Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

Background Report Reference

AP-42 Section Number: 9.13.2

Background Chapter: 4

Reference Number: 3

Title: Stack Sampling Report for General Foods Corporation, Maxwell House Division, Hoboken, NJ, on Rotoclone Inlet and Outlet

Recon Systems, Inc.

Recon Systems, Inc.

September 1987

AP-42 Section 9.13.2
Reference —
Report Sect. 4
Reference 3

RECON SYSTEMS, INC.

Route 202 North, P.O. Box 460
Three Bridges, N.J. 08887
201-782-5900

New England 617-752-4217 Pennsylvania 215-433-5511

STACK SAMPLING REPORT FOR

General Foods Corporation
Maxwell House Division
Hoboken, New Jersey
on Rotoclone Inlet and Outlet

INTRODUCTION

The above referenced stacks were sampled for total particulate emissions and percent efficiency on September 9, 1987. This report contains the following information.

	PAGE
SUMMARY	2
PERSONNEL AND CERTIFICATIONS	3
SAMPLING LOCATIONS	4
VELOCITIES/FLOW RATES	6
CYCLONIC FLOW CHECK	8
GAS COMPOSITION	9
PARTICULATE EMISSIONS	11
PROCESS INFORMATION	13
ALLOWABLE EMISSIONS	14
PROTOCOL	15
NOMENCLATURE	25
CALIBRATION DATA	26
ORIGINAL DATA AND CALCULATION SHEETS	37

SUMMARY

The following results were obtained:

INLET			
Run No.	1	2	3
Date	9/9/87	9/9/87	9/9/87
Time	1116-1229	1346-1503	1541-1700
EMISSIONS DATA			
Particulates			
Pounds/hour	0.35	0.11	0.24
Grains/dscf	0.0123	0.0038	0.0077
Grains/scf	0.0119	0.0037	0.0075

OUTLET			
Run No.	1	2	3
Date	9/9/87	9/9/87	9/9/87
Time	1115-1230	1345-1459	1540-1704
EMISSIONS DATA			
Particulates			
Pounds/hour	0.017	0.014	0.014
Grains/dscf	0.0006	0.0005	0.0005
Grains/scf	0.0006	0.0005	0.0005
UNIT EFFICIENCY, %	95	87	94

Samples from this project will be retained for sixty days from the date of this report unless otherwise directed.

PERSONNEL AND CERTIFICATIONS

Field sampling on this project was performed by:

P. F. Marshall T. F. Mattei

C. D. Ruff J. D. Kirby

Laboratory work on this project was performed by:

P. F. Marshall

Calculations and report preparation were by:

P. F. Marshall

The testing was observed by:

Tom Brown	NJDEP
Beth Rossi	NJDEP
Ernie Lasalle	General Foods

This Report is submitted by:

Frank W. Swetits
Manager, Air Testing

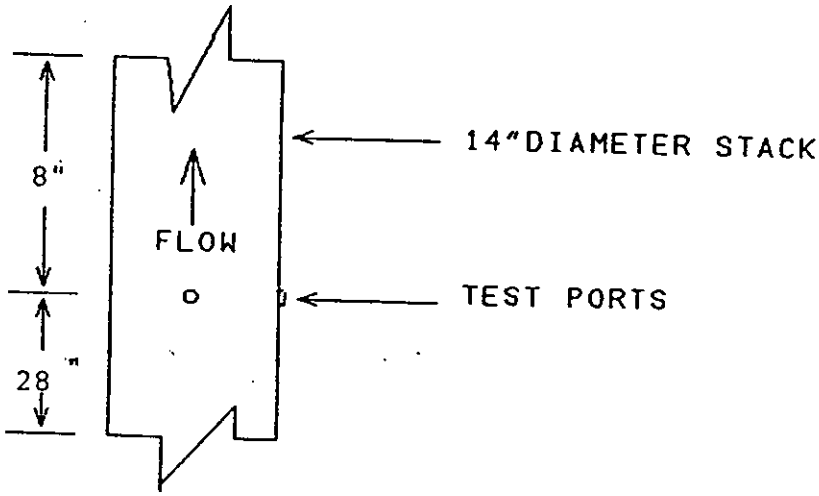
Richard F. Toro, M.Ch.E.
Executive Vice President

Professional Engineer Certification

I am in responsible charge of RECON's stack test work, and have discussed and reviewed the procedures and results of this set of tests with the relevant field and laboratory personnel.

Norman J. Weinstein, P.E.
New Jersey License 19536

GENERAL FOODS
ROTOCLONE OUTLET



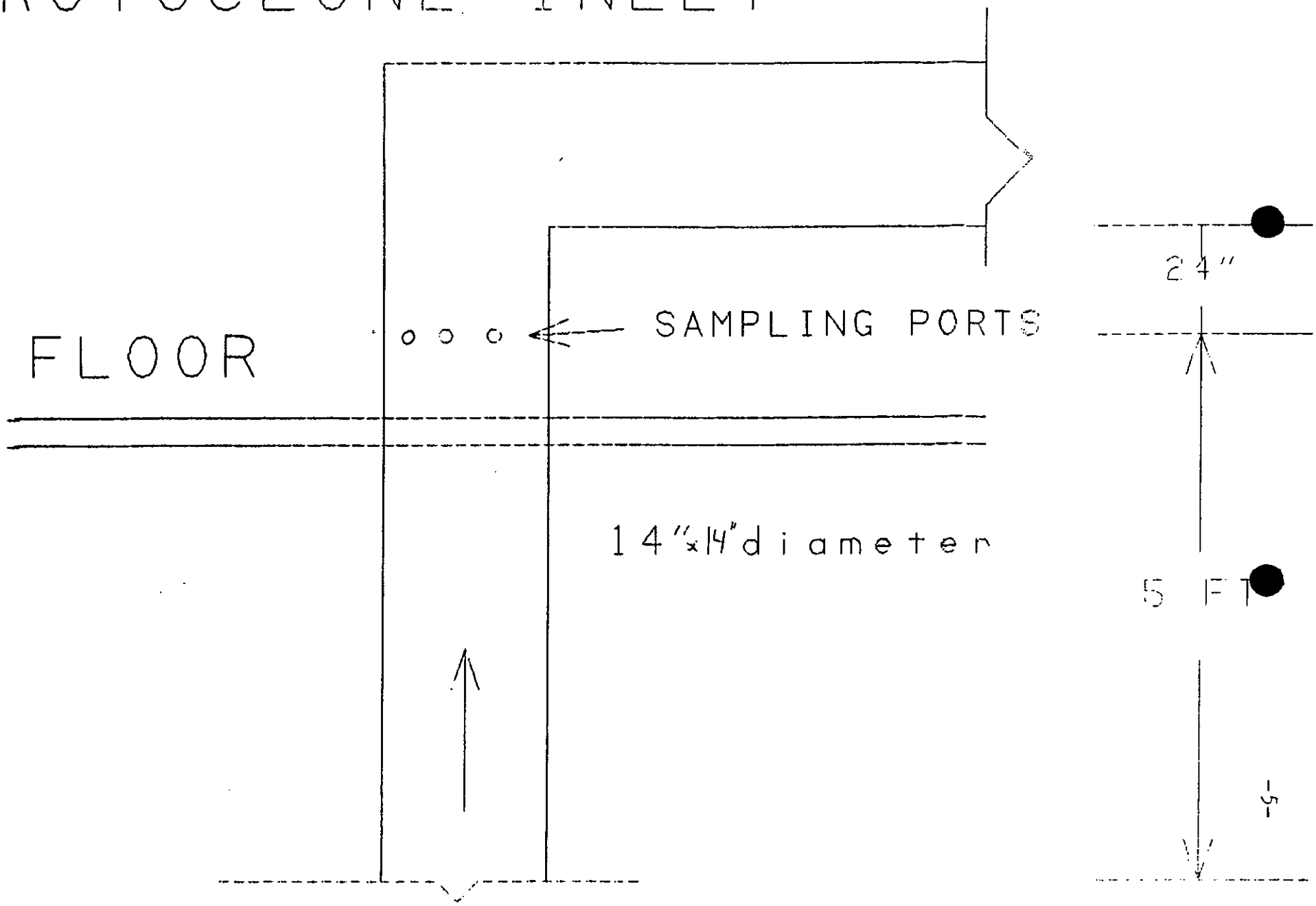
EPA DISTANCES

DISTANCE "A" = 2

DISTANCE "B" = 0.57

GENERAL FOODS

ROTOCLONE INLET



VELOCITY AND FLOW RATE DATA - Inlet

Sample No.	1	2	3
Date	9/9/87		
Time	1116-1229	1346-1503	1551-1700
Stack Diameter (in)	14		
Stack Cross Section (sq ft)	1.07		
Barometric Pressure ("Hg)	29.90		
Average Stack Temperature (^{o}F)	81	81	83
Stack Pressure ("H_2O-gage)	-2.1	-2.0	-2.0
Moisture (% vol)	2.4	2.4	3.2
Average Velocity (ft/sec)	53.86	55.17	59.24
Actual Flow Rate (acfm)	3460	3540	3800
Standard Flow Rate (scfm)	3370	3440	3690
Dry Standard Flow Rate (dscfm)	3290	3350	3570

Standard Conditions are $70^{o}F$, 29.92 "Hg.

VELOCITY AND FLOW RATE DATA - Outlet

Sample No.	1	2	3
Date	9/9/87		
Time	1115-1239	1345-1459	1540-1704
Stack Diameter (in)	14		
Stack Cross Section (sq ft)	1.07		
Barometric Pressure ("Hg)	29.90		
Average Stack Temperature (^{o}F)	80	80	81
Stack Pressure ("H_2O-gage)	1.4	1.3	1.3
Moisture (% vol)	2.9	2.8	3.0
Average Velocity (ft/sec)	55.93	57.23	56.81
Actual Flow Rate (acfm)	3590	3670	3650
Standard Flow Rate (scfm)	3540	3610	3580
Dry Standard Flow Rate (dscfm)	3430	3510	3470

Standard Conditions are 70°F, 29.92 "Hg.

CYCLONIC FLOW CHECK

INLET			OUTLET		
Port	Point	Angle°	Port	Point	Angle°
A	1	6	A	1	14
	2	8		2	13
	3	8		3	13
	4	7		4	10
	5	4		5	0
	6	5		6	2
	7	9		7	8
	8	12		8	4
				9	1
B	1	8		10	6
	2	10		11	0
	3	12		12	1
	4	12	B	1	18
	5	9		2	15
	6	8		3	13
	7	8		4	14
	8	10		5	13
				6	3
C	1	10		7	10
	2	12		8	5
	3	11		9	4
	4	11		10	1
	5	9		11	5
	6	9		12	8
	7	8			
	8	10		Avg.	7.5°
	Avg	9.0°			

STACK GAS COMPOSITION - Inlet

Sample No.	1	2	3
Date	9/9/87	----------	----------
Time	1116-1229	1346-1503	1551-1700

	% By Volume (Dry Basis)		
ONSITE FYRITE			
CO_2	0	0	0
O_2	21	21	21
N_2 (By Difference)	79	79	79
LAB ORSAT			
CO_2	0	0	0
O_2	21	21	21
N_2 (By Difference)	79	79	79

STACK GAS COMPOSITION - Outlet

Sample No.	1	2	3
Date	9/9/87	----------	----------
Time	1115-1230	1345-1459	1540-1704

	% By Volume (Dry Basis)		
ONSITE FYRITE			
CO_2	0	0	0
O_2	21	21	21
N_2 (By Difference)	79	79	79
LAB ORSAT			
CO_2	0	0	0
O_2	21	21	21
N_2 (By Difference)	79	79	79

PARTICULATE EMISSIONS - Inlet

Sample No.	1	2	3
Date	9/9/87		
Time	1116-1229	1346-1503	1551-1700
Sampling Data			
Nominal Nozzle Size (in)	3/16		
No. of Sampling Points	24		
Sampling Time (min)	72		
Sample Volume (dscf)	41.97	42.40	45.27
% Isokinetic	92	91	91
Emissions Data			
Particulates Grains/dscf	0.0123	0.0038	0.0077
Grains/scf	0.0119	0.0037	0.0075
Pounds/hour	0.35	0.11	0.24

PARTICULATE EMISSIONS - Outlet

Sample No.	1	2	3
Date	9/9/87		
Time	1115-1230	1345-1459	1540-1704
Sampling Data			
Nominal Nozzle Size (in)	3/16		
No. of Sampling Points	24		
Sampling Time (min)	72		
Sample Volume (dscf)	43.46	44.98	44.47
% Isokinetic	94	95	94
Emissions Data			
Particulates Grains/dscf	0.0006	0.0005	0.0005
Grains/scf	0.0006	0.0005	0.0005
Pounds/hour	0.017	0.014	0.014
Unit Efficiency, %	95	87	94

PROCESS INFORMATION

Process information was not supplied to RECON.

ALLOWABLE EMISSIONS

The following allowable emissions are based on our understanding of the applicable regulatory rules and regulations. Since we are not always privy to the situation, these should not be accepted without confirmation from relevant sources.

Particulate	Reference	Allowable
Federal Regulations	_____	_____
State Regulations	_____	_____
State Permit	_____	_____
Sulfur Dioxide		
Federal Regulations	_____	_____
State Regulations	_____	_____
State Permit	_____	_____
Sulfur Trioxide and Sulfuric Acid		
Federal Regulations	_____	_____
State Regulations	_____	_____
State Permit	_____	_____
Nitrogen Oxides		
Federal Regulations	_____	_____
State Regulations	_____	_____
State Permit	_____	_____
Hydrocarbon (VOS, VOC)		
Federal Regulations	_____	_____
State Regulations	_____	_____
State Permit	_____	_____
Other: _____		
Federal Regulations	_____	_____
State Regulations	_____	_____
State Permit	_____	_____

__X__ We do not have sufficient information to determine allowable emissions.

RECON SYSTEMS, INC.

Route 202 North, P.O. Box 460
Three Bridges, N.J. 08887
201-782-5900

New England 617-752-4217 Pennsylvania 215-433-5511

STACK TEST PROTOCOL SUBMITTAL

NEW JERSEY DEPARTMENT OF
ENVIRONMENTAL PROTECTION
Technical Services Section
380 Scotch Road
W. Trenton, NJ 08628

ATTN: Edward Choromanski

RE: General Foods Corporation
Maxwell House Division
1125 Hudson Street
Hoboken, NJ 07030

Contact: Ernie LaSalle
Phone No. 201-420-3731
RECON Project No. 0554

This protocol is submitted for stack testing planned by RECON SYSTEMS, INC. for the above referenced client.

Source to be tested Rotoclone Outlet, Rotoclone Inlet
ID No. 059

Applicable permit and/or
certificate numbers 078004

Approximate Date of Testing September 9, 1987

For Isokinetic Testing or Velocity Measurements, if any

Rotoclone Outlet
Stack diameter or dimensions 14"
Nearest upstream disturbances 20"
Nearest downstream disturbances 14"
EPA Distance "A" 1.42 EPA Distance "B" 1.00
Proposed number of sampling points 24
Proposed time per sampling point 3 minutes
Proposed total stack gas sample size ~34.00 dry standard ft^3

Rotoclone Inlet
Stack diameter or dimensions 14" x 14"
Nearest upstream disturbances 5'
Nearest downstream disturbances 24"
EPA Distance "A" 1.7 EPA Distance "B" 4.3
Proposed number of sampling points 24
Proposed time per sampling point 3 minutes
Proposed total stack gas sample size ~34.00 dry standard ft^3

All measurements to field verified

Source Operation Record Keeping

Responsibility of __A__ Owner __B__ RECON

__A__ Production rate
__A__ Fuel usage
___ Incineration feed rate
___ Steam production
__A__ Operating parameters (temperatures, pressures, flows, etc.)
___ Other

Sampling Program

Three (3) compliance tests will be run for total particulates, flow rate, temperature, O_2, CO_2 and N_2 (by difference) utilizing New Jersey Method No. 1. Temperatures of the stack probe, filter inlet, filter box, and filter outlet will be recoreded. Impingers Nos. 1 and 2 will have 100 mls each of distilled water. Impinger no. 3 will be emply. Impinger no. 4 will contain 200 gms silica gel.

Analytical Program

The sample filter is dried at 105°C, cooled in a dessicator, and weighed to a constant weight. The probe wash is evaporated in a pretared beaker, dessicated and weighed to a constant weight. The impingers are weighed to determine moisture gain.

The following are attached if available:

1. Test procedures proposed
2. Stack diagram
3. Permits or applications
4. Process description

This protocol submitted by

Richard F. TOro
Executive Vice President

Per Peter F. Marshall
Environmental Engineer
August 5,. 1987

STACK TESTING PROCEDURES CHECKLIST

Particulate Emissions:
- ___ US EPA 5
- ___ US EPA 17
- X N.J. Method 1
- ___ N.J. Method 4 (draft)
- ___ Plus impinger catch
- ___ Plus aqueous and organic impinger catch
- ___ Other _____

Probe Material Pyrex Glass

Velocity:
- ___ Standard pitot tube and manometer
- X "S" pitot tube and manometer
- ___ Other: _____
- X Cyclonic Flow Check X Yes ___ No

Temperature:
- X Thermocouple
- ___ Temperature gage
- ___ Process indicator

Gas Composition:
- X Onsite fyrite
- ___ Grab sample and lab orsat
- ___ Integrated sample and lab orsat
- X Integrated and traversed sample and lab orsat
- ___ Oxygen by Infrared Industries 2200 Electrochemical Analyzer

Particle Sizing:
- ___ Instack cascade impactor
- ___ Heated out of stack cascade impactor
- ___ Plus impinger catch
- ___ Plus aqueous and organic impinger catch

Sulfur Oxide Emissions:
- ___ US EPA 6
- ___ US EPA 8
- ___ Sulfite Corrections Made
- ___ Controlled condensation for SO_3
- ___ US EPA 6 __ or 8 ___ combined with US EPA 5 __ or 17 __ or particle sizing ___

Nitrogen Oxide Emissions:
- ___ US EPA 7 ___ A, ___ B, ___ C, ___ D, ___ E
- ___ Chemiluminescent monitor
- ___ US EPA 20 (Chemiluminescent Monitor)

Hydrogen Chloride (HCl) Emissions:
- ___ API 767-54
- ___ Cl^- analysis of particulate test wet catch
- ___ Other _____

Hydrocarbon Emissions:
- ___ N.J. Method 3
- ___ RECON Method 2
- ___ Integrated gas bag direct and lab GC
- ___ Grab sample gas bag direct and lab GC
- ___ Onsite GC direct ___ detector
- ___ Onsite Continuous Monitor (FID)

Metal Emissions
- ___ AA determination on filter and probe wash
- ___ AA determination on impinger catch

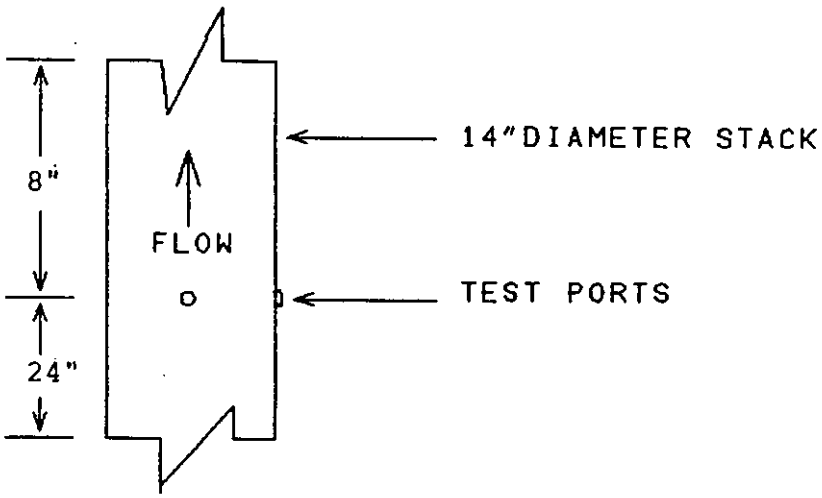
Carbon Monoxide Emissions:
- ___ Thermal Conductivity analysis of "Gas Composition" sample(s)
- ___ Onsite Continuous Monitor

Opacity:
- ___ N.J. Method 2
- ___ U.S. EPA Method 9

Calibrations: Dry gas meters and orifice, pitot tubes, thermocouples and nozzle calibrations will be supplied with the test report unless test is unofficial.

Comments:

GENERAL FOODS
ROTOCLONE OUTLET



EPA DISTANCES

DISTANCE "A" = 2

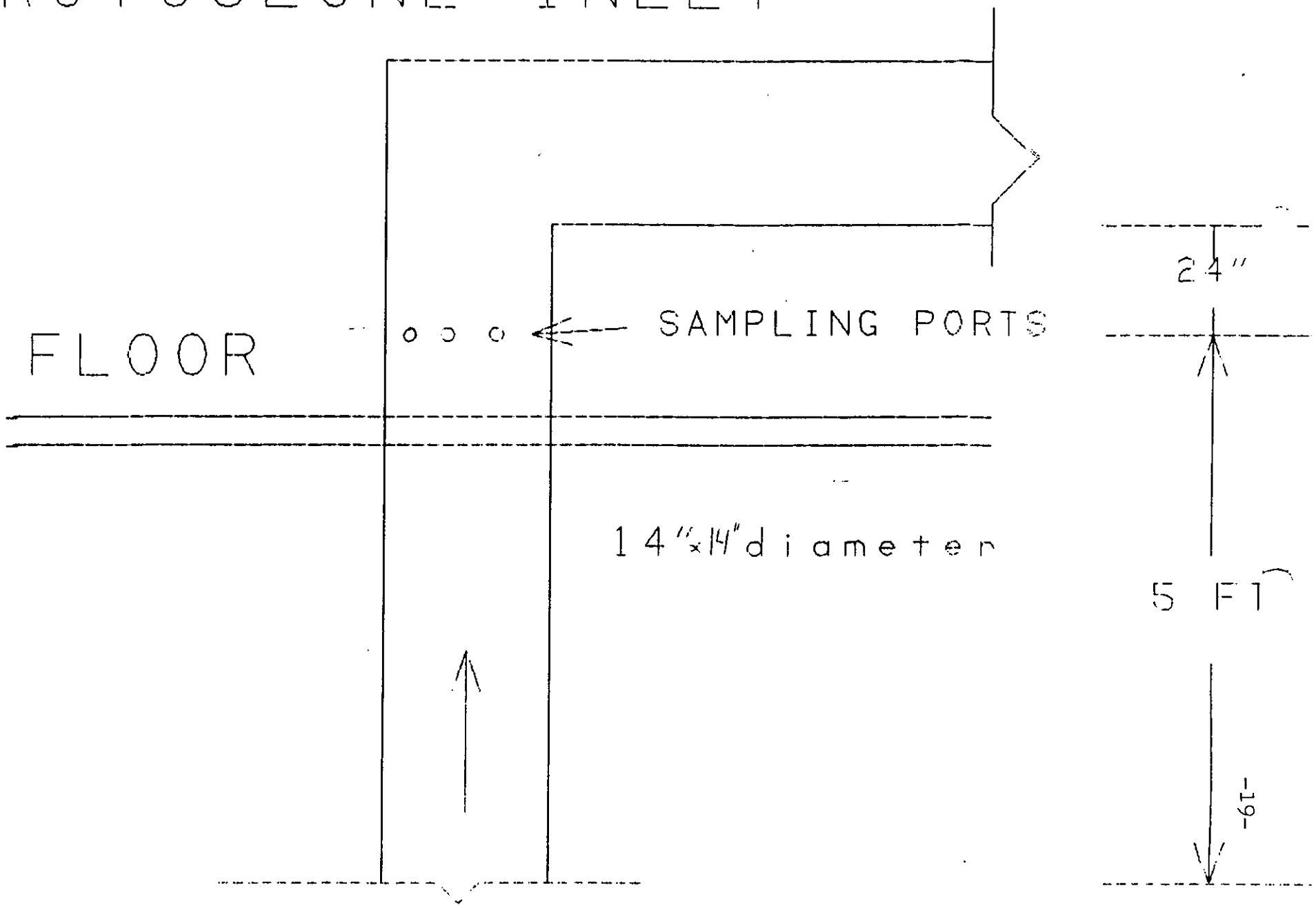
DISTANCE "B" = 0.57

CYCLONIC FLOW CHECK

PORT A	PORT B
1 = 5 °	1 = 6 °
2 = 8 °	2 = 5 °
3 = 7 °	3 = 3 °
4 = 6 °	4 = 2 °
5 = 1 °	5 = 0 °
6 = 10 °	6 = 7 °
AVG. = 6.2 °	AVG. = 3.8 °

GENERAL FOODS

ROTOCLONE INLET



NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PROGRAM
BUREAU OF NEW SOURCE REVIEW

All Correspondence must indicate your APC PLANT ID NUMBER

Permit/Certificate Number 078004 LOG NUMBER 863866A APC PLANT ID 10082

(Mailing Address)	(Plant Location)
GENERAL FOODS CORP. 1125 HUDSON STREET HOBOKEN NJ 07030	MAXWELL HOUSE DIVISION 1125 HUDSON STREET HOBOKEN

Applicant's Designation of Equipment BLDG.#10- ROTOCLONE
N.J. Stack No. 057 No. of Stacks 001 No. of Sources 01
Original Approval 03/30/87 Effective 03/30/87 Expiration 06/27/87

PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
TEMPORARY CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

* CONDITIONAL *

THIS PERMIT AND TEMPORARY CERTIFICATE IS BEING ISSUED UNDER THE AUTHORITY OF CHAPTER 106, P.L. 1967 (N.J.S.A.26:2C-9.2). THE TEMPORARY CERTIFICATE WILL ALLOW FOR INSPECTION AND EVALUATION TO ASSURE CONFORMANCE WITH ALL PROVISIONS OF THE NEW JERSEY ADMINISTRATIVE CODE, TITLE 7, CHAPTER 27. BASED ON THIS EVALUATION, STACK TESTS MAY BE REQUIRED IN ACCORDANCE WITH N.J.A.C. 7:27-8.4(C).

IF THE DEPARTMENT IS SOLELY RESPONSIBLE FOR BEING UNABLE TO INSPECT THIS EQUIPMENT IN OPERATION AS PERMITTED DURING THIS 90-DAY PERIOD, THIS TEMPORARY CERTIFICATE WILL BE EXTENDED AUTOMATICALLY. HOWEVER, IF YOU ARE RESPONSIBLE FOR THE DEPARTMENT'S BEING UNABLE TO INSPECT, E.G., NOT NOTIFYING THE DEPARTMENT WHEN THIS EQUIPMENT OR PROCESS IS IN OPERATION, THIS CERTIFICATE MAY NOT BE EXTENDED AND YOU WILL BE NOTIFIED BY THE DEPARTMENT THAT YOU MUST APPLY FOR AND OBTAIN AN EXTENSION AUTHORIZING YOU TO CONTINUE TO OPERATE THE EQUIPMENT. THE DEPARTMENT RESERVES THE RIGHT TO WITHHOLD ANY EXTENSION OF THIS TEMPORARY CERTIFICATE, IN WHICH EVENT YOU WILL BE NOTIFIED THAT YOU MUST APPLY FOR AND OBTAIN AN EXTENSION AUTHORIZING YOU TO CONTINUE TO OPERATE AFTER THE EXPIRATION DATE OF THIS CERTIFICATE.

IN ACCORDANCE WITH N.J.A.C. 7:27-6.3(D), THIS PERMIT AND CERTIFICATE MUST BE READILY AVAILABLE FOR INSPECTION ON THE OPERATING PREMISES.

THE FOLLOWING CONDITION(S) APPLY TO THIS PERMIT AND CERTIFICATE:
1 .THE OWNER OR OPERATOR SHALL NOT CONSTRUCT, INSTALL, USE OR CAUSE TO BE USED THIS EQUIPMENT IN A MANNER WHICH WILL RESULT IN ODORS BEING DETECTABLE BY SENSE OF SMELL IN ANY AREA, EXCEPT FOR THOSE AREAS OVER WHICH THE OWNER OR OPERATOR HAS EXCLUSIVE USE OR OCCUPANCY. 2. STACK TEST REQUIRED (SEE ATTACHED).

N.J. Department of Environmental Protection
Division of Environmental Quality
CN-027, 401 East State Street
Trenton, New Jersey 08625

Approved by: Richard Craig
Chief
Bureau of New Source Review

HUDSON REGIONAL HEALTH COMMISSION 05/29/87-51

YOU MUST CONDUCT A STACK TESTS IN ACCORDANCE WITH N.J.A.C. 7:27-8.4(c) WITHIN 90 DAYS OF START-UP OF THIS EQUIPMENT.

STACK TEST FOR: PARTICULATES & % CONTROL

A. SUBMIT FOR REVIEW AND APPROVAL, AT LEAST 30 DAYS PRIOR TO TESTING, A DETAILED DESCRIPTION OF SAMPLING LOCATIONS, SAMPLING EQUIPMENT, AND ANALYTICAL PROCEDURES FOR SUCH TESTS TO SUPERVISOR, TECHNICAL REVIEW, BUREAU OF TECHNICAL SERVICES, CN 411, 380 SCOTCH RD. TRENTON, N.J. 08618. PHONE 609-530-4041

B. NOTIFY THE METROPOLITAN REGIONAL OFFICE AT 201-669-3935 AT LEAST 7 DAYS PRIOR TO THE ACTUAL TESTING.

C. SUBMIT TWO (2) COPIES OF THE TEST RESULTS TO THE TECHNICAL SERVICES SECTION WITHIN 30 DAYS OF THE COMPLETION OF THE STACK TEST. THE TEST RESULTS MUST BE CERTIFIED BY A NEW JERSEY LICENSED PROFESSIONAL ENGINEER OR BY A CERTIFIED INDUSTRIAL HYGIENIST.

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
CN 027, TRENTON, N.J. 08625

JORGE H. BERKOWITZ, Ph.D.
DIRECTOR

(609) 292-5383

August 12, 1987

Mr. Peter F. Marshall
Senior Environmental Specialist
Recon Systems, Inc.
P.O. Box 460
Three Bridges, New Jersey 08887

Dear Mr. Marshall:

We have received the sampling and analytical protocol your company has submitted for the proposed emission tests at General Foods Corporation, Maxwell House Division located in Hoboken, New Jersey. These tests are to be conducted on the Building No. 10 - Rotoclone (NJ Stack No. 059).

Our review of the proposed procedures indicates that the outlet sampling location does not meet the minimum requirements for stacks less than 24 inches in diameter, as prescribed by USEPA Reference Method One. Unless the sampling location can be changed by incorporating temporary and/or permanent stack extensions or other similar alternatives, we will not approve the proposed protocol.

You will be required to submit details describing the changes necessary to insure the outlet sampling location will be acceptable.

A proposed sample date of September 9, 1987, was mentioned in your letter. We cannot schedule any test date until an approve protocol has been submitted.

If you have any questions, please feel free to call me at (609) 530-4041.

Sincerely,

Edward M. Choromanski
Supervisor/Technical Review
Bureau of Technical Services

New Jersey is an Equal Opportunity Employer
Recycled Paper

RECON SYSTEMS, INC.
Route 202 North, P.O. Box 460
Three Bridges, N.J. 08887
201-782-5900

New England 617-752-4217 Pennsylvania 215-433-5511

August 18, 1987

Mr. Edward M. Choromanski
Supervisor/Technical Review
Bureau of Technical Services
State of New Jersey
Deptartment of Environmental Protection
CN 027
Trenton, NJ 08825

Re: General Foods Corporation
Maxwell House Division
NJ Stack No. 059
Hoboken, NJ
RECON Project No. 0554

Dear Mr. Choromanski:

This letter is in response to your letter dated August 12, 1987 for the above mentioned project.

Enclosed please find revised sample location drawing for the outlet of the Rotoclone.

We would still like to keep the test scheduled for Setpember 9, 1987.

If you have any questions, please call.

Yours very truly,

Norman J. Weinstein
President

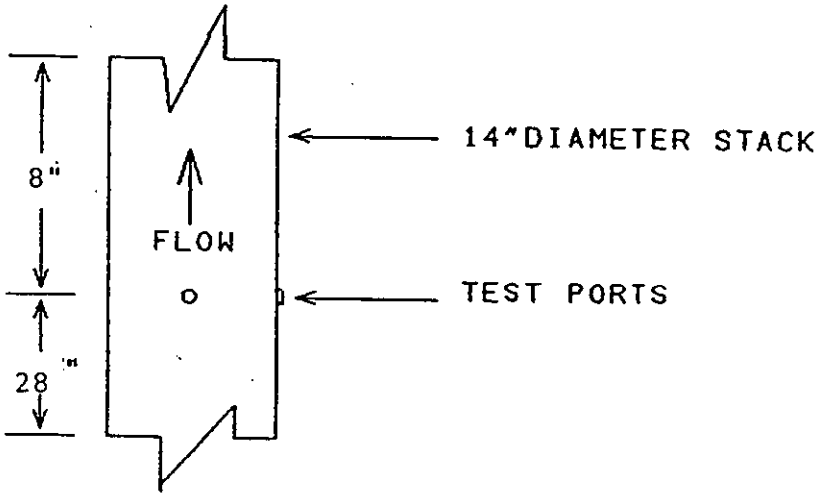
Frank W. Swetits
Frank W. Swetits
Manager, Field Testing

FWS/cp

Enclosure

cc: E. LaSalle, General Foods

GENERAL FOODS
ROTOCLONE OUTLET



EPA DISTANCES

DISTANCE "A" = 2

DISTANCE "B" = 0.57

CYCLONIC FLOW CHECK

PORT A	PORT B
1 = 5 °	1 = 6 °
2 = 8 °	2 = 5 °
3 = 7 °	3 = 3 °
4 = 6 °	4 = 2 °
5 = 1 °	5 = 0 °
6 = 10 °	6 = 7 °
AVG. = 6.2 °	AVG. = 3.8 °

SELECTED NOMENCLATURE

Time = military time
min = minutes
°F = degrees Fahrenheit
°C = degrees Centigrade
"H_2O = inches water (pressure or vacuum)
"Hg = inches mercury (pressure or vacuum)
mm Hg = millimeters of mercury (pressure or vacuum)
psig = pounds of pressure per square inch·gage
sq ft = square feet
in = inches
micron = 10^{-6} meters
ft/sec = feet per second
ft/min = feet per minute
acfm = cubic feet per minute of total gas flow at flowing conditions
scfm = cubic feet per minute of total gas flow at 70°F, 29.92"Hg
dscfm = dry cubic feet per minute of dry gas flow at 70°F, 29.92"Hg
pounds/hour = pounds per hour
pounds/hour = pounds per hour
BTU/hr = British thermal units per hour
% = volume per cent when referred to gases and water vapor
= weight percent for solids, liquids
% vol = volume per cent
% wgt = weight percent
ppmv = volumes of gaseous contaminants per million volumes of total gas
grains = grams x 15.4
ug = micrograms = 10^{-6} grams
mg = milligrams = 10^{-3} grams
grains/dscf = grains of pollutants per cubic foot of dry stack gas at 70°F, 29.92 "Hg
gr/dscf = grains/dscf
ug/m^3 = micrograms of pollutants per cubic meter of total stack gas at 25°C, 760 mm Hg
mg/l = milligrams/liter of liquid = ppm by weight if specific gravity of liquid = 1.0
C = elemental carbon
CO_2 = carbon dioxide
H = elemental hydrogen
H_2 = molecular hydrogen
H_2O = water
N = elemental nitrogen
N_2 = molecular nitrogen
NO_x = NO + NO_2 = nitrogen oxides = nitric oxide plus nitrogen dioxide reported as equivalent nitrogen dioxide
S = elemental sulfur
SO_2 = sulfur dioxide
SO_3 = sulfur trioxide
SO_4 = sulfate
H_2SO_4 = sulfuric acid
H_2S = hydrogen sulfide
Cl = elemental chlorine or chloride
Cl_2 = molecular chlorine
HCl = hydrogen chloride
F = elemental fluorine or fluoride
CH_4 = methane
O = elemental oxygen
O_2 = molecular oxygen
A = argon
< = less than; represents the minimum detectability limits
≤ = equal to or less than
ND = none detected

Front half (dry catch particulate) = particulate matter collected in/on nozzle, probe, cyclone, flask heated hose, and filter of EPA sampling train
Back Half (wet catch particulate) = material collected in impingers after filter of EPA sampling train

Organic wet catch = residue after low temperature (70°F) evaporation of ether/chloroform used to extract soluble materials from the wet catch
Aqueous wet catch = residue after high temperature (220°F) evaporation of water left after ether/chloroform extraction
Combustibles = volatiles = loss on heating @ 550°C after drying @ 100°C
Ash = residue after heating @550°C

CALIBRATION DATA

Test Equipment Calibration

Data Sheets Follow

used all 3 runs on outlet

PITOT TUBE CALIBRATION

Pitot tube calibration number 7 Date JUNE 11, 87

Calibrated by PFM & CDRuff

EFFECTIVE LENGTH 3'

A Side Calibration

Run No.	Δp_{std} cm H_2O (in. H_2O)	Δp_s cm H_2O (in. H_2O)	$C_{p(s)}$	Deviation $C_{p(s)}-\bar{C}_{p(A)}$
1	0.74	1.00	0.85	+0.02
2	0.29	0.41	0.83	0.00
3	0.17	0.25	0.82	-0.01
		$\bar{C}_{p(side\ A)}$	0.83	$\delta = 0.010$ *

B Side Calibration

Run No.	Δp_{std} cm H_2O (in. H_2O)	Δp_s cm H_2O (in. H_2O)	$C_{p(s)}$	Deviation $C_{p(s)}-\bar{C}_{p(B)}$
1	0.74	1.00	0.85	+0.02
2	0.29	0.41	0.83	0.00
3	0.17	0.25	0.82	-0.01
		$\bar{C}_{p(side\ B)}$	0.83	$\delta = 0.010$ *

$C_p(A) - C_p(B) = 0.00$ *

Figure 4-10. Pitot tube calibration data.

* VALUE MUST BE $\leq \pm 0.01$

RECON SYSTEMS, INC.
Route 202 North P.O. Box 460
THREE BRIDGES, NEW JERSEY 08887
(201) 782-5900

FORM: L-26 (REV. JUNE 10, 87)

RECON SYSTEMS, INC.
Route 202 North P. O. Box 460
THREE BRIDGES, NEW JERSEY 08887
(201) 782-5900

Used all 3 run on inlet

CALIBRATION OF PITOT TUBE

Time _____
Date 6/30/86
Location RECON
Operator SDK

Type S Tube No.: 217
Standard Tube No.: 167 WIDGET
Comments: _____

SIDE A DOWNSTREAM

Run No.	Fan Setting	Flue Temp. °F	Vel. From ΔP_{STD} f/s	Cp_{STD}	ΔP_{STD}	ΔP_{TEST}	Cp_{TEST}	Average Cp_{TEST}
1	H Full/Full	72		0.99	0.680	0.960	0.833	
2	H Full/50%	72		0.99	0.475	0.675	0.830	0.831
3	L Full/Full	72		0.99	0.315	0.460	0.819	
4	L Full/50%	72		0.99	0.170	0.235	0.842	$\sigma = 0.008$

SIDE B DOWNSTREAM

Run No.	Fan Setting	Flue Temp. °F	Vel. From ΔP_{STD} f/s	Cp_{STD}	ΔP_{STD}	ΔP_{TEST}	Cp_{TEST}	Average Cp_{TEST}
1	H Full/Full	72		0.99	0.680	0.910	0.856	
2	H Full/50%	72		0.99	0.475	0.655	0.843	0.855
3	L Full/Full	72		0.99	0.315	0.415	0.862	
4	L Full/50%	72		0.99	0.170	0.225	0.860	$\sigma = 0.007$

$$Cp_{TEST} = Cp_{STD} \sqrt{\frac{\Delta P_{STD}}{\Delta P_{TEST}}}$$

WHERE: Cp_{TEST} = Pitot tube coefficient of Type S pitot tube.
Cp_{STD} = Pitot tube coefficient of standard type pitot tube (if unknown, use 0.99).
ΔP_{STD} = Velocity head measured by standard type pitot tube.
ΔP_{TEST} = Velocity head measured by Type S pitot tube.

Used all 3 runs on outlet

METER BOX I.D. - #4 METER NO. - 5787-3 DATE INSTALLED - 7/27/87 BY:

BARO. PRESS. - 30.26

ΔH ORIFICE SETTING	METER TEMP. IN	OUT	AVG. T	T+460	METER READING	A CUBIC FT.	TIME @ SEC.	$\Delta H_@$	DIFFERENCE FROM AVG. ΔH.
					1. 581.950				
.5	90	80	85	545	2. 581.201	.749	120	2.04	+ 0.04
					1. 582.635				
1.0	88	80	84	544	2. 582.540	.905	120	1.94	- 0.06
					1. 583.345				
1.5	87	80	84	544	2. 584.253	1.289	120	2.06	+ 0.06
					1. 584.831				
2.0	91	81	86	546	2. 585.350	1.519	120	1.98	- 0.02
					1. 586.365				
2.5	90	82	86	546	2. 587.049	1.684	120	2.02	+ 0.02
					1. 588.233				
3.0	89	81	85	545	2. 589.096	1.863	120	1.97	- 0.03
							AVG =	2.00	

CALCULATION:

$$\Delta H_@ = \frac{.0317(\Delta H)}{29.84(T+460)}\left[\frac{T+460(120)}{A(60)}\right]^2$$

AVG. $\Delta H_@$ = 2.00

NOTE: DIFF. NOT TO EXCEED ± .15 FROM AVG. $\Delta H_@$

Route 202N, Box 460
THREE BRIDGES, NJ 08887
(201) 782-5900

SHEET NO. L-32 OF TECH. FILE

CALCULATED BY _____ DATE _____

-29-

STATE METER SHOP

PROOF AND DIFFERENTIAL TEST RECORD

Meter Size 1304190 Date Received 8/6/86 Inspector Rick Gatto

Date Tested 8/7/86 New ____ Repaired ✓ Manufacturer Singer & Rockwell

Prover No. 1264 Temperatures: Room Air 77 F.

Total Meters this Page 3 Oil 77 F.

Prover Air 77 F.

Temp.Comp.Meters: $\frac{\text{Abs.Base Temp.}}{\text{Abs.Prover Temp.}}$ x Uncorr. %Proof = Corr. % Proof

Meter No.	Repair Class	Percent Proof Check	Percent Proof Open	Differential Maximum	Remarks
59295	Intest	101.5	102.5	38	Uncorr. % Proof as found
					Corr. % Proof —
578753	Intest	99.5	98.7	27	Uncorr. % Proof as found
					Corr. % Proof
625432	Intest	103.0	102.5	32	Uncorr. % Proof as found
					Corr. % Proof
					Uncorr. % Proof —
					Corr. % Proof
59295	Valve adjust	100.0	100.0	25	Uncorr. % Proof as calibrated
					Corr. % Proof
578753	adjust	100.0	100.0	26	Uncorr. % Proof as calibrated
					Corr. % Proof —
625432	Valve adjust	100.0	100.0	28	Uncorr. % Proof as calibrated
					Corr. % Proof

Route 202N, Box 460
THREE BRIDGES, NJ 08887
(201) 782-5900

SHEET NO. L-32 OF TECH. FILE

CALCULATED BY _____ DATE _____

-31-

METER BOX I.D. - #3 METER NO.# - 59333 DATE INSTALLED - AUG. 20, 87 BY: Tom M.

BARO. PRESS. - 30.38

ΔH ORIFICE SETTING	METER TEMP. IN	OUT	AVG. T	T+460	METER READING	A CUBIC FT.	TIME θ SEC.	$\Delta H_@$	DIFFERENCE FROM AVG. ΔH.
.5	101	95	98	558	2.944.844 / 1.944.077	.767	120	1.98	-0.10
1.0	101	95	98	558	2.946.343 / 1.945.221	1.082	120	1.99	-0.09
1.5	103	95	99	559	2.947.918 / 1.946.612	1.306	120	2.05	-0.03
2.0	106	96	101	561	2.949.958 / 1.948.436	1.522	120	2.02	-0.06
2.5	108	96	102	562	2.952.235 / 1.950.615	1.620	120	2.23	+0.15
3.0	105	93	98	559	2.965.021 / 1.963.243	1.778	120	2.21	+0.13
						AVG =		2.08	

CALCULATION:

$$\Delta H_@ = \frac{.0317(\Delta H)}{29.84(T+460)}\left[\frac{T+460(120)}{A(60)}\right]^2$$

AVG. $\Delta H_@$ = NOTE: DIFF. NOT TO EXCEED ± .15 FROM AVG. $\Delta H_@$

used all 3 runs on bottom

STATE METER SHOP

PROOF AND DIFFERENTIAL TEST RECORD

2-1905

Meter Size 1-130 Date Received 4-13-87 Inspector Joe Soprano

Date Tested 4-20-87 New ____ Repaired ✓ Manufacturer Rockwell + Amer.

Prover No. 1264 Temperatures: Room Air 78 F.

Total Meters this Page 3 Oil 78 F.

Prover Air 78 F.

Temp.Comp.Meters: $\frac{\text{Abs.Base Temp.}}{\text{Abs.Prover Temp.}}$ x Uncorr. %Proof = Corr. % Proof

Meter No.	Repair Class	Percent Proof Check	Percent Proof Open	Differential Maximum	Remarks
59295	INTEST	101.0	101.9	24	Uncorr. % Proof AS FOUND
					Corr. % Proof
59333	INTEST	101.6	102.0	28	Uncorr. % Proof AS FOUND
					Corr. % Proof
L250998	INTEST	100.9	101.9	31	Uncorr. % Proof AS FOUND
					Corr. % Proof
					Uncorr. % Proof
					Corr. % Proof
59295	VAlve	100.0	100.5	20	Uncorr. % Proof AS CALIBRATED
					Corr. % Proof
59333	ADJUST	99.5	99.9	28	Uncorr. % Proof AS CALIBRATED
					Corr. % Proof
L250998	ADJUST	100.1	100.0	31	Uncorr. % Proof AS CALIBRATED
					Corr. % Proof

NOZZLE CALIBRATION DATA FORM

Date 1/6/87 Calibrated by T. Patti

Nozzle identification number (CSA)[d]	Nozzle Diameter[a] D_1, mm (in.)	D_2, mm (in.)	D_3, mm (in.)	ΔD,[b] mm (in.)	D_{avg}[c]
#25	.179	.178	.180	.002	.179
#29	.250	.250	.250	.000	.250
#33	.368	.368	.368	.000	.368
Nozzle used 43 runs in outlet → #34	.374	.374	.374	.000	.374
#4	.250	.251	.251	.001	.251
#35	.153	.152	.153	.001	.153
#36	.174	.176	.175	.002	.175
#37	.490	.488	.488	.002	.489
#38	.500	.500	.500	.501	.500

where:

[a] $D_{1,2,3}$ = three different nozzles diameters, mm (in.); each diameter must be within (0.025 mm) 0.001 in.

[b] ΔD = maximum difference between any two diameters, mm (in.), $\Delta D \leq$ (0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3.

[d] CSA=cross sectional area of nozzle,actual,in ft^2

NOZZLE CALIBRATION DATA FORM

Date 1/6/87 Calibrated by T. Mattei

Nozzle identification number (CSA)[d]	Nozzle Diameter[a] D_1, mm (in.)	D_2, mm (in.)	D_3, mm (in.)	ΔD,[b] mm (in.)	D_{avg}[c]
# 28	.310	.307	.310	.003	.309
# 29	.310	.308	[illegible]	.002	.309
# 30	.302	.301	.300	.003	.301
# 31	.307	.307	.304	.003	.306
# 1	.148	.148	.149	.001	.148
# 17	.248	.245	.247	.003	.247
# 32	.263	.262	.261	.002	.262
→ # 19	.373	.376	.374	.003	.374
# 2	.193	.192	.192	.001	.192

*used all runs w inlet

where:

[a] $D_{1,2,3}$ = three different nozzles diameters, mm (in.); each diameter must be within (0.025 mm) 0.001 in.

[b] ΔD = maximum difference between any two diameters, mm (in.), $\Delta D \leq$ (0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3.

[d] CSA=cross sectional area of nozzle,actual,in ft^2

INLET

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 7/1/86 Thermocouple number #3 (5-1)

Ambient temperature 76 F ~~°C~~ Barometric pressure 30.0 in. Hg

Calibrator Peter L. Rosen Reference: mercury-in-glass ASTM

other

Reference point number	Source[a] (specify)	Reference thermometer temperature, °C	Thermocouple potentiometer temperature, °C	Temperature difference,[b] %
	Hot Oil	83	85	0.56
	Hot Oil	140	143	0.73
	Hot Oil	161	164	0.69

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °C} + 273) - (\text{test thermom temp, °C} + 273)}{\text{ref temp, °C} + 273}\right] 100 \leq 1.5\%.$

OUTLET

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 10/11/86 Thermocouple number #32 (3" E.L.)

Ambient temperature 63F Barometric pressure 30.25 in. Hg

Calibrator [illegible] Reference: mercury-in-glass ASTM

other NONE

Reference point number	Source[a] (specify)	Reference thermometer temperature, °F	Thermocouple potentiometer temperature, °F	Temperature difference,[b] %
	BOILING WATER	213	214	0.1%
	"	213	214	0.1
	"	213	214	0.1
	HOT OIL	386	386	0.0
	"	387	386	0.1
	"	387	387	0.0
	ICE WATER	35	33	0.4
	"	35	33	0.4
	"	35	33	0.4

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °C} + 273) - (\text{test thermom temp, °C} + 273)}{\text{ref temp, °C} + 273}\right] 100 \leq 1.5\%$.

ORIGINAL DATA AND CALCULATION SHEETS

RECON SYSTEMS INC.
ROUTE 202N, P.O. BOX 460, THREE BRIDGES, N.J. 08887
201-782-5900

DAILY FIELD SAMPLING RECORD

PARTICULATE STACK SAMPLING DATA BOOK

CLIENT Ernic Lord
RECON Job # 0554
FIELD Supervisor P. Marshall

Date 9-9-87
Jobsite
Company Macwell House
Street 1127 Hudson St.
City Hoboken State NJ Zip 07030

Processes, Stacks, Sites, etc. Tested:

1. INLET Condition* STEADY
2. Condition*
3. Condition*
4. Condition*

* (e.g. stack opacity, raining?, water odor, color, flowrate; process steady or upset; etc.)

Milestone Times (Military)

Arrival 8:00 Lost Time —
Lunch 1230 to 1315
Departure 1830

Reasons For Lost Time

Client or Jobsite Representative Aware of Lost Time

Personnel Onsite
RECON: PFM, TFM, CAR, JDK, ____, ____,
____, ____, ____, ____, ____, ____,
____, ____, ____, ____, ____, ____,
Client: ____, ____, ____, ____, ____, ____.
Jobsite Reps: ____, ____, ____, ____, ____, ____.
Agencies Observing (1) NJDEP (2) NJDEP
Agency Personnel (1) TOM BROWN, ____, ____.
(2) BETH ROSSI, ____, ____.

NOZZLE No. 19
THERMO. NO. 3
PITOBE NO. 217
CONSOLE NO. 3

Particulate Sampling Field Data

Plant Maxwell House
Stack ROTOCLONE INLET
Nozzle Size 3/16 "
Time @ Each Point (θ) 3 Min
Ambient Temperature 80 °F

Date 9/9/87
Sample No. 1
Box No. 3
Probe Heater @ %
Box Heate @ °F
Hose Heater @
Ambient Pressure (P_{bar}) 29.90 "Hg

Stack Pressure (P) ~ 2.("H_2O (gage) ÷ 13.6 = "Hg (gage)

Stack Pressure (P_s) = P_{bar} + P = . "Hg

Dry Bulb ___ °F

Wet Bulb ___ °F ___ %H_2O

Operating Condition or Remarks

Port/ Point	Military Clock Time	Meter Reading	Pitot ΔP	Orifice ΔH	Meter Temp (°F) IN	Meter Temp (°F) OUT	Line Vac "Hg	Probe Outlet (°F)	Box Outlet Temp (°F)	Box Temp °F)	Stack Temp °F/°C
A-1	11:16	156.078	1.1	1.45	98	90	6	178	148	250	81
2	:19		2.1	2.70	106	92	9	198	228	240	80
3	:22	162.10	3.8	4.7	120	92	10	211	244	235	80
4	:25	164.5	3.5	4.4	125	95	10	206	239	230	80
5	:28	168.1	2.6	3.2	130	98	10	188	227	212	80
6	:31	169.8	1.6	2.1	130	99	8	180	217	210	81
7	:34	173.1	.67	.99	125	100	5	173	207	200	81
8	:37	175.3	.26	.36	122	98	3	169	205	215	81
End	11:40	175.934									
B-1	11:42	175.934	.52	.7	118	101	4	161	186	230	80
2	:45	177.40	1.7	2.3	120	102	7	179	223	230	81
3	:48	179.1	2.2	2.8	125	103	8	185	231	230	80
4	:51	182.2	2.2	2.6	128	104		184	226	220	81
5	:54	184.8	1.7	2.2	130	104		180	217	205	81
6	:57	185	.84	1.2	128	105		178	207	200	81
7	12:00	189.0	.26	.36	122	105	3	173	201	200	81
8	:03	191.235	.11	.22	120	106	2	168	197	205	82
End	12:06	191.235									
C-1	:08	191.235	.36	.38	115	106	3	159	180	230	83
2	11:[illegible]		.37	.41	116	106		180	215	230	82
3	:14	193.52	.44	.56	116	106	3	228	224	225	82
4	:17	198.8	.48	.61	118	106	3	189	225	215	82
5	:20	196.08	.26	.37	118	106	3	184	221	205	82
6	:23	197.1	.13	.16	115	105	2	187	210	200	81
7	:26	197.8	.64	.65	114	105	1	197	198	200	82
*	θ=:29	V=	-----	ΔH=	T_m=						T_s=

* Sum, Average, or Difference

(Convert to °F)

V_m = V (DGMCF) = (1.0)(41.978) = 41.978 ft³

Other Data

Time	Sample or Measurement	Value
	FYRITE O_2	21
	CO_2	0
	ORSAT O_2	21
	CO_2	0

Average CO_2 = ___ % x MW/100 =
x 0.44 = ___

O_2 = x 0.32 = ___

N_2 = ___ x 0.28 = ___

100.0 = dry MW

Pre-Leak Check 0.00 at 15"
Post Leak Check .61 CFM

Particulate Sampling Field Data

Plant Maxwell House
Stack
Nozzle Size "
Time @ Each Point (θ) Min
Ambient Temperature °F

Date 9/9/87
Sample No. 1
Probe Heater @ %
Hose Heater @
Ambient Pressure (P_{bar}) "Hg

PITOBE NO.
CONSOLE NO.
Box No.
Box Heater @ °F

Stack Pressure (P) "H_2O (gage) ÷ 13.6 = "Hg (gage)

Stack Pressure (P_s) = P_{bar} + P = "Hg

Dry Bulb °F
Wet Bulb °F %H_2O

Operating Condition or Remarks

Port/ Point	Military Clock Time	Meter Reading	Pitot ΔP	Orifice ΔH	Meter Temp (°F) IN	Meter Temp (°F) OUT	Line Vac "Hg	Probe Outlet (°F)	Box Outlet Temp (°F)	Box Temp °F)	Stack Temp °F/°C
1-8	12:26										
1-8	12:29	198.3	.04	.3	112	102	1	146	190	210	82
ch6	12:32	198.696									
*	θ=	V= 41.978	-----	ΔH=	T_m=						T_s=

(Convert to °F)

* Sum, Average, or Difference

V_m = V (DGMCF) = ( )( ) = ft³

Other Data

Time	Sample or Measurement	Value
	~~Orsat~~ O_2	21.0
	~~Orsat~~ CO_2	0.0
	Fyrite	

Average CO_2 = % x MW/100 = x 0.44 =

O_2 = x 0.32 =

N_2 = x 0.28 =

100.0 = dry MW

Pre-Leak Check
Post Leak Check

CLIENT: GENERAL FOODS
SAMPLING DATE: 9/9/87
SAMPLING TIME: 1116-1229
UNIT SAMPLED: ROTO. INLET

Date: 09/21/87
Time: 9:44 AM
Run # 1

AVERAGE VELOCITY PRESSURE

Delta P (IN H2O)	Delta P Square Root
1.10	1.05
2.10	1.45
3.80	1.95
3.50	1.87
2.60	1.61
1.60	1.26
0.67	0.82
0.26	0.51
0.52	0.72
1.70	1.30
2.20	1.48
2.20	1.48
1.70	1.30
0.84	0.92
0.26	0.51
0.11	0.33
0.30	0.55
0.32	0.57
0.44	0.66
0.48	0.69
0.26	0.51
0.13	0.36
0.04	0.20
0.04	0.20

THE AVERAGE SQUARE ROOT OF DELTA P = .9298872

CLIENT: GENERAL FOODS
SAMPLING DATE: 9/9/87
SAMPLING TIME: 1116-1229
UNIT SAMPLED: ROTO.INLET

Date: 09/21/87
Time: 9:44 AM
Run # 1

Delta H (IN H2O)	Meter Temp(F) IN	Meter Temp(F) OUT	Stack Temp(F)
1.45	98.00	90.00	81.00
2.70	106.00	92.00	80.00
4.70	120.00	92.00	80.00
4.40	125.00	95.00	80.00
3.20	130.00	98.00	80.00
2.10	130.00	99.00	81.00
0.99	125.00	100.00	80.00
0.36	122.00	98.00	81.00
0.70	118.00	101.00	80.00
2.20	120.00	102.00	81.00
2.60	125.00	103.00	81.00
2.60	128.00	104.00	81.00
2.20	130.00	104.00	81.00
1.20	128.00	105.00	81.00
0.36	122.00	105.00	81.00
1.22	120.00	106.00	82.00
0.38	115.00	106.00	83.00
0.41	116.00	106.00	82.00
0.56	116.00	106.00	82.00
0.61	118.00	106.00	82.00
0.37	118.00	106.00	82.00
0.17	115.00	105.00	81.00
0.05	114.00	105.00	82.00
0.05	112.00	102.00	82.00

AVERAGES

DELTA H = 1.4825 IN H2O
METER TEMP. = 110.5625 F
STACK TEMP. = 81.125 F

Water and Dry Particulate Collections

PLANT MAXWELL HOUSE
TEST FOR Particulate
SAMPLE NO. 1 BOX NO.

STACK ROTO. INLET
DATE 9/9/87
OPERATING CONDITION

		Grams		Grams
Impinger 1	Final Weight	699.4		
	Initial Weight	706.0		
	Increase		Impinger 1	-6.6
Impinger 2	Final Weight	706.7		
	Initial Weight	696.9		
	Increase		Impinger 2	9.8
Impinger 3	Final Weight	485.6		
	Initial Weight	482.4		
	Increase		Impinger 3	3.2
Silica Gel	Final Weight	717.3		
	Initial Weight	703.4		
	Increase		Silica Gel	13.9

Record Water Collected in cyclone, flash, if any:

Final Weight _____ gms

Initial Weight _____ gms

Increase _____ gms

20.3 grams

Total mass of water caught

Filter Diameter 4 inches

Filter Type Glass Fiber

Filter	Final Weight	.6280	
	Initial Weight	.6270	
	Increase	.016	0.0160 gram

Total mass of particulate caught on filter

Is ice present in the impinger bath at the end of this sample?
Yes ✓ No _____

RECON SYSTEMS, INC.
Three Bridges NJ

Lab Data - Evaporations

PLANT Maxwell House STACK Roto Inlet SAMPLE NO. 1 FOR _____

SAMPLING DATE 9/9/81 OPERATING CONDITION _____

Acetone Washings

TOTAL SAMPLE Gross 535.2 GMS
Tare- 338.2 GMS
(A) Net 197.0 GMS

AMOUNT EVAPORATED 197.0 GMS (B)

Evap. Beaker NO. ____
Gross 103.0997 GMS
Tare- 103.0847 GMS
Net 0.0150 (C) GMS

Acetone Blank = 0.0000 GMS / 100 GMS
(D)

Corrected Net (E) = (C)-(B)(D)

= 0.0150 - 197 (0.0000 / 100)

= 0.0150 GMS

Scaled Up Net = (E) $\frac{A}{B}$

= 0.0150 (197.0 / 197.0)

= 0.0150 GMS

Wet Catch

TOTAL SAMPLE Gross _____ GMS
Tare- _____ GMS
(F) Net _____ GMS

AMOUNT EXTRACTED (G) _____ GMS (mls)

AMOUNT of E/C _____ mls (H)

Water Phase
Evap. Beaker No. ____
Gross _____ GMS
Tare- _____ GMS
Net _____ (J) GMS

Water Blank (L) = ____ GMS / 100 GMS

Corrected Net (N) = J-(G)(L)

= ____ - ____ (____ / 100)

= _____ GMS

Scaled Up Net = N $\left(\frac{F}{G}\right)$

= ____ (____)

= _____ GMS

E/C Phase
Evap. Beaker No. ____
Gross _____ GMS
Tare- _____ GMS
Net _____ (K) GMS

E/C Blank (M) = ____ GMS / 100 mls

Corrected Net (P) = K-H(M)

= ____ - ____ (____ / 100)

= _____ GMS

Scaled Up Net = P $\left(\frac{F}{G}\right)$

= ____ (____)

= _____ GMS

Run #
INLET

Particulates

Nozzle, Probe, and Acetone Washing .015 grms

Filter .0160 grms

Enter "0" if no Organic or Aqueous Phase

Aqueous Phase 0 grms

Organic Phase 0 grms

Totals

GRAINS/DSCF = .0122761
POUNDS/HOUR = .3457558

HIT RETURN TO CONTINUE

NOZZLE NO. 19
THERMO. NO. 3
PITOBE NO. 217
CONSOLE NO. 3
Box No. 3

Particulate Sampling Field Data

Plant Maxwell House
Stack ROTOCLONE INLET
Nozzle Size 3/16 "
Time @ Each Point (θ) 3 Min
Ambient Temperature °F

Date 9/9/87
Sample No. 2
Probe Heater @ % Box Heate
Hose Heater @ @ °F
Ambient Pressure (P_{bar}) 29.90 "Hg

Stack Pressure (P) -2.0 "H_2O (gage) ÷ 13.6 = "Hg (gage)

Stack Pressure (P_s) = P_{bar} + P = "Hg

Dry Bulb ___ °F

Wet Bulb ___ °F ___ %H_2O

Operating Condition or Remarks

Port/ Point	Military Clock Time	Meter Reading	Pitot ΔP	Orifice ΔH	Meter Temp (°F) IN	Meter Temp (°F) OUT	Line Vac "Hg	Probe Outlet (°F)	Box Outlet Temp (°F)	Box Temp °F)	Stack Temp °F/°C
A-1	13:46	198.908	.53	.68	91	93	2	90	114	189	83
-2	:49	200.3	2.0	2.7	95	94		88	145	210	83
3	:52	202.8	2.5	3.2	107	93	7	124	164	236	81
4	:55	205.5	2.5	3.2	115	95	7	145	180	236	82
5	:58	208.4	2.0	2.7	120	95	7	158	191	222	82
6	14:01	211.2	1.0	1.30	124	96	4	163	190	205	82
7	:04	212.8	.45	.58	119	98	3	167	185	195	82
8	:07	214.3	.3	.39	118	98	2	167	177	195	83
end	14:10	215.233									
B-1	14:12	215.233	.65	.83	113	99	3	164	168	225	87
2	:15	216.8	1.9	2.4	118	100	6	180	203	225	86
3	:18	219.4	2.4	3.0	122	101	7	185	212	219	84
4	:21	222.0	2.7	3.45	126	102	8	155	206	205	83
5	:24	225.1	1.9	2.4	129	103		120	186	195	83
6	:27	227.0	1.1	1.4	128	104	4	135	175	190	83
7	:30	229.5	.45	.60	124	105	3	152	177	205	83
8	:33	230.4	.33	.42	122	105	3	160	180	230	83
end	14:36	231.882									
C-1	14:37	231.882	.25	.32	117	105	2	163	179	230	86
2	:40			.68	118	106	2	182	198	215	
3	:43	2:42 No Power									
4	:46	2:44 Back on									
5	46:46		.73	.93	118	106	4	178	205	190	84
6	49:[illegible]	236.3	.69	.88	120	106	4	182	205	190	83
7	52:[illegible]	237.4	.65	.83	120	109	4	183	206	213	83
*	θ=	V=	-----	ΔH=	T_m=						T_s=

* Sum, Average, or Difference

(Convert to) °F

V_m = V (DGMCF) = (1.0)(42.404) = 42.404 ft³

Other Data

Time	Sample or Measurement	Value
	Fyrite O_2	21.0
	CO_2	0
	Orsat O_2	21.0
	CO_2	0

Average CO_2 = % x MW/100 = x 0.44 = ___

O_2 = x 0.32 = ___

N_2 = ___ x 0.28 = ___

100.0 = dry MW

Pre-Leak Check 0.00 at 15"

Post Leak Check .01

RECON SYSTEMS, INC.
Three Bridges NJ

Particulate Sampling Field Data

Plant MAXWELL HOUSE
Stack
Nozzle Size "
Time @ Each Point (Θ) Min
Ambient Temperature °F

Date 9/9/87
Sample No. 1
Probe Heater @ %
Hose Heater @
Ambient Pressure (P_{bar}) "Hg

PITOBE NO.
CONSOLE NO.
Box No.
Box Heater @ °F

Stack Pressure (P) "H_2O (gage) ÷ 13.6 = "Hg (gage)

Stack Pressure (P_s) = P_{bar} + P = "Hg

Dry Bulb °F

Wet Bulb °F %H_2O

Operating Condition or Remarks

Port/ Point	Military Clock Time	Meter Reading	Pitot ΔP	Orifice ΔH	Meter Temp (°F) IN	Meter Temp (°F) OUT	Line Vac "Hg	Probe Outlet (°F)	Box Outlet Temp (°F)	Box Temp °F)	Stack Temp °F/°C
8	55		.37	.47	121	106		183	208	230	82
8	58		.05	.06	118	106		165	211	230	82
8	13:01	241.0	.05	.06	116	106		158	206	230	82
end	13:03	~~241.0~~									
		241.312									
*	Θ=	V=42.404	-----	ΔH=	T_m=						T_s=

* Sum, Average, or Difference

(Convert to) °F

V_m = V (DGMCF) = ( )( ) = _____ ft^3

Other Data

Time	Sample or Measurement	Value

Average CO_2 = % x MW/100 = x 0.44 = _____

O_2 = x 0.32 = _____

N_2 = _____ x 0.28 = _____

100.0 = dry MW

Pre-Leak Check _____

Post Leak Check _____

RECON SYSTEMS, INC.
Three Bridges N.J.

CLIENT: GENERAL FOODS
SAMPLING DATE: 9/9/87
SAMPLING TIME: 1346-1303
UNIT SAMPLED: ROTO.INLET

Date: 09/21/87
Time: 9:44 AM
Run # 2

AVERAGE VELOCITY PRESSURE

Delta P (IN H2O)	Delta P Square Root
0.53	0.73
2.00	1.41
2.50	1.58
2.50	1.58
2.00	1.41
1.00	1.00
0.45	0.67
0.30	0.55
0.65	0.81
1.90	1.38
2.40	1.55
2.70	1.64
1.90	1.38
1.10	1.05
0.45	0.67
0.33	0.57
0.25	0.50
0.53	0.73
0.83	0.91
0.69	0.83
0.65	0.81
0.37	0.61
0.05	0.22
0.05	0.22

THE AVERAGE SQUARE ROOT OF DELTA P = .9507572

CLIENT: GENERAL FOODS
SAMPLING DATE: 9/9/87
SAMPLING TIME: 1346-1303
UNIT SAMPLED: ROTO.INLET

Date: 09/21/87
Time: 9:44 AM
Run # 2

Delta H (IN H2O)	Meter Temp(F) IN	Meter Temp(F) OUT	Stack Temp(F)
0.68	91.00	93.00	83.00
2.70	95.00	94.00	83.00
3.20	107.00	93.00	81.00
3.20	115.00	95.00	81.00
2.70	120.00	95.00	82.00
1.30	124.00	96.00	82.00
0.58	119.00	98.00	82.00
0.39	118.00	98.00	83.00
0.83	113.00	99.00	85.00
2.40	118.00	100.00	86.00
3.10	122.00	101.00	84.00
3.45	126.00	102.00	83.00
2.40	129.00	103.00	83.00
1.40	128.00	104.00	83.00
0.60	124.00	105.00	83.00
0.42	122.00	105.00	83.00
0.32	117.00	105.00	86.00
0.68	118.00	106.00	86.00
0.93	118.00	106.00	84.00
0.88	120.00	106.00	84.00
0.83	120.00	109.00	83.00
0.47	121.00	106.00	83.00
0.06	118.00	106.00	82.00
0.06	116.00	106.00	82.00

AVERAGES

DELTA H = 1.399167 IN H2O
METER TEMP. = 109.375 F
STACK TEMP. = 83.20835 F

Water and Dry Particulate Collections

PLANT Maxwell House
TEST FOR Particulate
SAMPLE NO. 2 BOX NO. 3

STACK ROTO. IN.
DATE 9-9-87
OPERATING CONDITION STEADY

		Grams		Grams
Impinger 1	Final Weight	681.0		
	Initial Weight	677.8		
	Increase		Impinger 1	3.2
Impinger 2	Final Weight	685.5		
	Initial Weight	690.5		
	Increase		Impinger 2	-5.0
Impinger 3	Final Weight	506.5		
	Initial Weight	502.8		
	Increase		Impinger 3	3.7
Silica Gel	Final Weight	802.2		
	Initial Weight	783.2		
	Increase		Silica Gel	19

Record Water Collected in cyclone flash, if any:

Final Weight _____ gms

Initial Weight _____ gms

Increase _____ gms

20.9 grams

Total mass of water caught

Filter Diameter 4 inches

Filter Type Glass Fiber

Filter	Final Weight	.6415	
	Initial Weight	.6328	
	Increase		0.0087 gram

Total mass of particulate caught on filter

Is ice present in the impinger bath at the end of this sample?
Yes ✓ No _____

RECON SYSTEMS, INC.
Three Bridges NJ

Lab Data - Evaporations

PLANT Maxwell House STACK Roto. Inlet SAMPLE NO. 2 FOR Particulate

SAMPLING DATE _____ OPERATING CONDITION Steady

Acetone Washings

TOTAL SAMPLE Gross 519.6 GMS

Tare- 339.2 GMS

(A) Net 180.4 GMS

AMOUNT EVAPORATED 180.4 GMS (B)

Evap. Beaker NO. _____

Gross 96.7833 GMS

Tare- 96.7823 GMS

Net 0.001 (C) GMS

Acetone Blank (D) = 0 / 100 GMS GMS

Corrected Net (E) = (C)-(B)(D)

= 0.001 - 180.4 (0/100)

= 0.001 GMS

Scaled Up Net = (E) A/B

= 0.001 (180.4/180.4)

= 0.001 GMS

Wet Catch

TOTAL SAMPLE Gross _____ GMS

Tare- _____ GMS

(F) Net _____ GMS

AMOUNT EXTRACTED (G) _____ GMS (mls)

AMOUNT of E/C _____ mls (H

Water Phase

Evap. Beaker No. _____

Gross _____ GMS

Tare- _____ GMS

Net _____ (J) GMS

Water Blank (L) = _____ GMS / 100 GMS

Corrected Net (N) = J-(G)(L)

= _____ - _____ (/100)

= _____ GMS

Scaled Up Net = N (F/G)

= _____ (/)

= _____ GMS

E/C Phase

Evap. Beaker No. _____

Gross _____ GMS

Tare- _____ GMS

Net _____ (K) GM

E/C Blank (M) = _____ GMS / 100 mls

Corrected Net (P) = K-H(M)

= _____ - _____ (/100)

= _____ GMS

Scaled Up Net = P (F/G)

= _____ (/)

= _____ GMS

Run #2
Inlet

Particulates

Nozzle, Probe, and Acetone Washing .0010 grms

Filter .0087 grms
.0010
.0097

Enter "0" if no Organic or Aqueous Phase

Aqueous Phase 0 grms

Organic Phase 0 grms

Totals

GRAINS/DSCF = .0037955
POUNDS/HOUR = .1090658

HIT RETURN TO CONTINUE

NOZZLE NO. 19
THERMO NO. 3
PITOBE NO. 217
CONSOLE NO. 3

Particulate Sampling Field Data

Plant Maxwell House
Stack ROTOCLONE INLET
Nozzle Size 3/16"
Time @ Each Point (Θ) 3 Min
Ambient Temperature 80 °F

Date 9/8/87
Sample No. 3 Box No. 3
Probe Heater @ % Box Heate
Hose Heater @ @ °F
Ambient Pressure (P_{bar}) 29.90 "Hg

Stack Pressure (P) -2.0 "H_2O (gage) ÷ 13.6 = "Hg (gage)

Stack Pressure (P_s) = P_{bar} + P = "Hg

Dry Bulb ___ °F
Wet Bulb ___ °F ___ %H_2O

Operating Condition or Remarks

Port/ Point	Military Clock Time	Meter Reading	Pitot ΔP	Orifice ΔH	Meter Temp (°F) IN	Meter Temp (°F) OUT	Line Vac "Hg	Probe Outlet (°F)	Box Outlet Temp (°F)	Box Temp °F)	Stack Temp °F/°C
C-1	15:51	241.52	.37	.47	98	99	3	93	138	213	84
2	:54	242.7	.24	.31	99	99	3	90	165	197	83
3	:57		.45	.58	103	100		90	167	181	84
4	16:00	245.0	.55	.70	107	100		89	167	190	82
5	:03	246.45	.45	.58	110	100	4	102	165	201	82
6	:06	247.7	.15	.19	112	100		126	161	225	83
7	:09	248.5	.08	.10	110	106		141	163	230	83
8	:12	249.05	.03	.04	110	102		138	160	225	83
end	16:15	249.438									
R-1	16:16	249.438	7	.89	111	102	5	172	163	207	86
2	:19		1.0	1.28	117	103		189	183	195	84
3	:22	253.1	2.3	2.9	123	103	13	188	196	194	83
4	:25	255.6	2.5	3.2	128	104	15	198	192	215	83
5	:28	258.5	2.3	2.95	132	106		186	198	230	83
6	:31	261.35	1.5	1.92	136	107		186	202	230	83
7	:34	263.5	.63	.81	135	109	5	180	200	230	83
8	:37	265.1	.60	.77	130	109		170	199	217	84
end	16:40	266.546									
A-1	16:42	266.546	1.3	1.65	126	109		177	183	195	86
2	:45		3.0	2.55	130	110		188	196	190	83
3	:48		3.5	*4.48	138	111		160	192	190	83
4	:51	274.6	3.5	*4.48	138	112		165	187	200	83
5	:54	277.8	2.8	3.6	140	112		168	184	225	83
6	:57	280.9	2.4	3.07	143	113	13	172	195	230	84
7	17:00	283.6	.75	.96	141	103	5	177	143	223	84
*	Θ=	V=	-----	ΔH=	T_m=						T_s=

* Sum, Average, or Difference

* Pump could only manage 4.2 (Convert to °F)

V_m = V (DGMCF) = (1.0)(45.277) = ___ ft^3

Other Data

Time	Sample or Measurement	Value
	Fyrite O_2	21
	CO_2	0
	Orsat O_2	21
	CO_2	0

Average CO_2 = ___ % x MW/100 = ___ x 0.44 = ___

O_2 = ___ x 0.32 = ___

N_2 = ___ x 0.28 = ___

100.0 = dry MW

Pre-Leak Check 0.00 at 15"
Post Leak Check 0.01

Particulate Sampling Field Data

Plant MAXWELL HOUSE
Stack
Nozzle Size "
Time @ Each Point (Θ) Min
Ambient Temperature °F

Date 9/86
Sample No. 3
Probe Heater @ %
Hose Heater @
Ambient Pressure (P_{bar}) "Hg

PITOBE NO.
CONSOLE NO.
Box No.
Box Heater @ °F

Stack Pressure (P) "H_2O (gage) ÷ 13.6 = "Hg (gage)

Stack Pressure (P_s) = P_{bar} + P = "Hg

Dry Bulb °F
Wet Bulb °F %H_2O

Operating Condition or Remarks

Port/ Point	Military Clock Time	Meter Reading	Pitot ΔP	Orifice ΔH	Meter Temp (°F) IN	Meter Temp (°F) OUT	Line Vac "Hg	Probe Outlet (°F)	Box Outlet Temp (°F)	Box Temp °F)	Stack Temp °F/°C
8	17:03	285.25	.65	.83	136	114	5	181	190	210	83
end	17:06	286.797									
*	Θ=	V= 45.27	-----	ΔH=	T_m=						T_s=

* Sum, Average, or Difference

(Convert to °F)

V_m = V (DGMCF) = ( )( ) = ft³

Other Data

Time	Sample or Measurement	Value

Average CO_2 = % x MW/100 = x 0.44 =
O_2 = x 0.32 =
N_2 = x 0.28 =
100.0 = dry MW

Pre-Leak Check
Post Leak Check

CLIENT: GENERAL FOODS
SAMPLING DATE: 9/9/87
SAMPLING TIME: 1551-1700
UNIT SAMPLED: ROTO.INLET

Date: 09/21/87
Time: 9:44 AM
Run # 3

AVERAGE VELOCITY PRESSURE

Delta P (IN H2O)	Delta P Square Root
0.37	0.61
0.24	0.49
0.45	0.67
0.55	0.74
0.45	0.67
0.15	0.39
0.08	0.28
0.03	0.17
0.70	0.84
1.00	1.00
2.30	1.52
2.50	1.58
2.30	1.52
1.50	1.22
0.63	0.79
0.60	0.77
1.30	1.14
2.00	1.41
3.50	1.87
3.50	1.87
2.80	1.67
2.40	1.55
0.75	0.87
0.65	0.81

THE AVERAGE SQUARE ROOT OF DELTA P = 1.01915

CLIENT: GENERAL FOODS
SAMPLING DATE: 9/9/87
SAMPLING TIME: 1551-1700
UNIT SAMPLED: ROTO. INLET

Date: 09/21/87
Time: 9:44 AM
Run # 3

Delta H (IN H2O)	Meter Temp(F) IN	Meter Temp(F) OUT	Stack Temp(F)
0.47	98.00	99.00	86.00
0.31	99.00	99.00	83.00
0.58	103.00	100.00	81.00
0.70	107.00	100.00	84.00
0.58	110.00	100.00	82.00
0.19	112.00	100.00	83.00
0.10	110.00	100.00	83.00
0.04	110.00	102.00	83.00
0.89	111.00	102.00	83.00
1.28	117.00	103.00	83.00
2.90	123.00	103.00	83.00
3.20	128.00	104.00	83.00
2.95	132.00	106.00	83.00
1.92	136.00	107.00	84.00
0.81	135.00	109.00	83.00
0.77	130.00	110.00	83.00
1.65	126.00	109.00	83.00
2.55	130.00	110.00	86.00
4.48	138.00	111.00	83.00
4.48	138.00	112.00	83.00
3.60	140.00	112.00	83.00
3.07	143.00	113.00	84.00
0.96	141.00	103.00	84.00
0.83	136.00	114.00	83.00

AVERAGES

DELTA H = 1.637917 IN H2O
METER TEMP. = 114.1875 F
STACK TEMP. = 83.29166 F

Water and Dry Particulate Collections

PLANT MAXWELL HOUSE
TEST FOR Particulate
SAMPLE NO. 3 BOX NO. 3

STACK ROTO. IN.
DATE 9/9/81
OPERATING CONDITION

		Grams		Grams
Impinger 1	Final Weight	671.2		
	Initial Weight	669.4		
	Increase		Impinger 1	1.8
Impinger 2	Final Weight	693.5		
	Initial Weight	684.6		
	Increase		Impinger 2	8.9
Impinger 3	Final Weight	502.3		
	Initial Weight	502.0		
	Increase		Impinger 3	0.3
Silica Gel	Final Weight	768.7		
	Initial Weight	750.2		
	Increase		Silica Gel	18.5

Record Water Collected in cyclone, flash, if any:

Final Weight _____ gms

Initial Weight _____ gms

Increase _____ gms

29.5 grams

Total mass of water caught

Filter Diameter 4 inches

Filter Type Glass Fiber

Filter	Final Weight	.6353	
	Initial Weight	.6167	
	Increase		0.0186 gram

Total mass of particulate caught on filter

Is ice present in the impinger bath at the end of this sample?
Yes ✓ No _____

RECON SYSTEMS, INC.
Three Bridges NJ

Lab Data - Evaporations

PLANT MAXWELL HOUSE STACK ROTO-INLET SAMPLE NO. 3 FOR Particulate

SAMPLING DATE 9/9/87 OPERATING CONDITION

Acetone Washings

TOTAL SAMPLE Gross 530.6 GMS

Tare- 342.5 GMS

(A) Net 188.1 GMS

AMOUNT EVAPORATED 188.1 GMS (B)

Evap. Beaker NO.

Gross 99.6203 GMS

Tare- 99.6179 GMS

Net 0.0024 (C) GMS

Acetone Blank = 0 / 100 GMS (D)

Corrected Net (E) = (C)-(B)(D)

= 0.0024 - 188.1 (0/100)

= 0.0024 GMS

Scaled Up Net = (E) A/B

= 0.0024 (188.1/188.1)

= 0.0024 GMS

Wet Catch

TOTAL SAMPLE Gross ____ GMS

Tare- ____ GMS

(F) Net ____ GMS

AMOUNT EXTRACTED (G) ____ GMS (mls)

AMOUNT of E/C ____ mls (H)

Water Phase

Evap. Beaker No. ____

Gross ____ GMS

Tare- ____ GMS

Net ____ (J) GMS

Water Blank (L) = ____ GMS / 100 GMS

Corrected Net (N) = J-(G)(L)

= ____ - ____ (____/100)

= ____ GMS

Scaled Up Net = N (F/G)

= ____ (____)

= ____ GMS

E/C Phase

Evap. Beaker No. ____

Gross ____ GMS

Tare- ____ GMS

Net ____ (K) GMS

E/C Blank (M) = ____ GMS / 100 mls

Corrected Net (P) = K-H(M)

= ____ - ____ (____/100)

= ____ GMS

Scaled Up Net = P (F/G)

= ____ (____)

= ____ GMS

Run #3
Inlet

Particulates

Nozzle, Probe, and Acetone Washing .0024 grms

Filter .0186 grms
.0024
.0210

Enter "0" if no Organic or Aqueous Phase

Aqueous Phase 0 grms

Organic Phase 0 grms

Totals

GRAINS/DSCF = 7.756192E-03
POUNDS/HOUR = .2373201

HIT RETURN TO CONTINUE

CLIENT: GENERAL FOODS

Date: 09/21/87
Time: 9:44 AM

ISOKINETIC CALCULATIONS

SAMPLE NO.	1	2	3
DATE	9/9/87	9/9/87	9/9/87
TIME	1116-1229	1346-1303	1551-1700
UNIT SAMPLED	ROTO. INLET	ROTO. INLET	ROTO. INLET
METER VOLUME (VM-STD), SCU-FT	38.97	39.44	41.78
WATER COLLECTED (VW-STD), SCU-FT	0.96	0.99	1.40
MOISTURE (VOL %)	2.41	2.45	3.23
ACTUAL MOLECULAR WEIGHT (MW), LBS/LB-MOLE	28.58	28.58	28.49
ACTUAL VELOCITY IN STACK (VS), FT/SEC	53.86	55.17	59.24
ACTUAL FLOW RATE IN STACK (ACFM)	3457.98	3542.23	3803.01
VELOCITY @ STP (VS-STD), FT/SEC	52.44	53.53	57.46
STACK FLOW RATE @ STP (SCFM)	3366.94	3436.58	3689.01
DRY FLOW RATE (DSCFM)	3285.92	3352.49	3569.72
NOZZLE VELOCITY @ STP (VN-STD), FT/SEC	48.20	48.81	52.13
ISOKINETIC %	91.92	91.18	90.72

CLIENT: GENERAL FOODS

Date: 09/21/87
Time: 9:44 AM

THE FOLLOWING WERE PROGRAMMER INPUTS FOR ISOKINETICS

SAMPLE NO.	1	2	3
DATE	9/9/87	9/9/87	9/9/87
TIME	1116-1229	1346-1303	1551-1700
UNIT SAMPLED	ROTO. INLET	ROTO. INLET	ROTO. INLET
ACTUAL NOZZLE DIAMETER (ND), IN	0.19	0.19	0.19
PITOT FACTOR (CP)	0.85	0.85	0.85
TIME @ EACH POINT (MIN)	3.00	3.00	3.00
AMBIENT PRESSURE (PBAR), IN-HG	29.90	29.90	29.90
STACK PRESSURE (PS), IN-HG	-2.10	-2.00	-2.00
METER VOLUME (VM), CU-FT	41.97	42.40	45.27
WATER COLLECTED IMPINGERS, GRMS	20.30	20.90	29.50
CARBON DIOXIDE (CO_2), %	0.00	0.00	0.00
OXYGEN (O_2), %	21.00	21.00	21.00
STACK DIAMETER (DIA), IN	14.00	14.00	14.00
STACK CROSS SECTIONAL AREA (CSA), FT^2	1.07	1.07	1.07

RECON SYSTEMS INC.

ROUTE 202N, P.O. BOX 460, THREE BRIDGES, N.J. 08887
201-782-5900

-62-

DAILY FIELD SAMPLING RECORD

PARTICULATE STACK SAMPLING DATA BOOK

CLIENT Ernie Lasol
RECON Job # 0554
FIELD Supervisor P. MARSHALL

Date 9/9/87
Jobsite
Company GENERAL FOODS
Street 1127 Hudson St.
City Hoboken State NJ Zip 07030

Processes, Stacks, Sites, etc. Tested:

1. OUTLET Condition* STEADY
2. Condition*
3. Condition*
4. Condition*

* (e.g. stack opacity, raining?, water odor, color, flowrate; process steady or upset; etc.)

Milestone Times (Military)

Arrival 800 Lost Time —
Lunch 12³⁰ to 13¹⁵
Departure 1830

Reasons For Lost Time

Client or Jobsite Representative Aware of Lost Time

Personnel Onsite
RECON: PFM, TFM, CDR, JDK, , ,
, , , , , ,
, , , , , ,
Client: , , , , , ,
Jobsite Reps: , , , , , ,
Agencies Observing (1) WJDEP (2) WJDEP
Agency Personnel (1) TOM BROWN, Beth Rossi, ,
(2) , , ,

L-41 (pg 1 of 2)2.85(Olv D7649)

NOZZLE NO. 34
THERMO. NO. 32
PITOBE NO. 7
CONSOLE NO. 4

Particulate Sampling Field Data

Plant MAXWELL
Stack OUTLET
Nozzle Size 3/16"
Time @ Each Point (Θ) 3 Min
Ambient Temperature 85 °F

Date 9-9-87
Sample No. 1 Box No. 4
Probe Heater @ % Box Heate
Hose Heater @ @ °F
Ambient Pressure (P_{bar}) 29.90 "Hg

Stack Pressure (P) +1.45 "H_2O (gage) ÷ 13.6 = "Hg (gage)

Stack Pressure (P_s) = P_{bar} + P = "Hg

Dry Bulb ___ °F
Wet Bulb ___ °F ___ %H_2O

Operating Condition or Remarks

Port/ Point	Military Clock Time	Meter Reading	Pitot ΔP	Orifice ΔH	Meter Temp (°F) IN	Meter Temp (°F) OUT	Line Vac "Hg	Probe Outlet (°F)	Box Outlet Temp (°F)	Box Temp °F)	Stack Temp °F/°C
A-1	1115	924.384	1.20	1.55	87	87	4+	99	159	222	80
2	18	926.3	1.20	1.55	89	87	4+	99	163	220	80
3	21	928.3	1.10	1.40	91	87	4+	101	185	223	80
4	24	930.2	1.00	1.30	94	88	4+	133	191	226	80
5	27	932.1	1.00	1.30	95	88	4	120	192	220	80
6	30	933.9	.93	1.25	96	88	3+	128	198	223	79
7	33	936.2	.93	1.25	97	88	3+	131	196	221	79
8	36	937.7	.85	1.10	97	89	3+	125	192	218	80
9	39	939.3	.80	1.05	97	89	3+	135	189	215	78
10	42	940.7	.80	1.05	97	89	3+	137	188	217	80
11	45	942.7	.85	1.10	98	90	3+	141	183	219	80
12	48	944.2	.72	.95	98	90	3+	142	185	220	79
END	1151	945.970									
B-1	1154	945.970	1.30	1.70	94	90	5	125	186	219	80
2	57	947.5	1.30	1.70	95	90	5	151	187	220	81
3	1200	949.7	1.20	1.55	96	90	4+	191	189	221	80
4	03	951.6	1.10	1.40	97	90	4+	212	208	223	80
5	06	953.8	1.15	1.50	98	90	4+	168	209	225	79
6	09	955.5	1.15	1.50	98	90	4+	170	208	223	80
7	12	957.4	.98	1.30	99	91	4+	182	210	220	79
8	15	959.4	.90	1.20	99	91	3+	200	211	223	80
9	18	960.9	.87	1.15	99	91	3+	153	212	225	80
10	21	962.5	.85	1.13	99	91	3+	176	210	223	79
11	24	964.6	.83	1.10	99	91	3+	179	208	220	78
12	27	966.0	.85	1.13	99	91	3+	180	200	219	78
END	Θ=1230	V=967.844	-----	ΔH=	T_m=						T_s=

43.460

* Sum, Average, or Difference

(Convert to) °F

V_m = V (DGMCF) = (1.0)(43.469) = 43.460 ft^3

Other Data

Time	Sample or Measurement	Value
	FYRITE O_2	21
	CO_2	0

Average CO_2 = ___ % x MW/100 = ___ x 0.44 = ___

O_2 = ___ x 0.32 = ___

N_2 = ___ x 0.28 = ___

100.0 = dry MW

Pre-Leak Check 0.018 at 10"
Post Leak Check 0.019 at 5"

RECON SYSTEMS, INC.

CLIENT: GENERAL FOODS

Date: 09/21/87
Time: 9:53 AM

AVERAGE VELOCITY PRESSURE

Delta P (IN H2O)	Delta P Square Root
1.20	1.10
1.20	1.10
1.10	1.05
1.00	1.00
1.00	1.00
0.93	0.96
0.93	0.96
0.85	0.92
0.80	0.89
0.80	0.89
0.85	0.92
0.72	0.85
1.30	1.14
1.30	1.14
1.20	1.10
1.10	1.05
1.15	1.07
1.15	1.07
0.98	0.99
0.90	0.95
0.87	0.93
0.85	0.92
0.83	0.91
0.85	0.92

THE AVERAGE SQUARE ROOT OF DELTA P = .9935587

CLIENT: GENERAL FOODS

Date: 09/21/87
Time: 9:53 AM

Delta H (IN H2O)	Meter Temp(F) IN	Meter Temp(F) OUT	Stack Temp(F)
1.55	87.00	87.00	80.00
1.55	89.00	87.00	80.00
1.40	91.00	87.00	80.00
1.30	94.00	88.00	80.00
1.30	95.00	88.00	80.00
1.25	96.00	88.00	79.00
1.25	97.00	88.00	79.00
1.10	97.00	89.00	80.00
1.05	97.00	89.00	78.00
1.05	97.00	89.00	80.00
1.10	98.00	90.00	80.00
0.95	98.00	90.00	79.00
1.70	94.00	90.00	80.00
1.70	95.00	90.00	81.00
1.55	96.00	90.00	80.00
1.40	97.00	90.00	80.00
1.50	98.00	90.00	79.00
1.50	98.00	90.00	80.00
1.30	99.00	91.00	79.00
1.20	99.00	91.00	80.00
1.15	99.00	91.00	80.00
1.13	99.00	91.00	79.00
1.10	99.00	91.00	78.00
1.13	99.00	91.00	78.00

AVERAGES

DELTA H = 1.300417 IN H2O
METER TEMP. = 92.79166 F
STACK TEMP. = 79.54166 F

Water and Dry Particulate Collections

PLANT General Foods
TEST FOR Particulate
SAMPLE NO. 1 BOX NO.

STACK ROTO. OUT.
DATE 9-9-87
OPERATING CONDITION

		Grams		Grams
Impinger 1	Final Weight	666.9		
	Initial Weight	669.3		
	Increase		Impinger 1	-2.4
Impinger 2	Final Weight	706.2		
	Initial Weight	696.3		
	Increase		Impinger 2	9.9
Impinger 3	Final Weight	507.1		
	Initial Weight	503.2		
	Increase		Impinger 3	3.9
Silica Gel	Final Weight	784.7		
	Initial Weight	769.4		
	Increase		Silica Gel	15.3

~~Record Water Collected in cyclone, flash, if any:~~

~~Final Weight _____ gms~~

~~Initial Weight _____ gms~~

~~Increase _____ gms~~

26.7 grams

Total mass of water caught

Filter Diameter 4 inches

Filter Type Glass Fiber

Filter	Final Weight	.6318	
	Initial Weight	.6311	
	Increase		0.0007 gram

Total mass of particulate caught on filter

Is ice present in the impinger bath at the end of this sample?
Yes ✓ No _____

RECON SYSTEMS, INC.
Three Bridges NJ

Lab Data - Evaporations

PLANT Maxwell House STACK Roto. Out. SAMPLE NO. 1 FOR Particulates

SAMPLING DATE 9/9/87 OPERATING CONDITION

Acetone Washings

TOTAL SAMPLE Gross 519.8 GMS

Tare- 342.2 GMS

(A) Net 177.6 GMS

AMOUNT EVAPORATED 177.6 GMS (B)

Evap. Beaker NO. ____

Gross 101.2209 GMS

Tare- 101.2200 GMS

Net 0.0009 (C) GMS

Acetone Blank = 0 / 100 GMS (D) GMS

Corrected Net (E) = (C)-(B)(D)

$= 0.0009 - 177.6\left(\frac{0}{100}\right)$

$= 0.0009$ GMS

Scaled Up Net = (E) $\frac{A}{B}$

$= 0.0009\left(\frac{177.6}{177.6}\right)$

$= 0.0009$ GMS

Wet Catch

TOTAL SAMPLE Gross ____ GMS

Tare- ____ GMS

(F) Net ____ GMS

AMOUNT EXTRACTED (G) ____ GMS (mls)

AMOUNT of E/C ____ mls (H)

Water Phase

Evap. Beaker No. ____

Gross ____ GMS

Tare- ____ GMS

Net ____ (J) GMS

Water Blank (L) = ____ GMS / 100 GMS

Corrected Net (N) = J-(G)(L)

$= \_\_\_ - \_\_\_\left(\frac{\_\_\_}{100}\right)$

$=$ ____ GMS

Scaled Up Net = $N\left(\frac{F}{G}\right)$

$= \_\_\_\left(\frac{\_\_\_}{\_\_\_}\right)$

$=$ ____ GMS

E/C Phase

Evap. Beaker No. ____

Gross ____ GMS

Tare- ____ GMS

Net ____ (K) GMS

E/C Blank (M) = ____ GMS / 100 mls

Corrected Net (P) = K-H(M)

$= \_\_\_ - \_\_\_\left(\frac{\_\_\_}{100}\right)$

$=$ ____ GMS

Scaled Up Net = $P\left(\frac{F}{G}\right)$

$= \_\_\_\left(\frac{\_\_\_}{\_\_\_}\right)$

$=$ ____ GMS

Run #1
Outlet

Particulates

Nozzle, Probe, and Acetone Washing .0009 grms

Filter .0007 grms
.0009
.0016

Enter "0" if no Organic or Aqueous Phase

Aqueous Phase 0 grms

Organic Phase 0 grms

Totals

GRAINS/DSCF = 5.931919E-04
POUNDS/HOUR = 1.745396E-02

HIT RETURN TO CONTINUE

THERMO NO. 32
NOZZLE NO. 34
PITOBE NO. 7
CONSOLE NO. 4

Particulate Sampling Field Data

Plant Gerber Foods
Stack OUTLET
Nozzle Size 3/16"
Time @ Each Point (Θ) 3 Min
Ambient Temperature 80 °F

Date 9/9/81
Sample No. 2
Box No. 4
Probe Heater @ %
Box Heate @ °F
Hose Heater @
Ambient Pressure (P_{bar}) 29.90"Hg

Stack Pressure (P) + 1.30 "H_2O (gage) ÷ 13.6 = "Hg (gage)

Stack Pressure (P_s) = P_{bar} + P = "Hg

Dry Bulb ___ °F
Wet Bulb ___ °F ___ %H_2O

Operating Condition or Remarks

Port/ Point	Military Clock Time	Meter Reading	Pitot ΔP	Orifice ΔH	Meter Temp (°F) IN	Meter Temp (°F) OUT	Line Vac "Hg	Probe Outlet (°F)	Box Outlet Temp (°F)	Box Temp °F)	Stack Temp °F/°C
A-1	1345	968.000	1.20	1.60	88	88	5	85	108	185	80
2	48	970.1	1.30	1.70	90	88	5+	150	127	200	79
3	51	972.4	1.35	1.80	92	88	5+	165	138	210	79
4	54	974.7	1.15	1.50	93	89	4+	166	146	213	79
5	57	976.5	1.15	1.50	95	89	4+	191	152	220	79
6	1400	978.3	1.10	1.40	96	89	4+	220	168	223	79
7	03	980.5	1.00	1.30	97	90	4+	173	170	220	79
8	06	981.8	.90	1.20	98	90	4	182	185	218	79
9	09	983.7	1.00	1.30	99	90	4+	215	191	215	80
10	12	985.6	.90	1.20	99	91	4+	211	205	221	79
11	15	987.4	.85	1.10	99	91	3+	198	204	222	79
12	18	989.0	.70	.93	100	91	4	197	198	220	79
END	1421	990.392									
B-1	1423	990.392	1.10	1.40	98	91	4+	198	200	223	79
2	26	992.3	1.30	1.70	98	91	6+	200	201	224	82
3	29	994.4	1.30	1.70	99	92	6+	188	204	222	82
4	32	996.8	1.20	1.60	99	91	5+	185	203	220	82
5	35	998.8	1.20	1.60	100	92	5+	189	204	219	82
6	38	001.1	1.10	1.40	100	92	5+	195	205	218	81
7	41	002.9	1.0	1.30	102	92	5+	180	203	220	80
8	44	004.6	.95	1.25	103	92	4+	185	202	219	82
9	47	005.9	.90	1.20	103	93	4+	183	204	221	81
10	50	008.0	.78	1.00	104	93	3+	182	205	224	80
11	53	009.9	.78	1.00	106	94	3+	185	208	223	80
12	56	011.7	.78	1.00	106	94	3+	186	209	225	81
END	Θ=1489	V=012.988	-----	ΔH=	T_m=						T_s=

44.988

* Sum, Average, or Difference

(Convert to) °F

V_m = V (DGMCF) = (1.0) (44.988) = 44.988 ft³

Other Data

Time	Sample or Measurement	Value
	CO_2	21
	O_2	0

Average CO_2 = ___ % x MW/100 = ___ x 0.44 = ___

O_2 = ___ x 0.32 = ___

N_2 = ___ x 0.28 = ___

100.0 = dry MW

Pre-Leak Check 0.013 at 15"
Post Leak Check 0.013 at 7"

RECON SYSTEMS, INC.

CLIENT: GENERAL FOODS

Date: 09/21/87
Time: 9:53 AM

AVERAGE VELOCITY PRESSURE

Delta P (IN H2O)	Delta P Square Root
1.20	1.10
1.30	1.14
1.35	1.16
1.15	1.07
1.15	1.07
1.10	1.05
1.00	1.00
0.90	0.95
1.00	1.00
0.90	0.95
0.85	0.92
0.70	0.84
1.10	1.05
1.30	1.14
1.30	1.14
1.20	1.10
1.20	1.10
1.10	1.05
1.00	1.00
0.95	0.97
0.90	0.95
0.78	0.88
0.78	0.88
0.78	0.88

THE AVERAGE SQUARE ROOT OF DELTA P = 1.016201

CLIENT: GENERAL FOODS

Date: 09/21/87
Time: 9:53 AM

Delta H (IN H2O)	Meter Temp(F) IN	Meter Temp(F) OUT	Stack Temp(F)
1.60	88.00	88.00	80.00
1.70	90.00	88.00	79.00
1.80	92.00	88.00	79.00
1.50	93.00	89.00	79.00
1.50	95.00	89.00	79.00
1.40	96.00	89.00	79.00
1.30	99.00	90.00	80.00
1.20	98.00	90.00	79.00
1.30	99.00	90.00	80.00
1.20	99.00	91.00	79.00
1.10	99.00	91.00	79.00
0.93	100.00	91.00	79.00
1.40	98.00	91.00	79.00
1.70	98.00	91.00	82.00
1.70	99.00	91.00	82.00
1.60	99.00	91.00	82.00
1.60	100.00	92.00	81.00
1.40	100.00	92.00	81.00
1.30	102.00	92.00	80.00
1.25	103.00	92.00	82.00
1.20	103.00	93.00	81.00
1.00	104.00	93.00	80.00
1.00	106.00	94.00	80.00
1.00	106.00	94.00	81.00

AVERAGES

DELTA H = 1.361667 IN H2O
METER TEMP. = 94.70834 F
STACK TEMP. = 80.08335 F

Water and Dry Particulate Collections

PLANT MAXWELL HOUSE
TEST FOR Particulates
SAMPLE NO. 2 BOX NO. 4

STACK ROTO-OUT.
DATE 9/9/87
OPERATING CONDITION

		Grams		Grams
Impinger 1	Final Weight	671.0		
	Initial Weight	661.1		
	Increase		Impinger 1	9.9
Impinger 2	Final Weight	708.8		
	Initial Weight	703.3		
	Increase		Impinger 2	5.5
Impinger 3	Final Weight	505.2		
	Initial Weight	503.9		
	Increase		Impinger 3	1.3
Silica Gel	Final Weight	787.8		
	Initial Weight	778.2		
	Increase		Silica Gel	9.6

~~Record Water Collected in cyclone, flash, if any:~~

~~Final Weight _____ gms~~

~~Initial Weight _____ gms~~

~~Increase _____ gms~~

26.3 grams

Total mass of water caught

Filter Diameter 4 inches

Filter Type Glass Fiber

Filter	Final Weight	.6406	
	Initial Weight	.6398	
	Increase		0.0008 gram

Total mass of particulate caught on filter

Is ice present in the impinger bath at the end of this sample?
Yes ✓ No _____

RECON SYSTEMS, INC.
Three Bridges NJ

Lab Data - Evaporations

PLANT MAXWELL HOUSE STACK ROTO. OUT. SAMPLE NO. 2 FOR Particulates

SAMPLING DATE 9/9/87 OPERATING CONDITION

Acetone Washings

TOTAL SAMPLE Gross 504.4 GMS

Tare- 339.2 GMS

(A) Net 165.2 GMS

AMOUNT EVAPORATED 165.2 GMS (B)

Evap. Beaker NO.

Gross 103.7559 GMS

Tare- 103.7554 GMS

Net 0.0005 (C) GMS

Acetone Blank (D) = 0 / 100 GMS GMS

Corrected Net (E) = (C)-(B)(D)

$= 0.0005 - 165.2\left(\frac{0}{100}\right)$

$= 0.0005$ GMS

Scaled Up Net = (E) $\frac{A}{B}$

$= 0.0005\left(\frac{165.2}{165.2}\right)$

$= 0.0005$ GMS

Wet Catch

TOTAL SAMPLE Gross _____ GMS

Tare- _____ GMS

(F) Net _____ GMS

AMOUNT EXTRACTED (G) _____ GMS (mls)

AMOUNT of E/C _____ mls (H)

Water Phase Evap. Beaker No. ____

Gross _____ GMS

Tare- _____ GMS

Net _____ (J) GMS

Water Blank (L) = ____ / 100 GMS GMS

Corrected Net (N) = J-(G)(L)

$= \_\_\_ - \_\_\_\left(\frac{\_\_\_}{100}\right)$

$= \_\_\_$ GMS

Scaled Up Net = $N\left(\frac{F}{G}\right)$

$= \_\_\_\left(\frac{\_\_\_}{\_\_\_}\right)$

$= \_\_\_$ GMS

E/C Phase Evap. Beaker No. ____

Gross _____ GMS

Tare- _____ GMS

Net _____ (K) GMS

E/C Blank (M) = ____ / 100 mls GMS

Corrected Net (P) = K-H(M)

$= \_\_\_ - \_\_\_\left(\frac{\_\_\_}{100}\right)$

$= \_\_\_$ GMS

Scaled Up Net = $P\left(\frac{F}{G}\right)$

$= \_\_\_\left(\frac{\_\_\_}{\_\_\_}\right)$

$= \_\_\_$ GMS

Run #2
Outlet

Particulates

Nozzle, Probe, and Acetone Washing .0005 grms

Filter .0008 grms
.0005
.0013

Enter "0" if no Organic or Aqueous Phase

Aqueous Phase 0 grms

Organic Phase 0 grms

Totals

GRAINS/DSCF = 4.671436E-04
POUNDS/HOUR = 1.406405E-02

HIT RETURN TO CONTINUE

FOR INLET: MAXWELL PO# 335687 MHD
2340
RECON [illegible] 87-357
NOZZLE No. 34
THERM No. 32

Particulate Sampling Field Data -75-

PITOBE NO. 7
CONSOLE NO. 4

Plant General Foods
Stack OUTLET
Nozzle Size 3/16"
Time @ Each Point (Θ) 3 Min
Ambient Temperature 80 °F

Date 9/9/81
Sample No. 3 Box No. 4
Probe Heater @ % Box Heate
Hose Heater @ @ °F
Ambient Pressure (P_{bar}) "Hg

Stack Pressure (P) +1.30 "H_2O (gage) ÷ 13.6 = "Hg (gage)

Stack Pressure (P_s) = P_{bar} + P = "Hg

Dry Bulb ___ °F

Wet Bulb ___ °F ___ %H_2O

Operating Condition or Remarks

Port/ Point	Military Clock Time	Meter Reading	Pitot ΔP	Orifice ΔH	Meter Temp (°F) IN	Meter Temp (°F) OUT	Line Vac "Hg	Probe Outlet (°F)	Box Outlet Temp (°F)	Box Temp °F)	Stack Temp °F/°C
A-1	1540	014.000	1.10	1.40	93	9[illegible]	4+	155	198	218	80
2	33	016.1	1.20	1.55	95	93	4+	158	200	222	80
3	36	018.2	1.20	1.55	95	93	4+	165	201	221	80
4	39	020.7	1.10	1.40	96	93	4+	170	200	220	83
5	1642	022.6	1.10	1.40	97	92	4+	175	202	219	81
6	45	024.5	1.05	1.35	99	93	3+	180	200	224	81
7	48	026.2	.93	1.20	100	93	3+	185	201	224	81
8	1601	028.2	.90	1.18	101	94	3+	183	200	222	81
9	14	030.1	.90	1.18	101	93	3+	180	202	223	81
10	17	031.7	.85	1.10	102	93	2+	185	203	220	81
11	1620	033.2	.80	1.05	102	93	2+	188	200	221	81
12	23	034.6	.80	1.05	102	93	2+	187	201	220	81
C-1	1626	036.470									
1	1628	036.470	1.40	1.80	99	94	5+	175	199	218	81
2	31	038.6	1.40	1.80	99	94	5+	173	198	217	82
3	34	040.5	1.40	1.80	100	94	5+	170	201	220	82
4	37	042.7	1.20	1.55	100	95	4+	166	200	219	82
5	40	044.5	1.20	1.55	101	96	4+	165	205	223	82
6	43	047.0	1.20	1.55	102	94	4+	163	200	221	81
7	46	050.0	.90	1.18	102	94	3+	158	203	222	81
8	49	051.0	.80	1.05	103	95	2+	168	205	224	81
9	52	052.0	.80	1.05	103	95	2+	170	202	221	81
10	55	053.5	.80	1.05	103	95	2+	178	200	220	81
11	58	055.2	.80	1.05	103	95	2+	165	201	222	81
12	1701	056.6	.78	1.00	104	95	2+	160	197	220	81
*END	Θ= 1704	V= 058.472	-----	ΔH=	T_m=						T_s=

44.472

* Sum, Average, or Difference

(Convert to) °F

V_m = V (DGMCF) = (1.0)(44.472) = 44.472 ft³

Other Data

Time	Sample or Measurement	Value
	O_2	21
	CO_2	0

Average CO_2 = % x MW/100 = x 0.44 = ___

O_2 = x 0.32 = ___

N_2 = ___ x 0.28 = ___

100.0 = dry MW

Pre-Leak Check 0.00 at 15"

Post Leak Check 0.01 at 6"

RECON SYSTEMS, INC.

CLIENT: GENERAL FOODS

Date: 09/21/87
Time: 9:53 AM

AVERAGE VELOCITY PRESSURE

Delta P (IN H20)	Delta P Square Root
1.10	1.05
1.20	1.10
1.20	1.10
1.10	1.05
1.10	1.05
1.05	1.02
0.93	0.96
0.90	0.95
0.90	0.95
0.85	0.92
0.80	0.89
0.80	0.89
1.40	1.18
1.40	1.18
1.40	1.18
1.20	1.10
1.20	1.10
1.20	1.10
0.90	0.95
0.80	0.89
0.80	0.89
0.80	0.89
0.80	0.89
0.78	0.88

THE AVERAGE SQUARE ROOT OF DELTA P = 1.007504

CLIENT: GENERAL FOODS

Date: 09/21/87
Time: 9:53 AM

Delta H (IN H2O)	Meter Temp(F) IN	Meter Temp(F) OUT	Stack Temp(F)
1.40	93.00	93.00	80.00
1.55	95.00	93.00	80.00
1.55	95.00	93.00	80.00
1.40	96.00	93.00	83.00
1.40	97.00	92.00	81.00
1.35	99.00	93.00	81.00
1.20	100.00	93.00	81.00
1.18	101.00	94.00	81.00
1.18	102.00	93.00	81.00
1.10	102.00	93.00	81.00
1.05	102.00	93.00	81.00
1.05	102.00	93.00	81.00
1.80	99.00	94.00	81.00
1.80	99.00	94.00	82.00
1.80	100.00	94.00	82.00
1.55	100.00	95.00	82.00
1.55	101.00	96.00	82.00
1.55	102.00	94.00	81.00
1.18	102.00	94.00	81.00
1.05	103.00	95.00	81.00
1.05	103.00	95.00	81.00
1.05	103.00	95.00	81.00
1.05	103.00	95.00	81.00
1.00	104.00	95.00	81.00

AVERAGES

DELTA H = 1.326667 IN H2O
METER TEMP. = 96.97916 F
STACK TEMP. = 81.125 F

Water and Dry Particulate Collections

PLANT MAXWELL HOUSE
TEST FOR Particulate
SAMPLE NO. 3 BOX NO. 4

STACK ROTO. OUT.
DATE 9/9/87
OPERATING CONDITION STEADY

		Grams		Grams
Impinger 1	Final Weight	689.2		
	Initial Weight	686.0		
	Increase		Impinger 1	3.2
Impinger 2	Final Weight	683.2		
	Initial Weight	680.9		
	Increase		Impinger 2	2.3
Impinger 3	Final Weight	485.7		
	Initial Weight	484.6		
	Increase		Impinger 3	1.1
Silica Gel	Final Weight	763.9		
	Initial Weight	742.6		
	Increase		Silica Gel	21.3

~~Record Water Collected in cyclone, flash, if any:~~

~~Final Weight _____ gms~~

~~Initial Weight _____ gms~~

~~Increase _____ gms~~

279 grams
Total mass of water caught

Filter Diameter 4 inches

Filter Type Glass Fiber

Filter	Final Weight	.6314	
	Initial Weight	.6308	
	Increase		0.0006 gram

Total mass of particulate caught on filter

Is ice present in the impinger bath at the end of this sample?
Yes ✓ No _____

RECON SYSTEMS, INC.
Three Bridges NJ

Lab Data - Evaporations

PLANT MAXWELL HOUSE STACK ROTO. OUT SAMPLE NO. 3 FOR Particulates

SAMPLING DATE 9/9/81 OPERATING CONDITION

Acetone Washings

TOTAL SAMPLE Gross 489.8 GMS

Tare- 338.2 GMS

(A) Net 151.6 GMS

AMOUNT EVAPORATED 151.6 GMS (B)

Evap. Beaker NO.

Gross 105.1326 GMS

Tare- 105.1319 GMS

Net 0.0007 (C) GMS

Acetone Blank (D) = 0 / 100 GMS GMS

Corrected Net (E) = (C)-(B)(D)

= 0.0007 - 151.6 (0/100)

= 0.0007 GMS

Scaled Up Net = (E) A/B

= ( )

= 0.0007 GMS

Wet Catch

TOTAL SAMPLE Gross GMS

Tare- GMS

(F) Net GMS

AMOUNT EXTRACTED (G) GMS (mls)

AMOUNT of E/C mls (H)

Water Phase Evap. Beaker No.

Gross GMS

Tare- GMS

Net (J) GMS

Water Blank (L) = GMS / 100 GMS

Corrected Net (N) = J-(G)(L)

= - (100)

= GMS

Scaled Up Net = N(F/G)

= ( )

= GMS

E/C Phase Evap. Beaker No.

Gross GMS

Tare- GMS

Net (K) GMS

E/C Blank (M) = GMS / 100 mls

Corrected Net (P) = K-H(M)

= - (100)

= GMS

Scaled Up Net = P(F/G)

= ( )

= GMS

Run #3

Particulates

Nozzle, Probe, and Acetone Washing .0007 grms

Filter .0006 grms
.0007
.0013

Enter "0" if no Organic or Aqueous Phase

Aqueous Phase 0 grms

Organic Phase 0 grms

Totals

GRAINS/DSCF = 4.745402E-04
POUNDS/HOUR = 1.412562E-02

HIT RETURN TO CONTINUE

CLIENT: GENERAL FOODS

Date: 09/21/87
Time: 9:53 AM

ISOKINETIC CALCULATIONS

SAMPLE NO.	1	2	3
DATE	9/9/87	9/9/87	9/9/87
TIME	1115-1230	1345-1459	1540-1704
UNIT SAMPLED	ROTO.OUTLET	ROTO.OUTLET	ROTO.OUTLET
METER VOLUME (VM-STD), SCU-FT	41.62	42.95	42.28
WATER COLLECTED (VW-STD), SCU-FT	1.26	1.24	1.32
MOISTURE (VOL %)	2.95	2.82	3.03
ACTUAL MOLECULAR WEIGHT (MW), LBS/LB-MOLE	28.52	28.54	28.51
ACTUAL VELOCITY IN STACK (VS), FT/SEC	55.93	57.23	56.81
ACTUAL FLOW RATE IN STACK (ACFM)	3590.51	3673.95	3647.49
VELOCITY @ STP (VS-STD), FT/SEC	55.09	56.30	55.78
STACK FLOW RATE @ STP (SCFM)	3537.01	3614.25	3581.30
DRY FLOW RATE (DSCFM)	3432.79	3512.44	3472.83
NOZZLE VELOCITY @ STP (VN-STD), FT/SEC	51.78	53.35	52.63
ISOKINETIC %	93.98	94.76	94.35

:ENT: GENERAL FOODS

Date: 09/21/87
Time: 9:53 AM

THE FOLLOWING WERE PROGRAMMER INPUTS FOR ISOKINETICS

IPLE NO.	1	2	3
TE	9/9/87	9/9/87	9/9/87
ME	1115-1230	1345-1459	1540-1704
IT SAMPLED	ROTO.OUTLET	ROTO.OUTLET	ROTO.OUTLET
TUAL NOZZLE AMETER (ND), IN	0.19	0.19	0.19
TOT FACTOR (CP)	0.83	0.83	0.83
ME @ EACH INT (MIN)	3.00	3.00	3.00
BIENT PRESSURE BAR), IN-HG	29.90	29.90	29.90
ACK PRESSURE S), IN-HG	1.45	1.30	1.30
TER VOLUME M), CU-FT	43.46	44.98	44.47
TER COLLECTED PINGERS, GRMS	26.70	26.30	27.90
RBON DIOXIDE O_2), %	0.00	0.00	0.00
YGEN $_2$), %	21.00	21.00	21.00
ACK DIAMETER IA), IN	14.00	14.00	14.00
ACK CROSS SECTIONAL EA (CSA), FT^2	1.07	1.07	1.07

RECON SYSTEMS, INC.

Route 202 North, P.O., Box 460
Three Bridges, N.J. 08887
201-782-5900

LABORATORY ORSAT OR GC GAS ANALYSIS

PLANT General Foods STACK Rotoclone

SAMPLE NO. _____ OPERATING CONDITIONS _____

JOB NO. 0554

--Dry Basis--

Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Inlet Run #1	9/9/87	0	21.0	–	79.0
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Inlet Run #2	9/9/87	0	21.0	–	79.0
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Inlet Run #3	9/9/87	0	21.0	–	79.0
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Outlet Run #1	9/9/87	0	21.0	–	79.0
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Outlet Run #2	9/9/87	0	21.0	–	79.0
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Outlet Run #3	9/9/87	0	21.0	–	79.0
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)

CHEMIST: Peter F. Marshall

Date: 9/9/87

L-18 (8.17.82)

BUREAU OF ENFORCEMENT OPERATIONS

#3

PLANT ID #	INSPECTOR ASSIGNED
10082	025

FIELD INVESTIGATION ASSIGNMENT REPORT

DATE COMPLETED	COUNTY
9-9-87	Hudson

COMPANY: General Foods Corp., Maxwell House Division

LOCATION: 1125 Hudson St., Hoboken

TYPE OF ASSIGNMENT: ☐ COMPLAINT ☐ APEDS ☐ ORDER FOLLOWUP ☒ OTHER (BY CODE) STD

TSS CLASS: A1 ___ A2 ___ B ___ NSPS ___ NESHAPS ___ PSD ___

APEDS CYCLE: ___

GRANT (105): ☐Yes ☐No PLLT: PT ___ S2 ___ CO ___ N2 ___ VO ___ OTHER ___

COMPLAINANT NAME ___ PHONE # ___

COMPLAINANT ADDRESS ___ RECORDED BY ___

DATE/TIME RECEIVED: ___ COMPLAINT DETAILS: ___

CONTACT: Ernie LeSalle

TITLE: plant Plant Supervisor

TIME AT PLANT: 9:30am

ATTENDANCE TIME: 100

PLANTS INSPECTED: 1

UNITS INSPECTED: 1

SUBCHAPTER	# INSP
8	1
6	1

COMPLAINT: TYPE ___

SUB 5 SOP FOLLOWED: ☐

TIME AT COMPLAINANT ___

VERIFIED: ☐Yes ☐No

GIVE DETAILS BELOW

VIOLATION FOLLOWUP INSPECTION

VIOLATION LOG # ___

ORDER DATED ___

SUBCHAPTER VIOLATED ___

COMPLIANCE ACHIEVED ☐Yes ☐No

GIVE DETAILS BELOW

NA

SAMPLES COLLECTED: NA

SAMPLES COLLECTED: NA

CODES (BY CODE): 007

REVIEWER'S INSTRUCTIONS: ___

SUMMARY OF INSPECTION: NJ STD #059, Plot # 78004 was stack tested by Rolan Systems. There is a change in raw materials processed. ~200 lb/hr of coffee beans were processed during the stack test. The coffee roaster cannot process > 200 lb/hr of coffee beans. Therefore the continuous cooler will not receive > 200 lb/hr of coffee beans. The permit should be amended to show the actual process, consequently the emission rate. Mr. LeSalle was informed of the need to amend the permit!

The Atlantic Scale Co. Inc., Nutley, calibrated the scale on 2-11-87. The scale weighs the beans and a digital display shows the amount processed. The calibration records should be checked as a matter of routine investigation.

INSPECTOR'S SIGNATURE: Elizabeth Rossi

TITLE: Sr. Envir. Specialist

SUPERVISOR'S REVIEW

SIGNATURE: DATE:

ATTACHED FOR ADDITIONAL INFORMATION: ☐ NO ☐ YES

rm DEQ-079
86

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR POLLUTION CONTROL

EMISSION TEST OBSERVATION FORM

1) COMPANY General Foods Corporation, Maxwell House Division

N.J. STACK NO. 059 DEP I.D. NO. 10082

PLANT LOCATION 1125 Hudson St Hoboken

2) PLANT CONTACT Ernie LaSalle Plt Pt. Super 420-3731 EMISSION TEST DATE(S) 9-9-81

3) SOURCE BEING TESTED Continuous cooler PERMIT/ CERTIFICATE NO. 78004

DESCRIPTION OF SOURCE Cooling zone after continuous roaster

4) TESTS ARE BEING CONDUCTED TO DETERMINE COMPLIANCE WITH THE FOLLOWING REGULATIONS. (Indicate all applicable regulations.)

N.J.A.C. 7:27 6.2 EPA NSPS Subpart NA EPA NESHAPS Subpart NA

5) TYPE OF CONTROL EQUIPMENT (if applicable) Roto-clone

CONTROL EQUIPMENT OPERATING PARAMETERS (During each test)

PARAMETER	RUN NO. 1	RUN NO. 2	RUN NO. 3

6) SOURCE OPERATING PARAMETERS (During each test)

PARAMETER	RUN NO. 1 (11:15am-12:30pm)	RUN NO. 2 (1:45pm-3:00pm)	RUN NO. 3 (3:50pm-5:05pm)
Cooling zone water spray (quench)	3 GPH	3 GPH	3 GPH
Coffee beans	160.0 lbs/hr	180.0 lbs/hr	182.4 lbs/hr
Odor off property	Upwind of continuous cooler which is downwind of entire plant, there were faint coffee odors, downwind of continuous cooler there were faint coffee odors. No significant determination made this day	Same as Run No. 1	Same as Run No. 1

7) TYPE OF FUEL BEING FIRED (if applicable) N4

AMOUNT OF FUEL BEING FIRED DURING EACH TEST N4

RUN NO. 1	RUN NO. 2	RUN NO. 3

8) WERE FUEL SAMPLES TAKEN DURING TESTS? ☐ YES ☒ NO (If yes, record fuel sample number(s) for each test.)

Run No. 1 _____

Run No. 2 _____

Run No. 3 _____

9) WERE ANY OTHER SAMPLES TAKEN DURING TEST? ☐ YES ☒ NO

(If yes, indicate type of sample, run number sample was taken, sampling location and sample numbers.)

TYPE	RUN NO.	LOCATION	SAMPLE NUMBERS	COMMENT

10) ANY PROCESS OR CONTROL EQUIPMENT PROBLEMS DURING ANY TEST? ☐ YES ☒ NO

(If yes, specify the type of problem and indicate during which run it occurred.)

RUN NO.	PROBLEM
1,2 & 3	~200 lb/hr of coffee beans were processed during the stack test. The coffee roaster cannot process > 200 lb/hr of coffee beans. Therefore the continuous cooler will not receive > 200 lb/hr of coffee beans. The permit should be amended to show the actual process rate; consequently, the emission rate.

11) EMISSION TESTS CONDUCTED BY ☐ DEP ☒ COMPANY CONSULTANT

RECON SYSTEMS INC
THREE BRIDGES, NJ
PETER MARSHALL
201 782-5900

INSPECTOR'S SIGNATURE Elizabeth Rossi

REGIONAL OFFICE REPRESENTED MRO

(#3)

Section 4 Reference ✓
AP-42 Reference ✓

Emission Test Report Review Checklist--Short Form

Reviewer: T. Lapp
Review Date: 8/18/94

A. Background Information

1. Facility name: General Foods Corp / Maxwell House Division
   Location: Hoboken, NJ
2. Source category: Coffee Roasting
3. Test date: September 9, 1987
4. Test sponsor: General Foods
5. Testing contractor: Recon Systems, Inc.
6. Purpose of test: Compliance Test for PM Emissions
7. Pollutants measured (include test method and indicate if valid): PM - Total NJ Method / Test PM measured at inlet and outlet of the Rotoclone
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	
	Continuous cooler after continuous roaster	NJ stack No. 059		Rotoclone	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.)

No Process description provided
measured PM at inlet and outlet of rotoclone

D. Emission Data/Mass Flux Rates/Emission Factors

INLET/OUTLET

Test ID	Parameter	Units	Values reported Run 1	Run 2	Run 3	Run 4
	Stack temperature	°F	81/80	81/80	83/81	
	Moisture	% V/V	2.4/2.9	2.4/2.8	3.2/3.0	
	Oxygen	% V/V	21/21	21/21	21/21	
	Volumetric flow, actual	ACFM	3460/3590	3540/3670	3800/3650	
	Volumetric flow, standard	dSCFM	3290/3430	3350/3510	3570/3470	
	Percent isokinetic		92/94	91/95	91/94	
Circle: Production or feed rate Capacity:		lbs/hr	160.8	180.0	182.4	
	Pollutant concentrations:					
	Filterable PM - INLET	GRAMS	0.031	0.0097	0.021*	MRI CORRECTED VALUE -
	- OUTLET	GRAMS	0.0016	0.0013	0.0013	TEST REPORT SHOWED 0.031 grams
	Pollutant mass flux rates:					
	Filt. PM - INLET	gr/dscf	0.00123	0.0038	0.0052*	CORRECTED
	- OUTLET	gr/dscf	0.0006	0.0005	0.0005	
	Rate					
	Emission factors:					
	Filt. PM Emission Rate	lbs/hr	0.35	0.11	0.16*	CORRECTED INLET
		lbs/hr	0.017	0.014	0.014	OUTLET
	EMISSION FACTORS					AVG.
	Filt. PM INLET	lb/ton	4.35	1.22	1.75	2.44
	Filt. PM OUTLET	lb/ton	0.211	0.156	0.154	0.174