
MEC DRYER
TEST LOCATION:
FREEHOLD, NJ
TEST CONDITION:
NORMAL
TEST DATE:
25MAR87
TEST NO.:
THREE
TEST ENGINEER:
LEHMANN, J.

DATA ENTRY

BAROMETRIC
Pb (IN HG) =
29.98
DELTA H
DH (IN H2O) =
1.38
METER VOL.
AVM (FT3) =
45.970
METER TEMP.
TM (DEGREE F) =
79.98
METER Y
FCTR YM =
0.976
VOL OF H2O
VW (ML-GM) =
113.30
STACK TEMP.
TS (DEGREE F) =
107.67
SQRT AVG.
DELTA P =
1.0335
NOZZLE
DIAMETER (IN) =
0.1933
% CO2 =
.01
% O2 =
20.90
% N2 =
79.10

PITOT FCTR
CP =
0.806 RUN
ELAPSED
TIME (MIN) =
72.000000 RUN
STATIC PRESS.
(IN H2O) =
0.60 RUN

STACK DIAMETER

SELECT OE OF THE
FOLLOWING CODES:

CIRCULAR=1
RECTANGULAR=2

CODE?
1.00 RUN

STK DIA, FT?
3.50 RUN

CALCULATIONS

METER TEMP (R)=539.98
VOL STD=44.10
STACK TEMP (R)=567.67
%MOISTURE=10.79
MW(DRY)=28.84
MW(WET)=27.67
STAK PRESS.=30.02
VELOCITY (FPS)=58.87
STK AREA (FT2)=9.62
ISOKINETIC (%)=102.20
ACFM=33,981.37
SCFM=28,283.42

DATA ENTRY

PARTICULATE
TOTAL (MG)=
42.30 RUN
F FACTOR-Fd=
0.00 RUN

CALCULATIONS
* Not Applicable
GR/SCF=0.0148
GR/SCF CORECTED
TO 12% CO2=17.7269 *
GR/ACF=0.0123
LB/HR=3.5813
LB/SCF=2.1103E-6

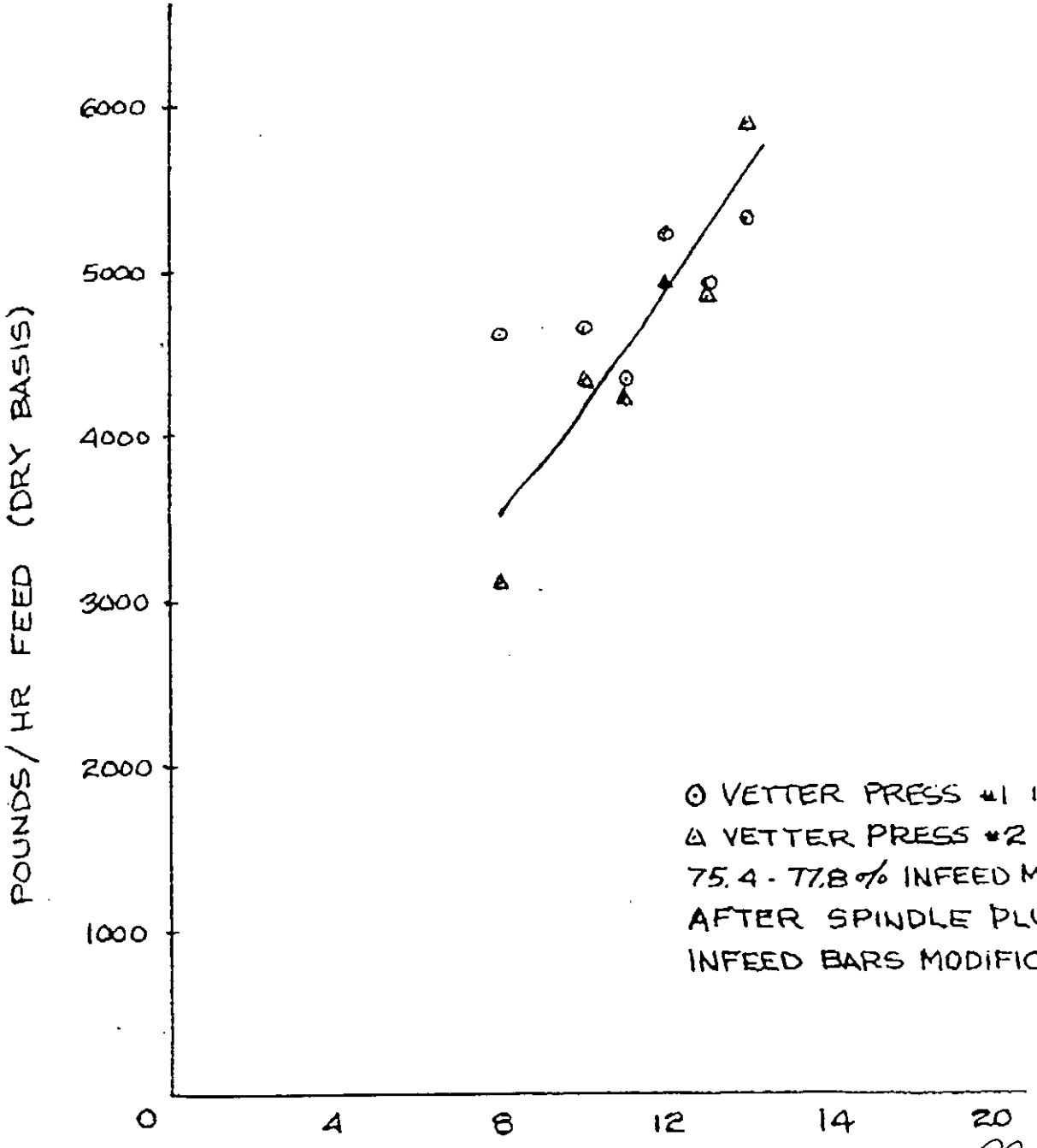
5.3 PROCESS DATA

CALCULATION SHEET

THE NESTLÉ COMPANY, INC. ENGINEERING DIVISION

PLANT: FREEHOLD BY: W. CHOATE CK'D:
JOB: DATE: 11/4/82
DESCRIPTION: SHEET 7 OF 10
REF. DWG.

THROUGHPUT VS RPM



At 14 RPM output ≅ 5,500#/hr/press

JK 4/15/83

2 presses were feeding into [illegible] at 11 & 11 rpm's

...stle

MEC DRYER CONTROL DATA SHEET

SHIFT: 8-4 DATE: 3-25-87 OPERATOR: Mcleod SUPERVISOR: SAR

TIME	MEC DRYER CONTROL DATA SHEET										WET SCRUBBER					EXTRACTION STATUS						
	INLET TEMP. (°F)	OUTLET TEMP. (°F)	MOISTURE (%)	WET BIN LEVEL (%)	LIVE BOTTOM SCREWS (% LOAD)	RIBBON BLENDER		PRODUCT USAGE			WET SCRUBBER					"A" SET TO:			"B" SET TO:		
						CO_2 (%)	TEMP. (°F)	OIL PLANT	BOILER	DUMPSTER	PUMP PSI	FLOW GPM	FLOW Primary	INLET M-T Press	DISCH M-T Press	EAST TANK	WEST TANK	WET BIN	EAST TANK	WEST TANK	WET BIN
8	660	134	6.2			20	130	X			116	325	125	6.0	4.4	X				X	
9	442	130	9.4			20	107	X			116	325	125	6.0	4.2					X	
10	664	134	9.2			20	112	X			116	325	125	6.0	4.2					X	
11	511	130	13.4			20	110	X			116	325	125	6.0	4.2					X	
12	604	126	18.7			20	108	X			116	325	125	6.0	4.2					X	
1	575	130	16.0			20	110	X			116	325	125	6.0	4.4					X	
2	564	130	14.0			20	112	X			116	325	125	6.0	4.4					X	
3	516	128	14.6			20	107	X			116	325	125	6.0	4.2					X	

COMMENTS: (INCLUDE REASONS FOR DOWNTIME, M&R PERFORMED)

127

Form No. 5649 MF (3/83)

Nestlé

MEC DRYER CONTROL DATA SHEET

SHIFT: 4-12 DATE: 3/25/87 OPERATOR: W.E. FRANCE SUPERVISOR: BAP / JEW

TIME	MEC DRYER CONTROL DATA SHEET									WET SCRUBBER					EXTRACTION STATUS					
	INLET TEMP. (°F)	OUTLET TEMP. (°F)	MOISTURE (%)	WET BIN LEVEL (%)	LIVE BOTTOM SCREWS (% LOAD)	RIBBON BLENDER		PRODUCT USAGE			WET SCRUBBER					"A" SET TO:			"B" SET TO:		
						CO_2 (%)	TEMP. (°F)	OIL PLANT	BOILER	DUMPSTER	PUMP PSI	FLOW GRID	FLOW Primary	INLET M-I Press	DISCH M-I Press	EAST TANK	WEST TANK	WET BIN	EAST TANK	WEST TANK	WET BIN
4:00	639.2	132.4	12.0	—	—	20	108	X			116	325	125	6.0	4.2		X			Down	
5:00	600.0	124.2	10.4			20	109	X			116	325	125	6.0	4.2		X				
6:00	926.0	132.7	12.4			20	112	X			116	325	125	6.0	4.2		X				
7:00	887	132	11.6			20	110	X			116	325	125	6.0	4.4		X				
8:00	667.8	127.7	10.2			20	112	X			116	325	125	6.0	4.4		X				
9:00	542.4	133.7	10.			20	111	X			116	325	125	6.0	4.4		X				
10:00	552.	128.3	9.8			20	108	X			116	325	125	6.0	4.8		X				
11:00	490.	127.2	16.6 (11.0)	—	—	20	100	X			116	325	125	6.0	4.6		X			Down	

COMMENTS: (INCLUDE REASONS FOR DOWNTIME, M&R PERFORMED)

5 GPM adding Sanitary grounds to System

All Bin Screws set to 8 RPM. (west tank)

Form No. 5649 MF (3/83)

Date: 3-25-87 Operator: Willard Supervisor: R.A.S. Shift: 8-4

1 VETTER PRESS

Time	On Off	RPM	Cone Press	Oper. Press	Oil Temp.	Suction Press	Charge Press	Press Cleaned
8	on	12	—	120	44	5.0	10.5	
9	on	10	—	40	46	5.5	10.5	
10	on	14	—	100	50	5.5	10.5	
11	on	14	—	100	52	6.0	10	
12	on	14	—	90	50	6.0	10	
1	on	14	—	110	56	6.0	10	
2	on	14	—	130	54	6.0	10	
3	on	14	—	100	56	6.0	10	

2 VETTER PRESS

Time	On Off	RPM	Cone Press	Oper. Press	Oil Temp.	Suction Press	Charge Press	Press Cleaned
	on	12	—	60	40	1.5	13	
	on	12	—	60	42	1.5	13	
	on	14	—	70	44	1.5	13	
	on	14	—	70	44	1.0	13	
	on	14	—	70	44	1.0	13	
	on	14	—	70	46	1.0	13	
	on	14	—	40	48	1.0	13	
	on	14	—	70	48	1.0	13	

3 VETTER PRESS

Time	On Off	RPM	Cone Press	Oper. Press	Oil Temp.	Suction Press	Charge Press	Press Cleaned
	on	14	—					
	on	14	—					
	on	14	—					
	on	14	—					
	on	14	—					
	on	14	—					
	on	14	—					
	on	14	—					

COMMENTS (Include reasons for downtime, M & R Performance)

14.5

Time	Bin Screws		Unloading Screws		Incline Screws		Truck Screws	
	East Tank	West Tank	East Tank	West Tank	East Tank	West Tank	East Tank	West Tank
8	off	on	off	on	off	on	off	on
9		on		on		on		on
10		on		on		on		on
11		on		on		on		on
12		on		on		on		on
1		on		on		on		on
2		on		on		on		on
3		on		on		on		on

Time	Ext. Cycle Time "A" Min.	Ext. Cycle Time "B" Min.	Blowdown Tank Levels % East	Blowdown Tank Levels % West	Container Transfers Ticket Number	Container Transfers Time
	Start up	16-17	0	60		
		16-17	0	58		
		16-17	0	49		
		16-17	0	48		
		16-17	0	47		
	Start up	Not Filled	0	37		
			0	30		
			0	21		

Noell

SHOT NTRC ASH

Date: 3/25/87 Operator: W.E. [illegible] Supervisor: RAP Shift: [illegible]

1 VETTER PRESS

Time	On / Off	RPM	Cone Press	Oper. Press	Oil Temp.	Suction Press	Charge Press	Press Cleaned
400	ON	14	-	130	60	6.5	9.5	
500	ON	14	-	145	58	6	9	
600	ON	14	-	140	56	6	9	
700	ON	14	-	135	56	6	9	
800	ON	14	-	80	48	5	10	
900	off	-	-	-	-	-	-	
1000								
1100								

2 VETTER PRESS

Time	On / Off	RPM	Cone Press	Oper. Press	Oil Temp.	Suction Press	Charge Press	Press Cleaned
	ON	14	-	25	50	1.5	13	
	ON	14	-	45	50	1.25	12	
	ON	14	-	45	50	1.25	12	
	ON	14	-	30	50	1.5	12	
	ON	14	-	25	45	1.25	13	
	off	-	-	-	-	-	-	

3 VETTER PRESS

Time	On / Off	RPM	Cone Press	Oper. Press	Oil Temp.	Suction Press	Charge Press	Press Cleaned
	ON	14	-	-	-	-	-	
	ON	14	-	-	-	-	-	
	ON	14	-	-	-	-	-	
	ON	14	-	-	-	-		
	ON	14	-	-	-	-	-	
	off	-	-	-	-	-	-	

COMMENTS (Include reasons for downtime, M & R Performance)

Time	Bin Screws East Tank	Bin Screws West Tank	Unloading Screws East Tank	Unloading Screws West Tank	Incline Screws East Tank	Incline Screws West Tank	Truck Screws East Tank	Truck Screws West Tank
400	off	ON	off	ON	off	ON	off	ON
500	|	|	|	|	|	|	|	|
600	|	|	|	|	|	|	|	|
700	|	|	|	|	|	|	|	|
800	|	off	|	off	|	off	|	|
900	|	|	|	|	|	|	|	|
1000	|	|	|	|	|	|	|	|
1100	off	off	off	off	off	off	off	ON

Time	Ext. Cycle Time "A" Min.	Ext. Cycle Time "B" Min.	Blowdown Tank Levels % East	Blowdown Tank Levels % West	Container Transfers Ticket Number	Container Transfers Time
	25	Down	0	15		
	20-25	|	|	13		
	20-25	|	|	10		
	20-25	|	|	6		
	20-25	|	|	6		
	20-25	|	|	10		
	20-25	|	|	16		
	20-25	Down	0	27		

5801 U (Rev. 10/85)

5.4 CALIBRATION DATA

5.4.1 PRETEST CALIBRATIONS

York Services

NOZZLE CALIBRATIONS

Date 3/23/87 Calibrated by DRW, KDP

Nozzle diameter Size		D_1	D_2	D_3	D_Δ	D average
1/8	.125	.125	.125	.126	.001	.125
5/32	.160					
3/16	.1875	.194	.193	.193	.001	.1933
1/4	.250	.250	.251	.252	.002	.251
5/16	.3125	.310	.310	.310	.000	.310
3/8	.375	.378	.377	.377	.001	.377
7/16	.4375					
1/2	.500	.495	.493	.499	.002	.495
5/8	.625					
3/4	.750					
Miscellaneous Diameter						

where:= nozzle diameter measurements in in. tolerance = .001 in.

$D_{1,2,3}$

D_4 = maximum difference in any two measurements = .004 in.

D_{avg} = average of D_1, D_2, D_3

PITOT TUBE CALIBRATION

Pitot Tube Identification Number: "5ft" 4629

Standard Pitot Tube Identification Number: #2

Standard Pitot Tube C_p: 0.99

Calibration Date: 20 MAR87

Calibrated By: J.L & K.P.

A-Side Calibration			
Δp_{std} (in. H_2O)	4629 Δp_s (TEST) (in. H_2O)	C_p	Deviation
0.68	1.15	0.761	- 0.045
0.75	1.10	0.817	+ 0.011
0.77	1.10	0.828	+ 0.022
0.75	1.10	0.817	+ 0.011
Average		0.806	δ = 0.030

B-Side Calibration			
Δp_{std} (in. H_2O)	Δp_s (in. H_2O)	C_p	Deviation
Not check: only one orientation possible with this Pitobe assembly. J.L.			
Average			

$$C_p = C_{p(std)}\sqrt{\frac{\Delta p_{std}}{\Delta p_s}}$$

STACK GAS THERMOCOUPLE CALIBRATION

Identification Number: sft -4629

Calibration Date: 23 MAR 87

Calibrated By: J. L.

	Reference Thermometer (^{o}F)	Stack Gas Thermocouple (^{o}F)
Ice Water	33.	34.
Ambient Air	67.	67.
Hot Water	155.	155.
Hot Oil	—	—

DRY GAS METER THERMOMETER CALIBRATION

Identification Number: RAC 1563 & RAC 2096

Calibration Date: 20 MAR 87

Calibrated By: Q.L. / K.P.

	Reference Thermometer (^{o}F)	Dry Gas Meter Thermometer (^{o}F)
RAC 1563 _ Ambient Air RAC 2096	67	In 66. Out 67. In 66. Out 67
~~Hot Water~~		

IMPINGER THERMOMETER CALIBRATION

Identification Number: 6 4 8

Calibration Date: 20 MAR 87

Calibrated By: J. L. & K. P

	Reference Thermometer (^{o}F)	Impinger Thermometer (^{o}F)
Ice Water		
#6 Ambient Air #8	67.	66. — — — — 67.

5.4.2 POSTTEST CALIBRATION

POSTTEST CALIBRATION CHECKS

Job No.: 4629 Date: 3 APRIL 87

Client: NESTLÉ/FREEHOLD, N.J. Checked By: J.L.

- Pitot Tube

  Pretest pitot tube coefficient 0.806

  Any damage to pitot tube prior to start of any test run? NO

  Pitot tube coefficient for calculations 0.806

- Stack Thermocouple

  Was a pretest temperature correction used? NO

  Average stack temperature during test ~ 115°F

  Temperature of reference thermometer during recalibration 120°F

  Temperature of stack thermocouple during recalibration 119°F

  Do values agree within ± 1.5%? yes

- Impinger Thermometer

  Was a pretest Temperature correction used? NO

  Posttest reference thermometer reading 67.

  Posttest impinger thermometer reading 67.

  Do values agree within ± 4°F? yes

- Dry Gas Meter Thermometers

  Was a pretest temperature correction used? NO

  Posttest thermometer reading at ambient temperature NOT CONDUCTED*

  Posttest reference thermometer reading

  Do they agree within ± 10.8°F?

- Dry Gas Meter

  Pretest calibration factor, Y 0.976

  Posttest calibration factor, Y NOT CONDUCTED*

  Is posttest calibration factor within ± 5% of pretest factor?

* UNIT Suffered irreparable damage subsequent to testing. while lowering UNIT, the supporting rope broke and UNIT fell ~60 feet to the ground. the UNIT used has a past history of changing less than 3% per year and 1% during a "before-after" calibration. J.L.

5.5 LABORATORY DATA

Environmental Consultants

CHEMICAL ANALYTICAL SERVICES REQUEST

JIM LEHMANN
Environmental Engineer

York Services Corporation
A Subsidiary of York Research Corporation
Research Drive, Stamford, Connecticut 06906 • Telephone: (203) 325-1371

Job No. 01-4629 Client NESTLÉ Date 26MAR87 Logged by Jim Lehmann

Sample Number & Type	Parameters to be determined	Chain of Custody
64326 EPAS Filter R-1	Net Weight to nearest 0.1 mgm	
64328 Probe Wash Outlet 1		
64329 Filter EPAS R-2		Received by Date
64321 EPAS Outlet R2		
64322 Filter EPAS out. R-3		Received by Date
64324 Front in EPAS out 3		
	Filters may be oven dried at 100°C, desiccated till cool then weighed. J.L.	
		FINAL DISPOSITION

COMMENTS

Record Volumes (approximate) on probe Washes for ATONE Blank subtraction.

EACH JOB NUMBER MUST APPEAR ON THE WRITTEN REPORT. RETURN THIS FORM, DULY SIGNED, WITH THE REPORT. COPIES OF THIS FORM MAY BE RETAINED BY YOUR FIRM FOR IN-HOUSE RECORDS.

PARTICULATE ANALYSIS FORM

JOB # 01-4629 Nestle TYPE OF SAMPLE Particulate/Filters DATE 4/1/87
Recd. 3/27/87.

SAMPLE #	TYPE Run	GROSS WT.G.	TARE WT.G.	NET WT.G.	VOL. ML.	BLANK G.	RESULTS - 1 mg. Net wt to nearest	Run
64322	3	0.40634	0.40078	0.00556			5.6 mg	3
64326	1	0.39853	0.40642	-0.00789			- 7.9 mg *	1
64329	2	0.41046	0.40665	0.00381			3.8 mg	2

ANALYST A Hackney APPROVED BY Jim Lehmann

* Filter # 64326 not intact - adhered to rubber gasket. Scraped and added to acetone.

PARTICULATE ANALYSIS FORM

JOB # 01-4629 Nestle TYPE OF SAMPLE Particulate / Acetone DATE 4/1/87 Rec'd 3/27/87

SAMPLE #	TYPE	GROSS WT.G.	TARE WT.G.	NET WT.G.	VOL. ML.	BLANK G.	RESULTS Wt out to nearest .1 mg
Blank	Acetone Run	106.32172	106.81958	0.00214	300	7.13×10^{-6} g/ml	Run
64321	2	103.27432	103.24156	0.03276	363	0.00259	30.2 2
64324	3	107.07796	107.03810	0.03986	450	0.00321	36.7 3
64328	1	100.90914	100.86645	0.04269	440	0.00314	39.6 1

ANALYST A. Hackney APPROVED BY Jim Johnson

5.6 CALCULATION FORMULAE

CALCULATION FORMULAE

PROGRAM 'STACK'

DEFINITIONS

P_s	=	Stack pressure (inches of mercury)
P_b	=	Barometric pressure (inches of mercury)
S_p	=	Static pressure (inches of water)
V_{mstd}	=	Volume of gas sampled (standard cubic feet)
V_m	=	Volume of gas sampled meter conditions (cubic feet)
Y	=	Meter calibration factor
ΔH	=	Average orifice pressure drop (inches of water)
T_m	=	Meter temperature (^oF)
V_{wgas}	=	Volume of water vapor (standard cubic feet)
V_w	=	Volume of water collected (ml)
H_2O	=	Moisture content (vol. %)
MW_d	=	Molecular weight (dry)
MW	=	Molecular weight (wet)
CO_2	=	Carbon Dioxide (vol. %)
O_2	=	Oxygen (vol. %)
N_2	=	Nitrogen (vol. %)
CO	=	Carbon Monoxide (vol. %)
V_s	=	Stack gas velocity (feet per second)
C_p	=	Pitot tube calibration factor
$\sqrt{\Delta p}$	=	Average of square root of Δp
T_s	=	Stack temperature (^oF)
I	=	Isokinetic ratio (%)
ACFM	=	Stack gas flow rate (actual cubic feet per minute)
A_s	=	Stack cross-sectional area (square feet)
A_n	=	Nozzle cross-sectional area (square feet)
SCFM	=	Stack gas flow rate (standard cubic feet per minute)
M_t	=	Pollutant sample weight (mg)

T_t = Test time (minutes)

gr/SCF = Emission concentration (grains per standard cubic foot)

gr/ACF = Emission concentration (grains per actual cubic foot)

lb/hr = Emission rate (pounds per hour)

lb/dscf = Emission rate (pounds per dry standard cubic foot)

F_d = F-factor

lb/MMBTU = Emission rate (pounds per million BTU heat input)

FORMULAE

$P_s = P_b \pm (S_p/13.6)$

$V_{mstd} = (V_m)(Y)(17.64)(P_b+\Delta H/13.6)/(T_m+460)$

$V_{wgas} = (0.04707)(V_w)$

$H_2O = \left[V_{wgas}/(V_{wgas}+V_{mstd})\right](100)$

$MW_d = (.44)(CO_2)+(.32)(O_2)+(.28)(N_2+CO)$

$MW = MW_d(1-H_2O/100)+18(H_2O/100)$

$V_s = 85.49(C_p)(\sqrt{\Delta p})\left[(T_s+460)/(P_s)(MW)\right]^{\frac{1}{2}}$

$$I = \frac{(0.09450)(T_s+460)(V_{mstd})}{(P_s)(V_s)(A_n)(T_t)(1-(H_2O/100))}$$

$ACFM = (V_s)(A_s)(60)$

$SCFM = (17.64)(ACFM)(P_s/(T_s+460))(1-H_2O/100)$

$gr/SCF = (M_t)(.0154)/(V_{mstd})$

$gr/ACF = (M_t)(.0154)/(V_m)$

gr/SCF @ 12% CO_2 = $(gr/SCF)(12/CO_2)$

lb/hr = (gr/SCF)(SCFM)(60)/(7000)

lb/dscf = (gr/SCF)/(7000)

lb/MMBTU = $(lb/dscf)(F_d)(20.9)/(20.9-O_2)$

(#2)

York Services Corporation
· Energy and Environmental Systems Engineering
· Atmospheric Sciences Services
· Emission Measurement Services

One Research Drive
Stamford, Connecticut 06905
Telephone (203) 325-1371
TWX 710-474-3947

May 1, 1987

NJDEP
Division of Environmental Quality
CN-027
Trenton, NJ 08625

Attention: Mr. Edward Choromanski

Subject: Nestle Food Corporation
Final Test Report - MEC Dryer-

Dear Mr. Choromanski:

Enclosed please find two copies of the final test report which describes the results of the emission compliance test program conducted on the MEC Dryer at Nestle Foods Corporation in Freehold, NJ.

If you have any questions, or require additional information, please call.

Very truly yours,

Roger A. Kniskern
Manager Emissions Measurement

RK/sb
Enclosures

Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
CENTRAL REGIONAL OFFICE, AIR PROGRAM
TWIN RIVERS PROFESSIONAL BLDG.
EAST WINDSOR, NJ 08520

MEMORANDUM

TO: Lou Mikolajczyk, Chief

FROM: Joseph N. DePierro, Regional Enforcement Officer

SUBJECT: Nestle Foods, Freehold I.D. # 20004 Stack Test 3-25-87

DATE: April 14, 1987

Attached is a report supplied to me by Mr. Paul Orlando regarding subject matter. I have examined Mr. Orlando's report and concur that ~~an~~ an accurate feed rate was difficult to determine. Furthermore, I do not feel that an extrapolated feed rate is prudent in obtaining process weights in order to determine control efficiency.

Please examine Mr. Orlando's report and discuss it with your staff. It is my position that a more accurate method should be implemented by subject facility in determining feed rate. In addition I feel that a retest must be conducted once accurate feed rates can be determined.

Please advise Mr. Orlando of your findings and recommendations; if any questions arise and feel free to contact this office.

Joseph N. DePierro
Regional Enforcement Officer

nlg

c: P. Orlando
S. Hawthorne

Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
CENTRAL REGIONAL OFFICE, AIR PROGRAM
TWIN RIVERS PROFESSIONAL BLDG.
EAST WINDSOR, NJ 08520

MEMORANDUM

TO: Joseph N. DePierro

FROM: Paul G. Orlando

SUBJECT: Nestle Foods Stack Test - Conducted on 3-25-87

DATE: April 8, 1987

Stack tests were conducted on Nestle Foods' # 51 rotary dryer (P/CT # 75818, N.J. stack # 050) for particulate emissions. Tests were performed by York Research Corporation. I was in attendance for the purpose of monitoring operating parameters and production rates. Parameters measured for this test were fuel oil feed rate; scrubber liquid flow, dryer exit temperature and coffee grounds feed rate. The coffee grounds feed rate could not be accurately measured during the test period due to a lack of measurement devices. Instead, the feed rate was estimated by measuring the revolutions per minute of the two Vetter presses and then obtaining the weight from a calibration chart of throughput vs R.P.M.. For example, a press conveyor screw speed of 12 R.P.M. would relate to a 4400 pound (dry basis) of coffee throughput. (see 11/4/82 chart attached) This method is a very crude technique for determining coffee throughput. More important, this calibration chart is over four years old! Since coffee ground throughput is the most important parameter measured for determination of scrubber efficiency, I do not feel this method should be accepted by our Department. Instead, I suggest that either the screw conveyors be re-calibrated with representatives of our Department present to insure their validity or the stack test be disapproved until a more accurate technique of determing coffee ground throughput can be developed.

The process operation during the stack test proceeded with minimal downtime. The only occurrence of concern was when the # 2 Vetter press shut down for a period of ten minutes during test # 3. The shut down was caused by excessive moisture content in the coffee grounds being fed to the Vetter presses. This downtime would reduce the amount of coffee

grounds fed to the dryer during this period. In conclusion, I would like to reiterate my opinion that the values for coffee ground feed rate are not accurate and should not be accepted as the actual feed rates for the specified test period. (A summary of the process parameters will follow.)

Paul G. Orlando
Environmental Engineer Trainee

nlg

c. E. Choromanski

Summary of Operating Parameters

	Test # 1	Test # 2	Test # 3	Permit Requirements
Fuel Oil Feed Rate (gal/hr)	6	6	6	120 (max)
Scrubber Flow Rate (gal/hr)	325	325	325	None
Dryer Exit Temp. (^{o}F)	126	126	126	200 (max)
Coffee Grounds Feed Rate (lb/hr) (Dry Basis)	13,000	12,000	10,000*	11,111

* grossly estimated due to downtime of # 2 press

STACK TEST DATA FOR NESTLE FOODS CORP.
Test Conducted on 3-25-87

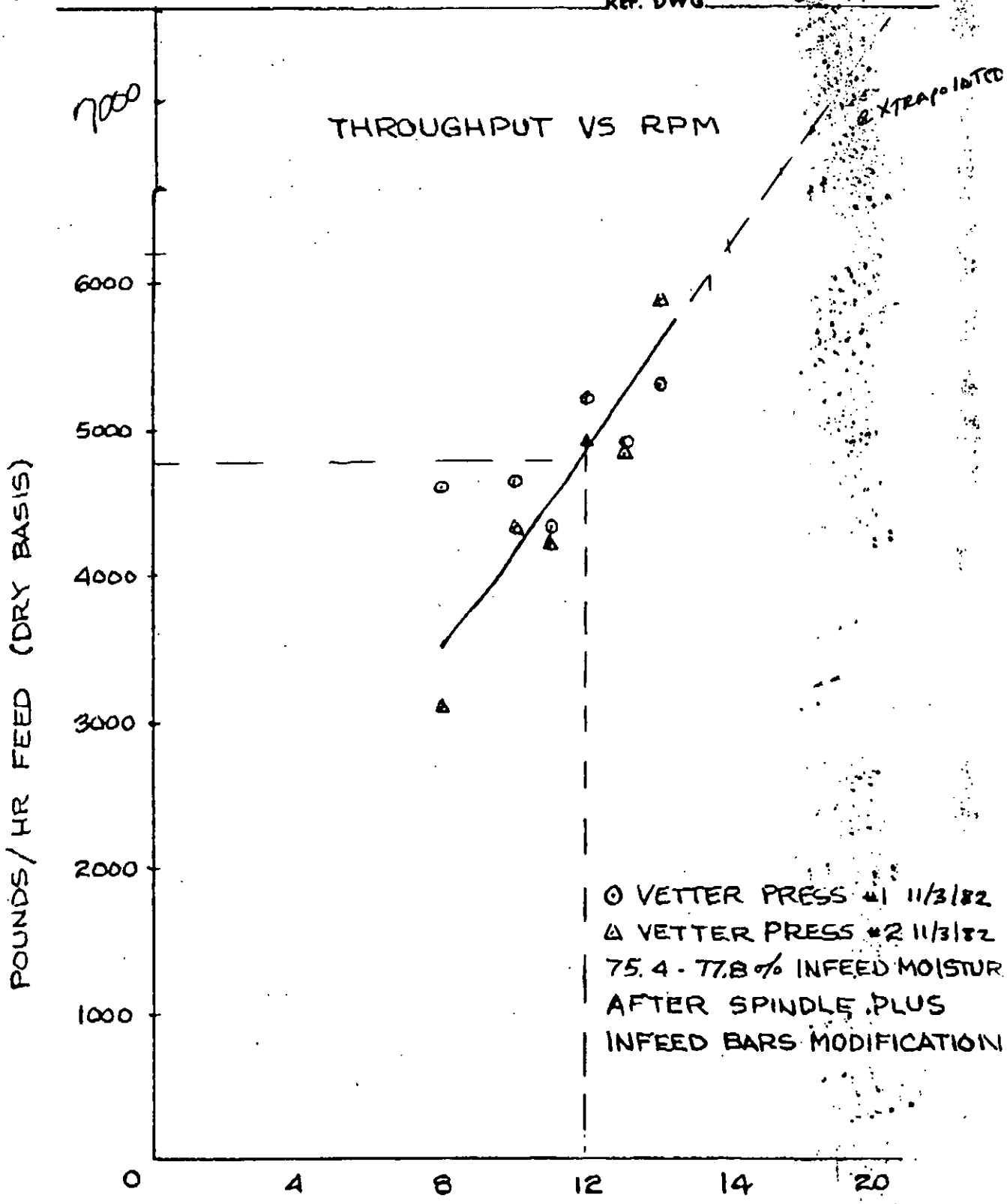
Scrubber Flow		Coffee Ground Feed Rate			Dryer Exit Temp.		Fuel Oil Feed Rate		Comments
Time	GPM	Time	Press #1 (RPM)	Press #2 (RPM)	Time	Temp. (°F)	Time	Gal	
	Test	#	1	Started		at	10:10		
10:10	325	10:13	16	16	10:10	128	10:10	29	* Press # 2
	325	10:45	16	16	10:47	124			Stopped
	325	11:12	16	14	11:10	125	11:10	35	rotating at
11:24	325	11:24	16	*	11:24	125			11:24 due to excessive moisture in coffee ground feed. Test # 1 was finished at this time. Should not affect results of this test.
	Test # 1 finished at 11:24								
	Test	#	2	Started		at	12:30		
12:35	325	12:30	14	14	12:35	126	12:35	45	
	325	13:12	14	14	13:12	125			
	325	13:35	14	14	13:37	125			
13:50	325	13:49	14	14	13:50	125	13:37	51	
	Test # 2 finished at 13:50								
	Test	#	3	Started		at	13:50		
14:52	325	14:48	14	14	14:51	125	14:52	59	** Press # 2
	325	15:05	14	**					stopped
	325	15:15	-	17	15:15	125			running for a
	325	15:25	14	17	15:45	125	16:00	65	period of 10 minutes during test # 3. This could affect the results of test # 3 since it makes it difficult to determine the actual feed rate for this run.
	Test # 3 finished at 16:10								

914 637 2622 ENGINEERING

CALCULATION SHEET

THE NESTLE COMPANY, INC. ENGINEERING DIVISION

PLANT: FREEHOLD BY: W. CHOATE CK'D:
JOB: DATE: 11/4/82
DESCRIPTION: SHEET 7 OF 10
REF. DWG.



orm DEQ-083
+/86

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
TECHNICAL SERVICES

EMISSION TEST OBSERVATION

1) Company: The Nestle Company, Inc

Address: 61 Jerseyville Ave

City/State: Freehold NJ Phone: (201) 462-1300

DEP ID No. 20004 Plant Contact: Jeff Canter

2) Source being tested: NJ Stack No. 051 Permit/Certificate No. 075818

3) Date of Test(s): 3/25/87

4) Consultant Company conducting tests: York Services Corporation

Name(s) of persons conducting tests: J. M Lehmann

Ken Pinckney

Name(s) of all other persons involved in the test program *(include all Agency, Company and Contractors and their affiliation).*

PERSON	AFFILIATION
Paul Orlando	Central Field Office

5) Outlet tests conducted for the following pollutants:

- ☒ Particulates
- ☐ Heavy Metals
- ☐ Hydrocarbons
- ☐ HCL
- ☐ SO_2
- ☐ CO
- ☐ SO_2/SO_3
- ☐ Specific Organics:
- ☐ NO_x
- ☐ Other:

Were any inlet tests conducted: ☐ Yes ☒ No

If yes, indicate the pollutant tested for.

6) How many tests were observed this date: *(If more than one date, indicate test runs observed on each date).*

DATE	NO. OF TEST RUNS OBSERVED
3/25/87	#1 10:10 AM - 11:27 AM
	#2 12:30 PM - 1:49 PM
	#3 2:45 PM - 4:02 PM

10) Were any continuous emission monitors used in conjunction with those tests: ☐ Yes ☒ No

If yes, indicate the following information:

POLLUTANT	PRINCIPLE OF MONITOR	NO. OF SPAN GASES	SPAN GAS CONCENTRATIONS

Strip Chart Speed: ______________________

Were monitors calibrated prior to each test: ☐ Yes ☐ No

If no, explain why not: ______________________

11) Were tests conducted in accordance with the approved protocol: ☒ Yes ☐ No

If no, indicate difference and reasons for change: ______________________

Were changes approved: ☐ Yes ☐ No If yes, indicated by whom: ______________________

If no, indicated reason: ______________________

12) Record and list other pertinent information or problems regarding these tests not previously recorded:

T_1 + T_3 were taken outside the glass and were not the actual gas stream ~~temp~~ temperature. * Run 1 failed leak check. Test will be recalculated, Final Total vol = Initial total volume − (.007 ft³/min × 72 m (see back)

13) Was company representative notified of any problems regarding the tests: ☒ Yes ☐ No

If yes, indicate company representative: Jeff Couture - Nestle

If no, indicate reason: ______________________

Signature of Observer: [signature] P. Brown *Title:* Env. Specialist *Date:* 3/25/87

Reviewed by: [signature] *Date:* 3/26/87

(#2)

TEST VOID BECAUSE PROCESS RATES ARE ESTIMATES

Section 4 Reference ✓
AP-42 Reference —

Emission Test Report Review Checklist--Short Form

Reviewer: TLAPP
Review Date: 8/18/94

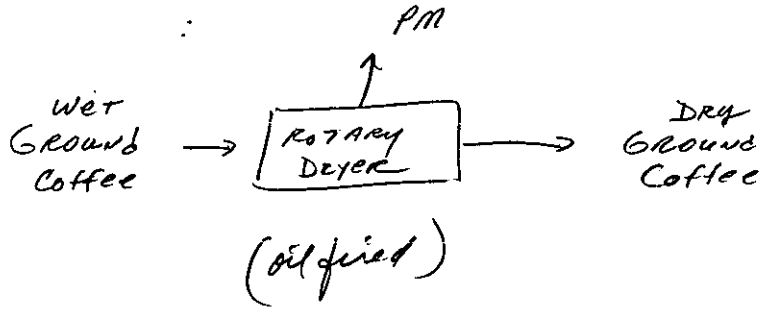
A. Background Information

1. Facility name: NESTLE FOOD CORP.
   Location: FREEHOLD, NJ
2. Source category: COFFEE ROASTING
3. Test date: MARCH 25, 1987
4. Test sponsor: NESTLE FOOD CORP.
5. Testing contractor: YORK SERVICES CORP.
6. Purpose of test: COMPLIANCE TEST FOR PM EMISSIONS
7. Pollutants measured (include test method and indicate if valid): TOTAL PM 40 CFR 60, APP. A, METHODS 1-5
8. Process overview: Attach a process description and a block diagram. Identify processes tested with letters from the beginning of the alphabet (A, B, C, etc...) and APC systems with letters from the end of the alphabet (V, W, X, etc...). Also identify test locations with Arabic numerals (1,2,3, ...). Using the ID symbols from the diagram, complete the table below.

Test ID	Process	Process ID	Emissions tested		APCD (controlled emissions only)
			Uncontrolled	Controlled	
	ROTARY DRYER (MEC DRYER)	NJ STACK No. 051		SCRUBBER/ DEMISTER	ID: Type: Model #:
					ID: Type: Model #:
					ID: Type: Model #:
					ID: Type: Model #:

B. Process Information

1. Provide a brief narrative description of the process and attach process flow diagram. (Note: If the process description provided in the test report is adequate, attach a copy here.)



D. Emission Data/Mass Flux Rates/Emission Factors

failed leak check – dry gas meter volume back calculated

Test ID	Parameter	Units	Values reported Run 1	Run 2	Run 3	Run 4
	Stack temperature	°F	108	108	108	
	Moisture	% v/v	8.2	8.9	10.8	
	Oxygen	% v/v	20.9	20.9	20.9	
	Volumetric flow, actual	ACFM	32,507	30,753	33,981	
	Volumetric flow, standard	dSCFM	27,830	26,118	28,283	
	Percent isokinetic		98.5	103	102	
Circle: Production or (feed rate) Capacity:	crude estimates	from calibration? -- N were unreliable	failed Test.	because	feed rates	
	Pollutant concentrations:					
	TOTAL PM	GRAMS	31.7	34.0	42.3	
	Pollutant mass flux rates:					
	TOTAL PM	gr/SCF	0.0117	0.0127	0.0148	
	Emission factors:					
	TOTAL PM Emission rate	lb/hr	NA	NA	NA	

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
CENTRAL REGIONAL OFFICE, AIR PROGRAM
TWIN RIVERS PROFESSIONAL BLDG.
EAST WINDSOR, NJ 08520

MEMORANDUM

TO: Joseph N. DePierro

FROM: Paul G. Orlando

SUBJECT: Nestle Foods Stack Test - Conducted on 3-25-87

DATE: April 8, 1987

Stack tests were conducted on Nestle Foods' # 51 rotary dryer (P/CT # 75818, N.J. stack # 050) for particulate emissions. Tests were performed by York Research Corporation. I was in attendance for the purpose of monitoring operating parameters and production rates. Parameters measured for this test were fuel oil feed rate; scrubber liquid flow, dryer exit temperature and coffee grounds feed rate. The coffee grounds feed rate could not be accurately measured during the test period due to a lack of measurement devices. Instead, the feed rate was estimated by measuring the revolutions per minute of the two Vetter presses and then obtaining the weight from a calibration chart of throughput vs R.P.M.. For example, a press conveyor screw speed of 12 R.P.M. would relate to a 4400 pound (dry basis) of coffee throughput. (see 11/4/82 chart attached) This method is a very crude technique for determining coffee throughput. More important, this calibration chart is over four years old! Since coffee ground throughput is the most important parameter measured for determination of scrubber efficiency, I do not feel this method should be accepted by our Department. Instead, I suggest that either the screw conveyors be re-calibrated with representatives of our Department present to insure their validity or the stack test be disapproved until a more accurate technique of determing coffee ground throughput can be developed.

The process operation during the stack test proceeded with minimal downtime. The only occurrence of concern was when the # 2 Vetter press shut down for a period of ten minutes during test # 3. The shut down was caused by excessive moisture content in the coffee grounds being fed to the Vetter presses. This downtime would reduce the amount of coffee

grounds fed to the dryer during this period. In conclusion, I would like to reiterate my opinion that the values for coffee ground feed rate are not accurate and should not be accepted as the actual feed rates for the specified test period. (A summary of the process parameters will follow.)

Paul G. Orlando
Environmental Engineer Trainee

nlg

c. E. Choromanski

orm DEQ-083
+/85

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
TECHNICAL SERVICES

EMISSION TEST OBSERVATION

1) Company: The Nestle Company, Inc

Address: 61 Jerseyville Ave

City/State: Freehold NJ Phone: (201) 462-1300

DEP ID No. 20004 Plant Contact: Jeff Cinder

2) Source being tested: NJ Stack No. 051 Permit/Certificate No. 075818

3) Date of Test(s): 3/25/87

4) Consultant Company conducting tests: YORK Services Corporation

Name(s) of persons conducting tests: J. M Lehmann

Ken Pinckney

Name(s) of all other persons involved in the test program *(include all Agency, Company and Contractors and their affiliation).*

PERSON	AFFILIATION
Paul Orlando	Central Field Office

5) Outlet tests conducted for the following pollutants:

- ☒ Particulates
- ☐ Heavy Metals
- ☐ Hydrocarbons
- ☐ HCL
- ☐ SO_2
- ☐ CO
- ☐ SO_2/SO_3
- ☐ Specific Organics:
- ☐ NO_x
- ☐ Other:

Were any inlet tests conducted: ☐ Yes ☒ No

If yes, indicate the pollutant tested for.

6) How many tests were observed this date: *(If more than one date, indicate test runs observed on each date).*

DATE	NO. OF TEST RUNS OBSERVED
3/25/87	#1 10:10 AM - 11:27 AM
	#2 12:30 PM - 1:49 PM
	#3 2:45 PM - 4:02 PM

10) Were any continuous emission monitors used in conjunction with those tests: ☐ Yes ☒ No
If yes, indicate the following information:

POLLUTANT	PRINCIPLE OF MONITOR	NO. OF SPAN GASES	SPAN GAS CONCENTRATIONS

Strip Chart Speed: ______

Were monitors calibrated prior to each test: ☐ Yes ☐ No

If no, explain why not: ______

11) Were tests conducted in accordance with the approved protocol: ☒ Yes ☐ No

If no, indicate difference and reasons for change: ______

Were changes approved: ☐ Yes ☐ No If yes, indicated by whom: ______

If no, indicated reason: ______

12) Record and list other pertinent information or problems regarding these tests not previously recorded:

$T_1 - T_3$ were taken outside the glass and were not the actual gas stream ~~temp~~ temperature. * Run 1 failed leak check. Test will be recalculated, Final Total vol = Initial total volume - (.007 ft³/min × 72 min) (see back)

13) Was company representative notified of any problems regarding the tests: ☒ Yes ☐ No

If yes, indicate company representative: Jeff Couture - Nestle

If no, indicate reason: ______

Signature of Observer: [signature] P. Brown *Title:* Env. Specialist *Date:* 3/25/87

Reviewed by: [signature] *Date:* 3/26/87