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

September 2, 1987

MEMORANDUM

TO: Don Patterson Through Lou Mikolajczyk

FROM: Edward Choromanski

SUBJECT: Ricci Brothers Sand Company, Inc. - Commercial Twp, NJ
DEP ID No. 75201 NJ Stack No. 001

Emission tests were conducted at the above referenced facility on the Sand Dryer Exhaust. The purpose of the tests was to determine the particulate emissions being emitted from the Sand Dryer to the atmosphere.

Tom Brown reviewed thee final test rport. His review indicates that the particulate emissions being emitted from the Sand Dryer were within the standards stated on Permit No. P-67877, during all test runs. The amount of sand being fed to the dryer was within the permit standards.

Based on the results indicated in the report, we recommend that the company be issued a 5-year certificate to operate this source.

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

c Milt Polakovic
Harold Christiff
Rich Craig
Julius Tivald
Tom Brown

Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
CN 027
TRENTON, N.J. 08625

August 31, 1987

MEMORANDUM

TO: Edward Choromanski

FROM: Thomas P. Brown

SUBJECT: Ricci Bros. Sand Co., Inc.
Port Norris, New Jersey
DEP ID NO. 75201

On July 14, 1987 emission tests were conducted at Ricci Bros. Sand Co., Inc. located in Commercial Township, New Jersey on the Dryer Exhaust (NJ Stack No. 001) by Recon Systems Inc. of Three Bridges, New Jersey. The purpose of the tests was to determine the particulate emission rates covered by Permit/Certificate No. 067877. The results as reported are as follows:

PARTICULATE EMISSION RATES

RUN NO.	ACTUAL EMISSION RATE (lbs/hr)	ALLOWABLE EMISSION RATE (lbs/hr) Sub. 8	% ISOKINETICS
1	1.08	4.00	99.6
2	0.98	4.00	99.8
3	0.94	4.00	99.2

Technical Services calculations using the raw data supplied produced substantially the same results.

The tests results indicate that the particulate emission rates from the Dryer Exhaust were within the standards stated on Permit/Certificate No. 067877 as filed under N.J.A.C. 7:27-8. during all tests runs.

Vincent Garbarino from the Southern Regional Office observed the process parameters. Mr. Garbarino recorded the following parameters:

TONS OF SAND/HOUR

RUN NO.	ACTUAL	ALLOWABLE
1	26.2	25.0
2	22.7	25.0
3	23.6	25.0

Mr. Garbarino noted the production rate was exceeded during the first run as the adjustments were being set to show maximum allowable conditions. No other problems were stated.

In addition, oil sample No. 34752 was taken during the third run. The subsequent analysis indicated compliance with all applicable regulations.

Based on the results of the stack tests a permanent certificate should be issued. As stated in a letter from owner, Richard A. Ricci normal production from this process is 18-20 tons/hour. The 25 ton/hour maximum capacity was established for the purpose of these tests and will rarely be attained.

Sampling procedures and calculations are acceptable.

Thomas P. Brown

Thomas P. Brown
Environmental Specialist
Bureau of Technical Services

TPB:ss

RECON SYSTEMS INC.

ROUTE 202N, P.O. BOX 460, THREE BRIDGES, N.J. 08887
201-782-5900
NEW ENGLAND 617-752-4217 PENNSYLVANIA 215-433-5511

COMPLIANCE
STACK SAMPLING REPORT

For

Richard Ricci Company
RD #1 Dragston Road
Port Norris,NJ 08349

Source Tested:

Dryer Outlet

In Fulfillment of Authorization Letter
dated June 11, 1987

RECON Project No. 0545

July 31, 1987

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

Richard Ricci Company
Port Norris, New Jersey on
Dryer Outlet

INTRODUCTION

The above referenced stack was sampled for total particulate emissions on July 14, 1987. This report contains the following information.

SUMMARY

The following results were obtained:

Run No.	1	2	3
Date	7/14/87	7/14/87	7/14/87
Time	0915-1019	1057-1200	1225-1328
Particulate Emissions			
Pounds/hour	1.08	0.98	0.94
Grains/dscf	0.0252	0.0234	0.0222
Grains/scf	0.0233	0.0217	0.0206

iden

PERSONNEL AND CERTIFICATIONS

Field sampling on this project was performed by:

P.F. Marshall T. F. Mattei

Laboratory work on this project was performed by:

Peter F. Marshall

Calculations and report preparation were by:

Peter F. Marshall

The testing was observed by:

Richard Ricci	Ricci Bros.
Doug Bruckman	NJ DEP
Vincent Garbarino	NJ DEP

This Report is submitted by:

Frank W. Swetits
Manager, Air Testing

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

Professional Engineer Certification

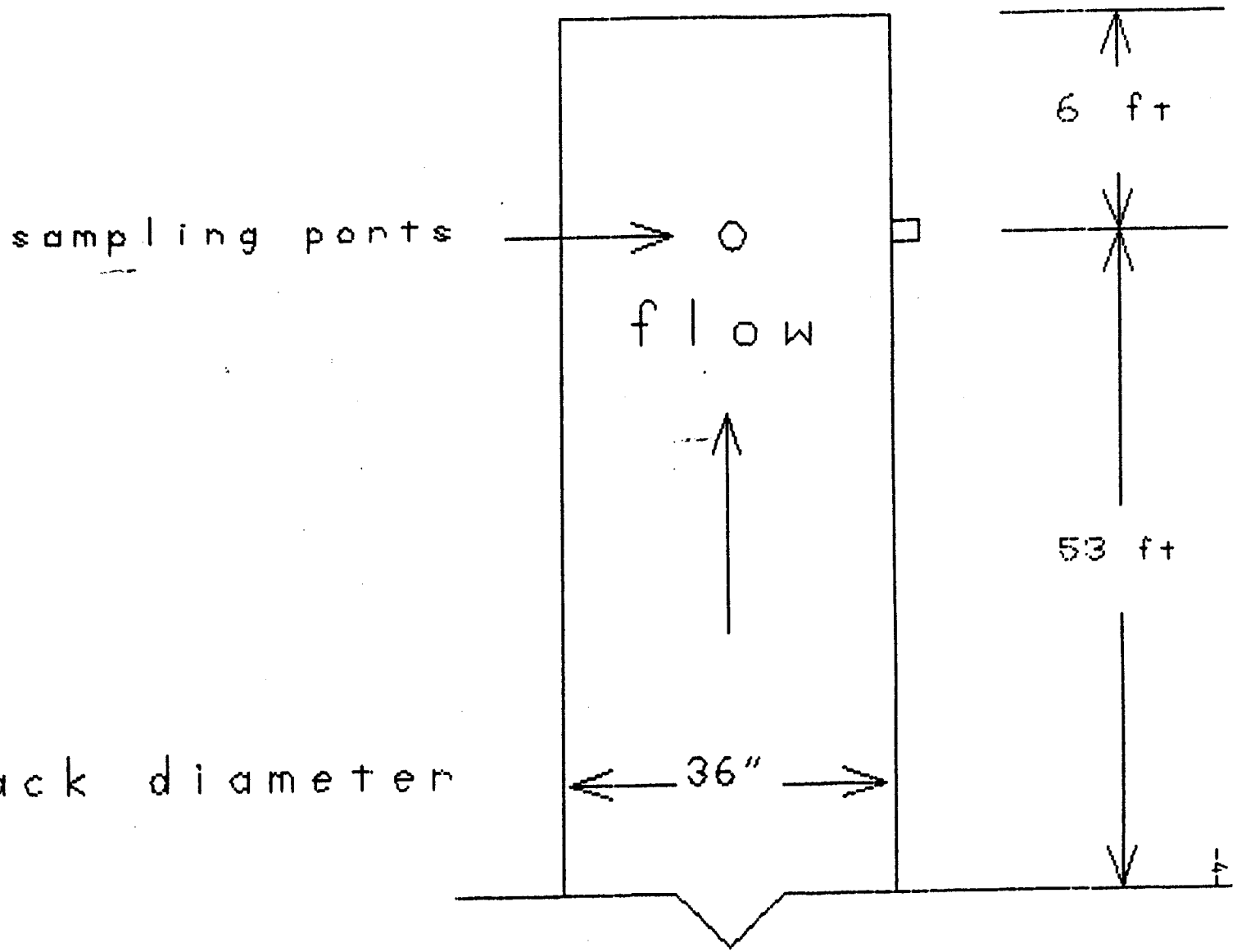
I am in responsible charge of RECON's stack test work, and have discussed and reviewed the procedures and results of this set of tests with the relevant field and laboratory personnel.

Norman J. Weinstein, P.E.

New Jersey License 19536

Richard Ricci Company

Dryer Exhaust Stack
Sampling Locations



VELOCITY AND FLOW RATE DATA

Run No.	1	2	3
Date	7/14/87	7/14/87	7/14/87
Time	0915-1019	1057-1200	1225-1328
Stack Diameter, in.	36	36	36
Stack Cross Section (sq ft)	7.068	7.068	7.068
Barometric Pressure ("Hg)	29.90	29.90	29.90
Average Stack Temperature (^{o}F)	108	108	108
Stack Pressure ("H_2O-gage)	-0.03	-0.03	-0.03
Moisture (% vol)	7.0	6.8	6.8
Average Velocity (ft/sec)	13.4	13.3	13.4
Actual Flow Rate (acfm)	5,700	5,600	5,700
Standard Flow Rate (scfm)	5,300	5,200	5,300
Dry Standard Flow Rate (dscfm)	4,900	4,900	4,900

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

STACK GAS COMPOSITION

Run No.	1	2	3
Date	7/14/87	7/14/87	7/14/87
Time	0915-1019	1057-1200	1225-1328
		% By Volume (Dry Basis)	
ONSITE FYRITE			
CO_2	2.0	2.0	1.5
O_2	19.0	19.0	19.5
N_2 (By Difference)	79.0	79.0	79.0
LAB ORSAT			
CO_2	2.0	1.7	1.7
CO	-	-	-
O_2	17.8	18.3	18.0
N_2 (By Difference)	80.2	80.0	80.3

PARTICULATE EMISSIONS

Run No.	1	2	3
Date	7/14/87	7/14/87	7/14/87
Time	0915-1019	1057-1200	1225-1328
Sampling Data			
Nominal Nozzle Size (in)	3/8	3/8	3/8
No. of Sampling Points	12	12	12
Sampling Time (min)	60	60	60
Sample Volume (dscf)	31.9	31.8	31.8
% Isokinetic	100	100	99
Emissions Data			
Pounds/hour	1.08	0.98	0.94
Grains/dscf	0.0252	0.0234	0.0222
Grains/scf	0.0233	0.0217	0.0206

PROCESS INFORMATION

Process information 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.

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: _____
___ Cyclonic Flow Check ___ 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 or ____ lab analysis of "Gas Composition" sample(s) by orsat

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:

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

June 18, 1987

Mr. Richard Ricci
RICCI BROS. SAND CO., INC.
Dragston Road
Port Norris, NJ 08349

RE: Stack Test Protocol

RECON Project No. 0545

Dear Mr. Ricci:

Enclosed please find a copy of the test protocol developed for the emission compliance evaluation of your rotary sand dryer exhaust.

Mr. Edward Choromanski of the NJ DEP has been sent a copy of this protocol and will review.

A tentative testing date has been scheduled for July 15, 1987. If this date is not agreeable, please contact George Wagner at your earliest convenience.

Yours very truly,

Richard F. Toro

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

per George H. Wagner II
Environmental Engineer

GHW/ab
enclosure

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

June 18, 1987

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

RE: RICCI BROS. SAND CO., INC.
Port Norris, NJ 08349

RECON Project No. 0545

Dear Mr. Choromanski:

Enclosed please find a stack test protocol developed for an emission compliance evaluation at the above referenced site. The compliance evaluation will be conducted on a rotary sand dryer exhaust owned by Ricci Bros. Sand Co., Inc.

A tentative testing date of July 15, 1987 has been scheduled.

If you have any questions or comments please do not hesitate to contact us.

Yours very truly,

Richard F. Toro

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

per George H. Wagner II
Environmental Engineer

GHW/ab
enclosure

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: Ed Choromanski

RE: RICCI BROS. SAND CO., INC.
Dragston Road
Port Norris, NJ 08349

CONTACT: Richard Ricci
PHONE NO.: 609-785-0166
RECON Project No. 0545

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

Source to be tested: Dryer Exhaust Stack
ID No.: 001

Applicable permit and/or
certificate numbers: 073363

Approximate Date of Testing: July 15, 1987

For Isokinetic Testing, if any

Stack diameter: 36"
Nearest upstream disturbances: 53'
Nearest downstream disturbance: 6'
EPA Distance "A" 2 EPA Distance "B" 17.7
Proposed number of sampling points: 12
Proposed time per sampling point: 5 minutes
Proposed total stack gas sample size -32 dry standard ft^3

Test Procedures

The particulate emission rate will be quantified in accordance with New Jersey Air Test Method No. 1. A measured volume of stack gas is extracted isokinetically, utilizing the sample train illustrated in Figure No. 1. The sampling probe and filter box is heated to approximately 225°F in order to eliminate water condensation and provide ease of particulate quantification. Four impingers are used to measure the percent moisture in the stack gas. The first two impingers contain 100 mls of water, the third impinger is empty and the fourth impinger contains a known quantity of silica gel.

A calibrated type "S" pitot tube, thermocouple and monometer are used to measure the volumetric flow rate. The ΔP, stack temperature and meter temperature are used to establish the required pressure drop across the dry gas meter for isokinetic sampling.

Three (3) New Jersey Method 1 tests will be performed at or near the maximum operation level of the rotary sand dryer.

Source Operation During Testing

The rotary sand dryer will be operated at or near the maximum operating condition, during the compliance test.

Source Operation Record Keeping

Responsibility of _X_ Owner ___ RECON

_X_ Production Rate
_X_ Fuel Usage
___ Incineration Feed Rate
___ Steam Production
_X_ Operating Parameters (Temperatures, Pressures, Flows, etc.)
___ Other

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

Richard F. Toro, M.Ch.E.
Executive Vice President
June 18, 1987

per George H. Wagner, II
Environmental Engineer

GHW/ab
enclosure
cc: R. Ricci

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 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
X Integrated sample and lab orsat
___ 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 SO3
___ 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)

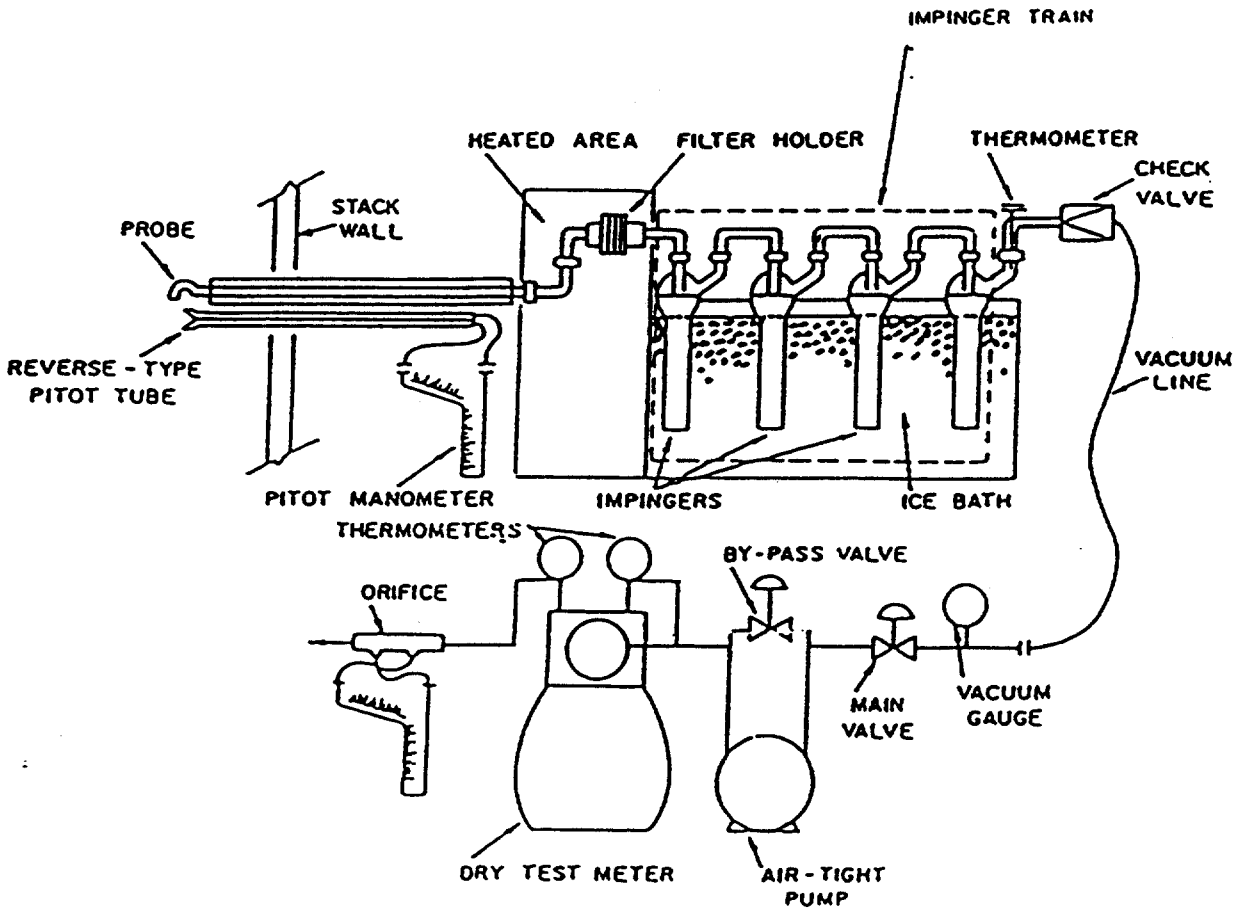
Metal Emissions
___ AA determination on filter and probe wash
___ AA determination on impinger catch

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:

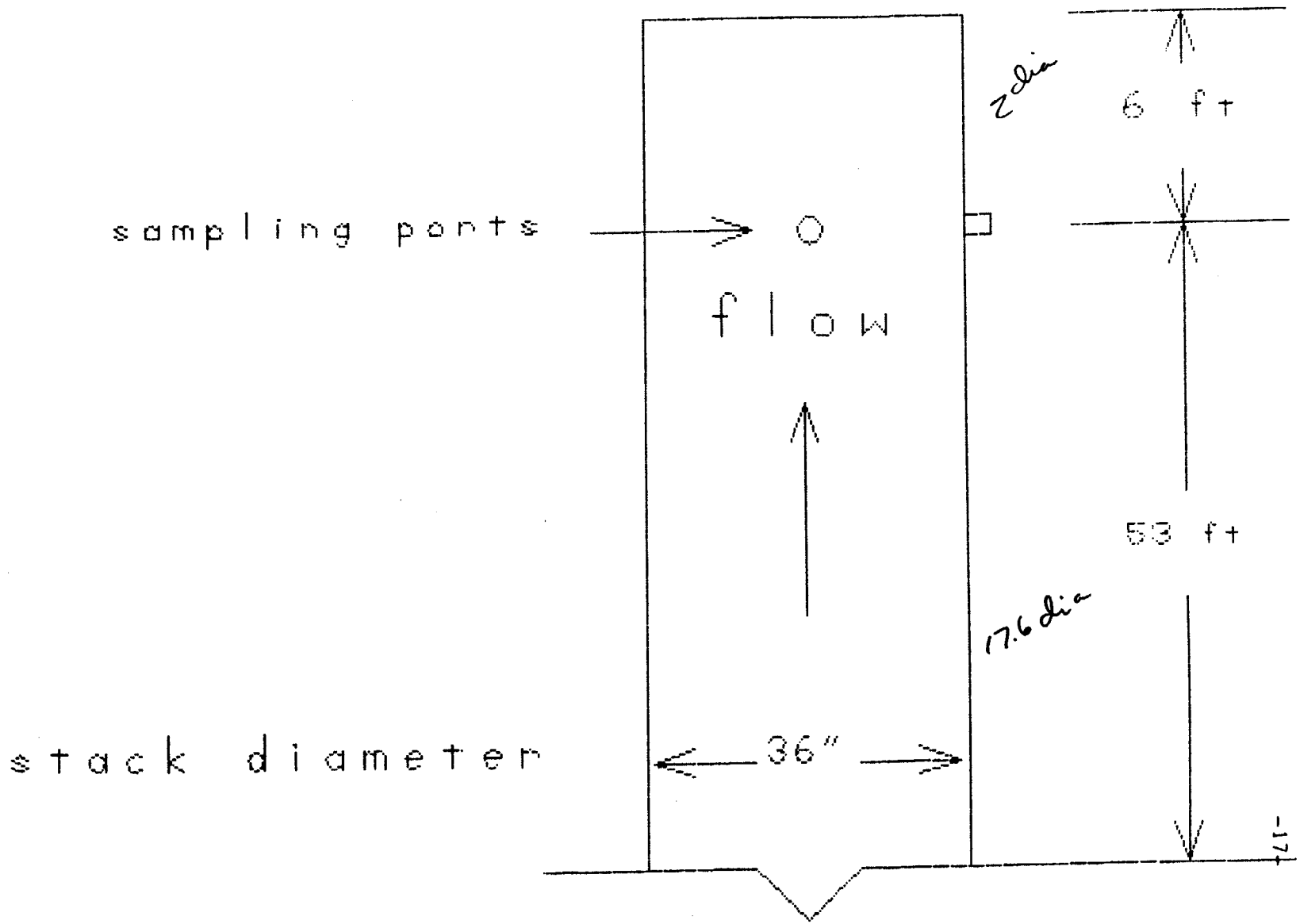


PARTICULATE - SAMPLING TRAIN

FIGURE 1

Richard Ricci Company

Dryer Exhaust Stack
Sampling Locations



My COPY New Collector

Form VEM-004
1/79

Side 1 -18-

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF AIR POLLUTION CONTROL

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

Source Emissions And Source Data Form
(Complete this form for each source and submit with application Form VEM-003)

SECTION E

SOURCE INFORMATION

1. Source Description ELEVATORS, 4 SCREENS AND 11 STORAGE SILOS

2. Operating Schedule 8 Hours/Day, 2000 Hours/Year, MAY 1985 Operation Starting Date

3. % Annual Production Throughput By Quarter: Jan.-Mar. 10, Apr.-June 30, July-Sept. 30, Oct.-Dec. 30

4. Volume Of Gas Discharged From This Source (ACFM) 12000, Source Discharge Temperature (°F) 250

SECTION F

CONTROL APPARATUS ON SOURCE

		Control Cost (Dollars)	Annual Operating Cost (Dollars)	No. of Sources Connected
Primary	DRY CYCLONE	2500	NONE	2
Secondary	IMPINGEMENT SCRUBBER	30,000	10,800	2
Tertiary				

SECTION G

AIR CONTAMINANTS FROM SOURCE

CONTAMINANT NAME	Emissions w/o Control (lbs./hr.)	Emissions with Control (lbs./hr.)	How Determined
SAND	10	1	4

TO INSURE PROPER COORDINATION BETWEEN VEM-003 AND VEM-004 FORMS, INSERT IDENTICAL COMPANY NAME AND DESIGNATION OF STACK FROM VEM-003 SIDE 1

Full Business Name RICCI BROS. SAND CO. INC

Company Designation of Stack (s) EAST HANOVER AVE.

(over)

SECTION H

A. MANUFACTURING AND MATERIALS HANDLING

1. Process Description: DRYING OF SAND

2. Total Amount Materials Processed: ☐ Batch _____ lb/batch, _____ hr/batch; ☒ Continuous 50,000 lb/hr

3. Raw Materials

Raw Materials	% By Wt.	Raw Materials	% By Wt.
SAND	100		

B. FUEL BURNING EQUIPMENT

1. Gross Heat Input (10^6 BTU/HR): 4

2. Type Heat Exchange: ☒ Direct ☐ Indirect ☐ Internal Combustion Engine

	PRIMARY FUEL	SECONDARY FUEL
3. a. Type of Fuel:	#2 OIL	PROPANE
b. Heating Value (Btu/lb):	19,500 BTU/LB	91,300 BTU/GAL
4. Method of Firing:	AIR ATOMIZED	FORCED DRAFT
5. % Sulfur in Fuel (Dry):	.10%	0.1%
6. % Ash Content of Fuel (Dry):	.01	0%
7. Amount Burned/Yr.	4.8	5
Units:	Solid Fuel (Tons)	Liquid Fuel (10^3 Gal) / Gaseous Fuel (10^6 Ft^3)

C. INCINERATION

1. Type of Unit: _____

2. Constituents of Waste (s): _____

3. Waste Code: ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

4. Amount Burned (lbs./hr.): _____ Type of Auxiliary Fuel (If Any): _____

D. STORAGE FACILITY

1. Tank Contents: _____

2. Type of Tank or Bin: _____ Height or Length (Ft.): _____

3. Capacity: _____ (10^3 Ft.^{3}) ☐ _____ (10^3 Gal.) ☐ Diameter or Actual Diameter (Ft.): _____

THE REMAINING QUESTIONS ARE TO BE ANSWERED ONLY FOR LIQUID STORAGE

4. Vapor Pressure at 70°F (PSIA): _____ Storage Temp. (If Not Ambient (°F): _____

5. Filling Rate (Gal/Min): _____ Annual Throughput (10^3 Gal/Yr): _____

6. Method of Fill: ☐ Top ☐ Bottom ☐ Submerged ☐ Other (Explain Below): _____

7. Color of Tank: ☐ White ☐ Other _____ Exposed to Sun's Rays: ☐ Yes ☐ No

8. Insulation Data for Insulated Tanks (Volatile Organic Substances):

Type _____ Thickness (Inches) _____ Thermal Conductivity (BTU/HR/FT^2/°F) _____

For Department Use Only

New Dust Collector - My Copy

VEM-003

Side 20 -

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF AIR POLLUTION CONTROL

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

TO: New Jersey Department of Environmental Protection
Bureau of Air Pollution Control
CN-027, Trenton, NJ 08625

Send $40 payable to

Read Instructions Before Completing Application

SECTION A

1. Full Business Name: RICCI BROS SAND CO INC
2. Mailing Address: DRAGSTON ROAD PORT NORRIS NJ 08349 (No. Street City State Zip Code)
3. Division and/or Plant Name: SAME
4. Plant Location: SAME (No. Street City State Zip Code)
5. Location of Equipment on Premises (bldg., dept., area, etc.): ADJACENT TO WASH PLANT
6. Nature of Business: INDUSTRIAL SAND & GRAVEL
7. Estimated Starting Date of Construction: [illegible]
8. Date Equipment to be put in use: [illegible]
9. Plant Contact: RICHARD A. RICCI — SECRETARY — 609 785 0166 (Name (print or type) Title Telephone No.)

SECTION B

REASON FOR APPLICATION (Check One)

- [ ] New Equipment without Control Apparatus
- [x] New Equipment with Control Apparatus
- [ ] New Control Apparatus on Existing Equipment
- [ ] Five Year Renewal of Certificate No.(s)
- [ ] Other (Explain)
- [ ] Modification to Existing Equipment
- [ ] Modification to Existing Control Apparatus
- [ ] Painting Tank White

SECTION C

STACK INFORMATION (EQUIVALENT STACK INFORMATION)

1. Company Designation of Stack(s): Exhaust on Dryer
2. Previous Certificate Number (if any): 67597
3. a. Number of Sources Venting to this Stack: 2 (Complete a separate VEM-004 for each source)
   b. Number of Stacks Venting Source Operation(s): [illegible]
4. Distance to the nearest Property Line (ft.): 1/2 mile
5. Stack Diameter (inches): 36 inches
6. Discharge Height Above Ground (ft.): 86 feet
7. Exit Temperature of Stack Gases (°F): 250
8. Volume of Gas Discharged at Stack Conditions (A.C.F.M.): 12,000
9. Discharge Direction: [ ] Horizontal [x] Up [ ] Down

The information supplied on applications VEM-003 and VEM-004, including the data in supplements, is to the best of my knowledge true and correct.

Richard A. Ricci — Signature — Date

Richard A. Ricci — Name (print or type) — Secretary — Title

This application will not be processed unless proper fee is submitted. FOR ASSISTANCE CALL (609) 292-6716

FOR DEPARTMENT USE ONLY

NJ I.D.	STACK	LOG NO.	CT NO.	FEE	EVAL

Forty dollars payable to N.J. D.E.P.

Form VEM-004
1/79

Side 1-21-

New Collector
My copy

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF AIR POLLUTION CONTROL

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

Source Emissions And Source Data Form
(Complete this form for each source and submit with application Form VEM-003)

SECTION E

SOURCE INFORMATION

1. Source Description: ROTARY SAND DRYER

2. Operating Schedule: 24 Hours/Day; 2000 Hours/Year; JUN 1 1985 Operation Starting Date

3. % Annual Production Throughput By Quarter: Jan.-Mar. 10; Apr.-June 20; July-Sept. 30; Oct.-Dec. 30

4. Volume Of Gas Discharged From This Source (ACFM): 12000; Source Discharge Temperature (°F): 250

SECTION F

CONTROL APPARATUS ON SOURCE

		Capital Cost (Dollars)	Annual Operating Cost (Dollars)	No. of Sources Connected
Primary	DRY CYCLONE	8,500	N.A.	2
Secondary	IMPINGEMENT SCRUBBER	3500	4800	2
Tertiary				

SECTION G

AIR CONTAMINANTS FROM SOURCE

CONTAMINANT NAME	Emissions w/o Control (lbs./hr.)	Emissions with Control (lbs./hr.)	How Determined
SAND	400	44	4
SO_2	1.218	0.974	3
CO	0.141	0.141	3
HC	0.028	0.028	3
NO_x	0.162	0.162	3

TO INSURE PROPER COORDINATION BETWEEN VEM-003 AND VEM-004 FORMS, INSERT IDENTICAL COMPANY NAME AND DESIGNATION OF STACK FROM VEM-003, SIDE 1.

Full Business Name: [redacted]

Company Designation of Stack(s): Exhaust on Dryer

(over)

SECTION H

A. MANUFACTURING AND MATERIALS HANDLING

1. Process Description SCREENING AND STORAGE OF SAND

2. Total Amount Materials Processed: ☐ Batch ____ lb/batch, ____ hr/batch; ☒ Continuous 50,000 lb/hr

3. Raw Materials	% By Wt.	Raw Materials	% By Wt.
SAND	100		

B. FUEL BURNING EQUIPMENT

1. Gross Heat Input (10^6 BTU/HR) ____

2. Type Heat Exchange ☐ Direct ☐ Indirect ☐ Internal Combustion Engine

	PRIMARY FUEL	SECONDARY FUEL
3. a. Type of Fuel:		
b. Heating Value (Btu/lb):		
4. Method of Firing:		
5. % Sulfur in Fuel (Dry):		
6. % Ash Content of Fuel (Dry):		
7. Amount Burned/Yr.		

Units: Solid Fuel (Tons) Liquid Fuel (10^3 Gal.) Gaseous Fuel (10^6 Ft.^{3})

C. INCINERATION

1. Type of Unit ____

2. Constituents of Waste (s) ____

3. Waste Code ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6

4. Amount Burned (lbs./hr.) ____ Type of Auxil. Fuel (If Any) ____

D. STORAGE FACILITY

1. Tank Contents Sand

2. Type of Tank or Bin Steel Height or Length (Ft.) 30

3. Capacity 90 Tons (10^3 Ft.^{3}) ☐ Equivalent or Actual Diameter (Ft.) 40
(10^3 Gal.) ☐

THE REMAINING QUESTIONS ARE TO BE ANSWERED ONLY FOR LIQUID STORAGE

4. Vapor Pressure at 70°F (PSIA) ____ Storage Temp. If Not Ambient (°F) ____

5. Filling Rate (Gal/Min) ____ Annual Throughput (10^3 Gal/Yr) ____

6. Method of Fill ☐ Top ☐ Bottom ☐ Submerged ☐ Other (Explain Below)

7. Color of Tank ☐ White ☐ Other ____ Exposed to Suns Rays? ☐ Yes ☐ No

8. Insulation Data for Insulated Tanks (Volatile Organic Substances)

Type ____ Thickness (Inches) ____ Thermal Conductivity (BTU/HR/FT^2/°F) ____

For Department Use Only

[ ][ ][ ][ ][ ] - [ ][ ] . [ ][ ][ ]

SELECTED NOMENCLATURE

Time = military time
min = minutes
^{o}F = degrees Fahrenheit
^{o}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
$\leq$ = 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

METER Box I.D. 4 METER NO. 175 176 DATE INSTALLED APR 13, 87 BY: CDR

BARO. PRESS. – 30.15 "Hg

ΔH ORIFICE SETTING	METER TEMP. IN	OUT	AVG °F	T+460	METER READING	A CUBIC FT.	TIME @ SEC.	ΔH@	DIFFERENCE FROM AVG. ΔH.
					2: 014.564				
.5	79 F	73F	76F	536R	1: 013.801	0.763	120	1.94	-0.03
					2: 013.374				
1.0	80	72	76	536	1: 012.302	1.072	120	1.96	-0.01
					2: 011.416				
1.5	80	72	76	536	1: 010.103	1.313	120	1.96	-0.01
					2: 009.104				
2.0	79	71	75	535	1: 007.604	1.500	120	2.00	+0.03
					2: 006.784				
2.5	78	71	74.5	534	1: 005.104	1.680	120	1.99	+0.02
					2: 003.647				
3.0	78F	70F	74 F	534 R	1: 001.804	1.843	120	1.98	+0.01
							AVG.	1.97	—

CALCULATION:

$$\Delta H@ = \frac{.0317(\Delta H)}{29.84(T+460)}\left[\frac{T+460(.20)}{A(60)}\right]^{-2}$$

AVG. $\Delta H@$ =

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

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

SHEET NO L-22 OF TECH. FILE

CALCULATED BY _____ DATE _____

PROOF AND DIFFERENTIAL TEST RECORD

Meter Size 3D12,5,90 Date Received 11/18/86 Inspector Jack Hatt

Date Tested 11/20/86 New ___ Repaired ✓ Manufacturer Rockwell American

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
716691	Intest	99.9	98.5	27	Uncorr. % Proof as found
					Corr. % Proof
175176	Intest	100.2	100.2	40	Uncorr. % Proof as found
					Corr. % Proof
29056	Intest	101.0	101.0	28	Uncorr. % Proof as found
					Corr. % Proof
					Uncorr. % Proof
					Corr. % Proof
716691	adjust	100.0	100.0	27	Uncorr. % Proof as calibrated
					Corr. % Proof
175176	adjust Valve	100.0	1000	30	Uncorr. % Proof as calibrated
					Corr. % Proof
29056	adjust	1000	1000	28	Uncorr. % Proof as calibrated
					Corr. % Proof

PITOT TUBE CALIBRATION

Pitot tube calibration number 19 Date JUNE 11, 87

Calibrated by PEM & CDR

EFFECTIVE LENGTH 4'

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	1.03	0.84	+0.01
2	0.29	0.41	0.83	0.00
3	0.17	0.24	0.83	0.00
		$\bar{C}_{p(side\ A)}$	0.83	$\delta = 0.003$ *

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	1.03	0.84	0.00
2	0.29	0.39	0.85	+0.01
3	0.17	0.24	0.83	-0.01
		$\bar{C}_{p(side\ B)}$	0.84	$\delta = 0.007$ *

$C_p(A) - C_p(B) = \pm 0.01$ *

Figure 4-10. Pitot tube calibration data.

* VALUE MUST BE $\leq \pm 0.01$

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

NOZZLE CALIBRATION DATA FORM

Date 1/6/87 Calibrated by T. Mathis

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
≠24	.250	.250	.250	.000	.250
#33	.368	.368	.368	.000	.368
≠34 (used for 3 runs)	.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

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 7/1/86 Thermocouple number #14

Ambient temperature 76 F ~~X~~ 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	164	165	0.23
	Hot Oil	95	98	0.82
	Hot Oil	125	128	0.75

[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 Richard Ricci
RECON Job # 0545
FIELD Supervisor P. MARSHALL

Date 7/14/87
Jobsite Company RICCI BROS-
Street Dragston Road
City Port Norris State NJ Zip 08349

Processes, Stacks, Sites, etc. Tested:

1. Dryer Outlet Condition* _____
2. _____ Condition* _____
3. _____ Condition* _____
4. _____ Condition* _____

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

Milestone Times (Military)

Arrival 730 am Lost Time —

Lunch — to _____

Departure 230 pm _____

Reasons For Lost Time _____

Client or Jobsite Representative Aware of Lost Time _____

Personnel Onsite
RECON: P. Marshall, T. Matter, _____, _____, _____, _____,
_____, _____, _____, _____, _____, _____,
_____, _____, _____, _____, _____, _____,
Client: R. Ricci, _____, _____, _____, _____, _____.
Jobsite Reps: R. Ricci, _____, _____, _____, _____, _____.
Agencies Observing (1) NJDEP (2) NJDEP
Agency Personnel (1) Doug Bruckman, _____, _____.
(2) Vincent Garbarino, _____, _____.

OUT OF SCOPE WORK REQUESTED AND PERFORMED

CHECKLIST

	Yes	No
1. Process data collected (by us or from customer?)	✓	
2. Process sketches made?	✓	
3. Sampling location sketches made?	✓	
4. Fuel, sludge, water or other supplemental samples required collected?	N/A	
5. All samples recovered, labeled and secured?	✓	
6. Reagent blanks collected?	✓	

If not, list to be done yet:

Other Observations, Comments, Notes, Etc.

1. Weather conditions and air temperature cloudy, 80°F
2. Barometric Pressure 29.90 "Hg
3. Method(s) used NJ #1
4.
5.

Calibration Data
Console No. 4 H @ 1.97 Nozzle No. 34 Dn 3/8 "
Meter CF 1.00 Pyrometer No. 3 ; 225 °F or ____ °C
Thermocouple No. 14 Pitobe No. 19 Cp .835
Filter Type Glass Fiber Size 4 "

Traverse Points
For Circular Stacks

See EPA Method 1 for determining the number of points to be sampled on each traverse. Circle this number and the entire column below it.

TABLE 1-2. LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

[Percent of stack diameter from inside wall to traverse point]

Traverse point number on a diameter	Number of traverse points on a diameter—											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.8	10.5
6			96.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	28.8	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	36.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

Use this and the following page for each probe marking.

Nozzle Areas (ft^2) = A_n

1/8" = $0.851(10^{-4})$ 3/8" = $7.65(10^{-4})$

3/16" = $1.92(10^{-4})$ 1/2" = $13.6(10^{-4})$

1/4" = $3.41(10^{-4})$

RECON SYSTEMS, INC.
Three Bridges NJ 08887

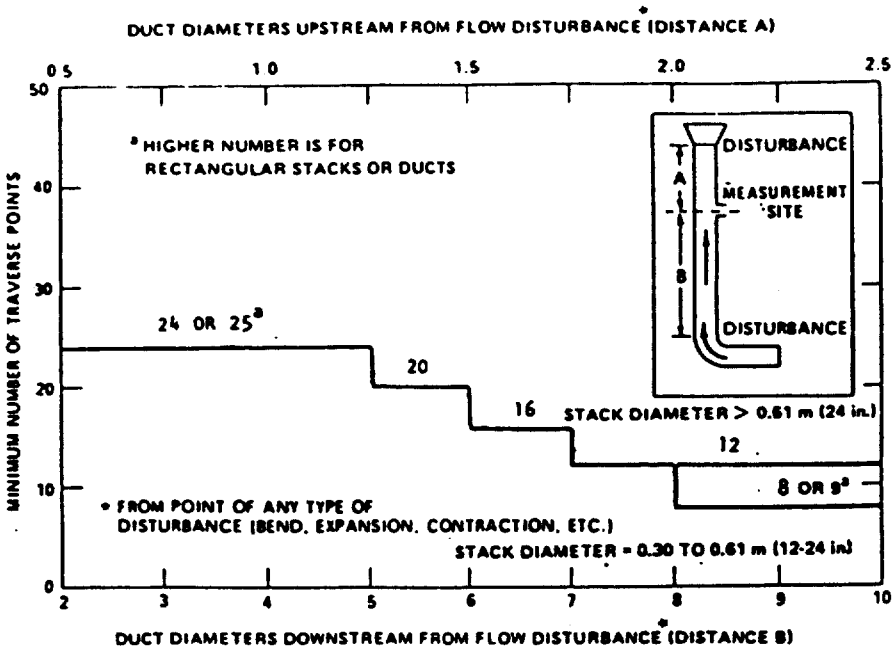


Figure 1-1. Minimum number of traverse points for particulate traverses.

TABLE 1-1. CROSS-SECTION LAYOUT FOR RECTANGULAR STACKS

Number of traverse points	Matrix layout
9	3x3
12	4x3
16	4x4
20	5x4

TABLE 1-1. CROSS-SECTION LAYOUT FOR RECTANGULAR STACKS—Continued

Number of traverse points	Matrix layout
25	5x5
30	6x5
36	6x6
42	7x6
49	7x7

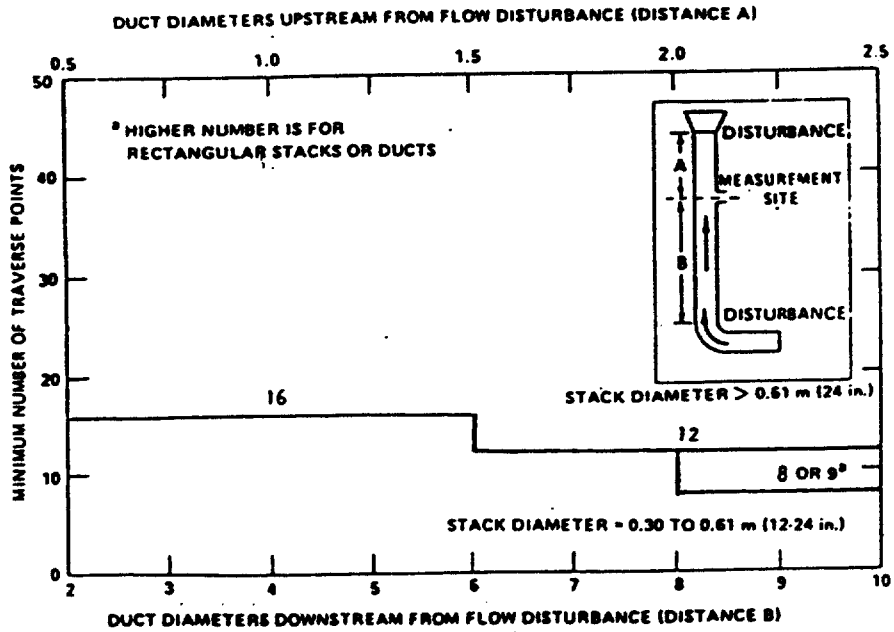


Figure 1-2. Minimum number of traverse points for velocity (nonparticulate) traverses.

Probe Markings - Circular Stack

Stack I.D. @ Port 36 inches Port Extension 2 inches

Right most column is the distance from probe tip to outside of port extension.

Traverse Point Number	Length Factor from Previous Page, K_L	Product of length factor times stack inside diameter (inches) K_L x (stack ID)	Sum of previous column and port extension (inches) K_L x(stack ID) + port extension	Convert previous column to inches and common fractions ↓
1	.044	1.58	3.58	3 1/2
2	.146	5.25	7.25	7 1/4
3	.296	10.66	12.66	12 1/2
4	.704	25.34	27.34	27 3/8
5	.854	30.74	32.74	32 3/4
6	.956	34.42	36.42	36 1/2
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Stack cross sectional area = csa = $\frac{0.785}{144}(ID)^2 = \frac{ID^2}{183.4}$ = 7.07 ft^2

Nozzle# 34
Therm.# 14
PITOBE NO. 19
CONSOLE NO. 4

Particulate Sampling Field Data

Plant Ricci Bros.
Stack Dryer Outlet
Nozzle Size 0 3/8" .375
Time @ Each Point (θ) 5 Min
Ambient Temperature 80 °F

Date 7/14/87
Sample No. 1 Box No. 4
Probe Heater @ % Box Heater @ °F
Hose Heater @
Ambient Pressure (P_{bar}) "Hg

Stack Pressure (P) − 0.03 "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	0915	856.451	.06	1.20	83	83	3+	108	200	220	107
2	20	59.2	.06	1.20	86	84	3+	114	203	222	109
3	25	62.5	.06	1.20	88	84	3+	113	204	223	109
4	30	65.3	.05	1.00	89	85	2+	131	208	225	107
5	35	68.0	.05	1.00	90	85	3+	140	207	220	107
6	40	70.7	.05	1.00	90	86	3+	150	209	223	107
END	0945	873.300									
B-1	0949	873.300	.05	1.00	88	86	2+	163	210	225	107
2	54	75.9	.05	1.00	91	87	2+	165	210	226	108
3	59	78.7	.05	1.00	91	87	2+	185	211	223	110
4	04	81.7	.05	1.00	91	87	2+	190	210	220	110
5	09	84.0	.05	1.00	91	87	2+	190	210	220	109
6	14	86.7	.05	1.00	92	87	2+	189	211	222	109
END	1019	889.442									
					89.2	85.6					
			.0525	1.05	~~80~~ 87	~~73~~ 43					108.25
*	θ=	V= 32.991	-----	ΔH=	T_m=						T_s=

* Sum, Average, or Difference

(Convert to °F)

V_m = V (DGMCF) = (32.991)(1.0) = 32.991 ft^3

Other Data

Time	Sample or Measurement	Value
	O_2	19.0
	CO_2	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 0.00 at 7"

CLIENT: Ricci Bros.
SAMPLING DATE: 7/14/87
SAMPLING TIME: 0915-1019
UNIT SAMPLED: DRYER OUTLET

Date: 07/23/87
Time: 11:04 AM
Run # 1

AVERAGE VELOCITY PRESSURE

Delta P (IN H2O)	Delta P Square Root
0.06	0.24
0.06	0.24
0.06	0.24
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22

THE AVERAGE SQUARE ROOT OF DELTA P = .2289424

CLIENT: RICCI BROS.
SAMPLING DATE: 7/14/87
SAMPLING TIME: 0915-1019
UNIT SAMPLED: DRYER OUTLET

Date: 07/23/87
Time: 11:04 AM
Run # 1

Delta H (IN H2O)	Meter Temp(F) IN	Meter Temp(F) OUT	Stack Temp(F)
1.20	83.00	83.00	107.00
1.20	86.00	84.00	109.00
1.20	88.00	84.00	109.00
1.00	89.00	85.00	107.00
1.00	90.00	85.00	107.00
1.00	90.00	86.00	107.00
1.00	88.00	86.00	107.00
1.00	91.00	87.00	108.00
1.00	91.00	87.00	110.00
1.00	91.00	87.00	110.00
1.00	91.00	87.00	109.00
1.00	92.00	87.00	109.00

AVERAGES
DELTA H = 1.05 IN H2O OK
METER TEMP. = 87.41666 F OK
STACK TEMP. = 108.25 F OK

Water and Dry Particulate Collections

PLANT Ricci Bros.
TEST FOR Particulates
SAMPLE NO. 1 BOX NO. 4

STACK Dryer Outlet
DATE 7-14-87
OPERATING CONDITION

		Grams	Grams
Impinger 1	Final Weight	601.6	
	Initial Weight	576.8	
	Increase		Impinger 1 24.8
Impinger 2	Final Weight	636.4	
	Initial Weight	625.9	
	Increase		Impinger 2 10.5
Impinger 3	Final Weight	478.2	
	Initial Weight	474.4	
	Increase		Impinger 3 3.8
Silica Gel	Final Weight	835.1	
	Initial Weight	823.4	
	Increase		Silica Gel 11.7

Record Water Collected in cyclone, flash, if any:

Final Weight _____ gms

Initial Weight _____ gms

Increase _____ gms

50.8 grams

Total mass of water caught

Filter Diameter 4 inches

Filter Type Glass Fiber

Filter	Final Weight	0.6643
	Initial Weight	0.6217
	Increase	

0.0426 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 Ricci Bros. STACK Dryer Outlet SAMPLE NO. 1 FOR Particulates

SAMPLING DATE 7-14-87 OPERATING CONDITION _____

Acetone Washings

TOTAL SAMPLE Gross 597.0 GMS
Tare- 306.7 GMS

(A) Net 290.3 GMS

AMOUNT EVAPORATED 290.3 GMS (B)

Evap. Beaker NO. ____
Gross 103.2331 GMS
Tare- 103.2237 GMS
Net 0.0094 (C) GMS

Acetone Blank = _____ / 100 GMS = _____ GMS
(D)

Corrected Net (E) = (C) - (B)(D)
= _____ - _____ (_____ / 100)
= _____ GMS

Scaled Up Net = (E) A/B
= _____ (_____)
= 0.0094 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

Particulates

Nozzle, Probe, and Acetone Washing .0094 grms

Filter .0426 grms

Enter "0" if no Organic or Aqueous Phase

Aqueous Phase 0 grms

Organic Phase 0 grms

Totals

GRAINS/DSCF = 2.516483E-02
POUNDS/HOUR = 1.080003

Particulate Sampling Field Data

Plant RICCI BROS. | Date 7/14/87 | PITOBE NO.
Stack DRYER OUTLET | Sample No. 2 | CONSOLE NO.
Nozzle Size 3/8 " | Probe Heater @ % | Box No.
Time @ Each Point (θ) 5 Min | Hose Heater @ | Box Heater @ °F
Ambient Temperature 85 °F | Ambient Pressure (P_{bar}) "Hg

Stack Pressure (P) - 0.03 "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	1057	895.175	.05	1.00	86	86	3+	134	190	218	107
2	1102	898.3	.05	1.00	89	86	3+	140	193	220	105
3	07	900.8	.05	1.00	89	86	3+	148	195	222	106
4	12	903.4	.05	1.00	90	86	3+	165	198	226	108
5	17	905.9	.05	1.00	91	87	3+	189	200	225	108
6	22	908.6	.05	1.00	91	87	3+	191	201	222	108
END	1127	911.220									
A-1	1130	911.220	.06	1.20	91	87	4+	190	202	224	107
2	35	914.2	.06	1.20	91	87	4+	189	202	224	108
3	40	917.2	.06	1.20	91	88	4+	190	201	223	108
4	45	920.1	.05	1.00	91	88	3+	191	200	220	109
5	50	923.2	.05	1.00	91	88	3+	191	202	225	110
6	55	925.7	.05	1.00	92	88	3+	192	202	223	110
END	1200	928.115									
				1.05	88.5						107.8
*	θ=	V= 32.940	-----	ΔH=	T_m=						T_s=

* Sum, Average, or Difference

(Convert to °F)

V_m = V (DGMCF) = ( )( ) = ft³

Other Data

Time	Sample or Measurement	Value
	O_2	19.0
	CO_2	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 0.003 at 15"

Post Leak Check 0.00 at 5"

CLIENT: RICCI BROS
SAMPLING DATE: 7/14/87
SAMPLING TIME: 1057-1200
UNIT SAMPLED: DRYER OUTLET

Date: 07/23/87
Time: 11:04 AM
Run # 2

AVERAGE VELOCITY PRESSURE

Delta P (IN H2O)	Delta P Square Root
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.06	0.24
0.06	0.24
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22

THE AVERAGE SQUARE ROOT OF DELTA P = .2271638

CLIENT: RICCI BROS.
SAMPLING DATE: 7/14/87
SAMPLING TIME: 1057-1200
UNIT SAMPLED: DRYER OUTLET

Date: 07/23/87
Time: 11:04 AM
Run # 2

Delta H (IN H2O)	Meter Temp(F) IN	OUT	Stack Temp(F)
1.00	86.00	86.00	107.00
1.00	87.00	86.00	105.00
1.00	89.00	86.00	106.00
1.00	90.00	86.00	108.00
1.00	91.00	87.00	108.00
1.00	91.00	87.00	108.00
1.20	91.00	87.00	107.00
1.20	91.00	87.00	108.00
1.00	91.00	88.00	108.00
1.00	91.00	88.00	109.00
1.00	91.00	88.00	110.00
1.00	92.00	88.00	110.00

AVERAGES
DELTA H = 1.033333 IN H2O
METER TEMP. = 88.54166 F
STACK TEMP. = 107.8333 F

Water and Dry Particulate Collections

PLANT RICCI Bros.
TEST FOR Particulates
SAMPLE NO. 2 BOX NO. 4

STACK Dryer outlet
DATE 7-14-87
OPERATING CONDITION

		Grams	Grams
Impinger 1	Final Weight	630.9	
	Initial Weight	617.0	
	Increase		Impinger 1 13.9
Impinger 2	Final Weight	618.9	
	Initial Weight	600.7	
	Increase		Impinger 2 18.2
Impinger 3	Final Weight	480.1	
	Initial Weight	475.6	
	Increase		Impinger 3 4.5
Silica Gel	Final Weight	828.1	
	Initial Weight	815.8	
	Increase		Silica Gel 12.3

Record Water Collected in cyclone, flask, if any:

Final Weight _____ gms

Initial Weight _____ gms

Increase _____ gms

43.7 grams

Total mass of water caught

Filter Diameter 4 inches

Filter Type Glass fiber

Filter	Final Weight	6620
	Initial Weight	6213
	Increase	

0.0407 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 Ricci Bros STACK Dryer Inlet SAMPLE NO. 2 FOR Particulates

SAMPLING DATE 7-14-81 OPERATING CONDITION

Acetone Washings

TOTAL SAMPLE Gross 589.1 GMS

Tare- 300.8 GMS

(A) Net 288.3 GMS

AMOUNT EVAPORATED 288.3 GMS (B)

Evap. Beaker NO.

Gross 105.6985 GMS
105.6911

Tare- ~~101.8941~~ GMS

Net 0.0074 (C) GMS

Acetone Blank = $\frac{0.0000 \text{ GMS}}{100 \text{ GMS}}$ (D)

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

= 0.0074 - 288.3 $\left(\frac{0000}{100}\right)$

= 0.0074 GMS

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

= 0.0074 $\left(\frac{288.3}{288.3}\right)$

= 0.0074 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) = $\frac{\text{GMS}}{100 \text{ GMS}}$

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

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

= _____ GMS

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

= _____ $\left(\text{_____}\right)$

= _____ GMS

E/C Phase

Evap. Beaker No. ____

Gross _____ GMS

Tare- _____ GMS

Net _____ (K) GM

E/C Blank (M) = $\frac{\text{GMS}}{100 \text{ mls}}$

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

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

= _____ GMS

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

= _____ $\left(\text{_____}\right)$

= _____ GMS

Particulates

Nozzle, Probe, and Acetone Washing .0074 grms

Filter .0407 grms

Enter "0" if no Organic or Aqueous Phase

Aqueous Phase 0 grms

Organic Phase 0 grms

Totals

GRAINS/DSCF = 2.336241E-02
POUNDS/HOUR = .9795658

Particulate Sampling Field Data

Plant RICCI BROS. | Date 7/14/87 | PITOBE NO.
Stack INTERMEDIATE | Sample No. 3 | CONSOLE NO.
Nozzle Size 3/8 " | Probe Heater @ % | Box No.
Time @ Each Point (θ) 5 Min | Hose Heater @ | Box Heater @ °F
Ambient Temperature 80 °F | Ambient Pressure (P_{bar}) "Hg

Stack Pressure (P) −0.03 "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	1225	928.218	.06	1.20	86	86	3+	121	180	218	107
2	30	91.1	.06	1.20	82	86	3+	135	189	220	108
3	35	34.0	.06	1.20	88	86	3+	152	188	223	108
4	40	37.5	.05	1.0	89	88	3+	164	193	226	110
5	45	39.7	.05	1.0	90	88	3+	170	198	222	108
6	50	42.5	.05	1.0	91	88	3+	175	199	223	106
END	1255	945.070									
B-1	1258	945.070	.05	1.0	91	88	3	178	197	220	108
2	03	47.2	.05	1.0	91	88	3	177	196	225	108
3	08	50.4	.05	1.0	91	88	3	179	198	228	109
4	13	53.1	.05	1.0	91	80	3	170	191	220	110
5	18	55.9	.05	1.0	91	88	3	189	190	226	109
6	23	59.1	.05	1.0	91	88	3	168	190	222	107
END	1228	961.219									
			.0525	1.05	53.6						108.2
*	θ=	V=33.001	-----	ΔH=	T_m=						T_s=

* Sum, Average, or Difference

(Convert to) °F

V_m = V (DGMCF) = (33.001)(1.0) = 33.001 ft^3

Other Data

Time	Sample or Measurement	Value
	O_2	19.5
	CO_2	1.5

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 0.000 at 15"

Post Leak Check 0.00 at 5"

CLIENT: RICCI BROS.
SAMPLING DATE: 7/14/87
SAMPLING TIME: 1225-1328
UNIT SAMPLED: DRYER OUTLET

Date: 07/23/87
Time: 11:04 AM
Run # 3

AVERAGE VELOCITY PRESSURE

Delta P (IN H2O)	Delta P Square Root
0.06	0.24
0.06	0.24
0.06	0.24
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22
0.05	0.22

THE AVERAGE SQUARE ROOT OF DELTA P = .2289424

CLIENT: Ricci Bros
SAMPLING DATE: 7/14/87
SAMPLING TIME: 1225-1328
UNIT SAMPLED: DRYER OUTLET

Date: 07/23/87
Time: 11:04 AM
Run # 3

Delta H (IN H2O)	Meter Temp(F) IN	OUT	Stack Temp(F)
1.20	86.00	86.00	107.00
1.20	86.00	86.00	108.00
1.20	88.00	86.00	108.00
1.00	89.00	88.00	110.00
1.00	90.00	88.00	108.00
1.00	91.00	88.00	106.00
1.00	91.00	88.00	108.00
1.00	91.00	88.00	108.00
1.00	91.00	88.00	110.00
1.00	91.00	88.00	110.00
1.00	91.00	88.00	109.00
1.00	91.00	88.00	107.00

AVERAGES
DELTA H = 1.05 IN H20
METER TEMP. = 88.58334 F
STACK TEMP. = 108.25 F

Water and Dry Particulate Collections

PLANT RICO Brass
TEST FOR Particulate
SAMPLE NO. 3 BOX NO. 9

STACK Dryer outlet
DATE 7-14-87
OPERATING CONDITION

		Grams	Grams
Impinger 1	Final Weight	608.5	
	Initial Weight	587.0	
	Increase		Impinger 1 [illegible]
Impinger 2	Final Weight	659.9	
	Initial Weight	648.1	
	Increase		Impinger 2 [illegible]
Impinger 3	Final Weight	477.8	
	Initial Weight	473.6	
	Increase		Impinger 3
Silica Gel	Final Weight	804.2	
	Initial Weight	797.9	
	Increase		Silica Gel

Record Water Collected in cyclone, flask, if any:

Final Weight _____ gms

Initial Weight _____ gms

Increase _____ gms

[illegible] grams

Total mass of water caught

Filter Diameter 4 inches

Filter Type Glass Fiber

Filter	Final Weight	6603
	Initial Weight	6205
	Increase	

0.0398 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 Ricci Bros STACK Dryer Outlet SAMPLE NO. 3 FOR Particulate

SAMPLING DATE 7-14-87 OPERATING CONDITION

Acetone Washings

TOTAL SAMPLE Gross 571.5 GMS
Tare- 304.8 GMS

(A) Net 266.7 GMS

AMOUNT EVAPORATED 266.7 GMS (B)

Evap. Beaker NO. ____
Gross 101.9001 GMS
Tare- 101.8941 GMS
Net 0.0059 (C) GMS

Acetone Blank (D) = 0.0000 GMS / 100 GMS

Corrected Net (E) = (C) - (B)(D)
= 0.0059 - 266.7 (0.0000/100)
= 0.0059 GMS

Scaled Up Net = (E) A/B
= 0.0059 (266.7/266.7)
= 0.0059 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

Particulates

Nozzle, Probe, and Acetone Washing .0059 grms

Filter .0398 grms

Enter "0" if no Organic or Aqueous Phase

Aqueous Phase 0 grms

Organic Phase 0 grms

Totals

GRAINS/DSCF = 2.215714E-02
POUNDS/HOUR = .9365529

CLIENT: RICCI BROS.

Date: 07/23/87
Time: 11:04 AM

THE FOLLOWING WERE PROGRAMMER INPUTS FOR ISOKINETICS

SAMPLE NO.	1	2	3
DATE	7/14/87	7/14/87	7/14/87
TIME	0915-1019	1057-1200	1225-1328
UNIT SAMPLED	DRYER OUTLET	DRYER OUTLET	DRYER OUTLET
ACTUAL NOZZLE DIAMETER (ND), IN	0.38	0.38	0.38
PITOT FACTOR (CP)	0.84	0.84	0.84
TIME @ EACH POINT (MIN)	5.00	5.00	5.00
AMBIENT PRESSURE (PBAR), IN-HG	29.90	29.90	29.90
STACK PRESSURE (PS), IN-HG	-0.03	-0.03	-0.03
METER VOLUME (VM), CU-FT	32.99	32.94	33.00
WATER COLLECTED IMPINGERS, GRMS	50.80	48.90	49.30
CARBON DIOXIDE (CO_2), %	2.00	2.00	1.50
OXYGEN (O_2), %	19.00	19.00	19.50
STACK DIAMETER (DIA), IN	36.00	36.00	36.00
STACK CROSS SECTIONAL AREA (CSA), FT^2	7.07	7.07	7.07

CLIENT: RICCI BROS.

Date: 07/23/87
Time: 11:04 AM

ISOKINETIC CALCULATIONS

SAMPLE NO.	1	2	3
DATE	7/14/87	7/14/87	7/14/87
TIME	0915-1019	1057-1200	1225-1328
UNIT SAMPLED	DRYER OUTLET	DRYER OUTLET	DRYER OUTLET
METER VOLUME (VM-STD), SCU-FT	31.89	31.77	31.83
WATER COLLECTED (VW-STD), SCU-FT	2.40	2.31	2.33
MOISTURE (VOL %)	7.01	6.79	6.83
ACTUAL MOLECULAR WEIGHT (MW), LBS/LB-MOLE	28.30	28.33	28.27
ACTUAL VELOCITY IN STACK (VS), FT/SEC	13.38	13.27	13.39
ACTUAL FLOW RATE IN STACK (ACFM)	5676.00	5627.41	5679.60
VELOCITY @ STP (VS-STD), FT/SEC	12.47	12.37	12.48
STACK FLOW RATE @ STP (SCFM)	5289.53	5248.09	5292.88
DRY FLOW RATE (DSCFM)	4918.65	4891.75	4931.36
NOZZLE VELOCITY @ STP (VN-STD), FT/SEC	12.42	12.35	12.37
ISOKINETIC %	99.60	99.78	99.16

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 RICCI BROS. STACK [redacted] DRYER OUTLET

SAMPLE NO. _____ OPERATING CONDITIONS _____

JOB NO. 0545

--Dry Basis--

Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Run#1	7/14/87	2.0	17.8	—	80.2
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Run#2	7/14/87	1.7	18.3	—	81.7
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Run#3	7/14/87	1.7	18.0	—	80.3
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)
Sample ID	Date	% CO_2	% O_2	% CO	% N_2 (By Diff.)

CHEMIST: [signature]

Date: 7/14/87