

March, 1998

COMPLIANCE REPORT

**SOURCE EMISSION
COMPLIANCE PROGRAM
for
NON-METALLIC MINERAL PROCESSING PLANT**

Prepared for:
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61 Main Street
Proctor, Vermont 05765

Purchase Order Number: 87512

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Project Numbers: 981232

April 17, 1998

FOREWORD

Air Quality Technical Services, Inc., an environmental consulting company specializing in air resource management and air quality assessment, has been contracted by OMYA, Inc. to conduct a source emission compliance program at the non-metallic mineral processing facility it owns and operates in Florence, Vermont.

This report presents program results, test and analytical data, sampling and analytical methods, and other relevant data.

To the best of my knowledge the data contained herein are correct and reliable.

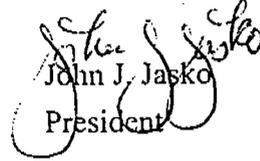

John J. Jasko
President

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1.0 INTRODUCTION

On September 13, 1996, the State of Vermont Agency of Natural Resources, Air Pollution Control Division (APCD), issued OMYA, Inc. (OMYA) an amended Air Pollution Control Permit (#AP-89-049d) to install and operate two new flash dryers systems, designated as Flash Dryer #1 and Flash Dryer #2, at the Verpol Plant it owns and operates in Florence, Vermont.

An Emissions Limitations section of the Permit address the discharge of air contaminants released to the atmosphere from the facility as follows:

Permit Condition (7) Visible Emission Standards (a) sets a limit on visible emissions (VE) of no greater than 7 percent opacity for fabric filter dust collectors, and, (c) requires that compliance with opacity standards be determined in accordance with Code of Federal Regulations (CFR) 40, Appendix A, Reference Method 9.

Permit Condition (8) specifies that emission concentrations of particulate matter (PM) from fabric filter dust collectors not exceed 0.01 grains per dry standard cubic foot (gr/dscf) and further limits the overall emission rates of PM from Flash Dryers #1 or #2 to 0.86 pounds per hour (lbs/hr), and states that compliance with emission limits be determined in accordance with CFR 40, Appendix A, Reference Method 5.

Permit Condition (32) requires that emission testing of the new flash dryers be conducted to demonstrate compliance with applicable emission limitations and a written report of the results be submitted within 180 days after the initial start-up date.

An initial compliance program was conducted from June 9 - 13, 1997. A second compliance was initiated October 26, 1997, with particulate emission determination, and continued November 13 and 18, 1997, with visible emission determination. At that time Flash Dryer #2 again failed to demonstrate compliance with permitted standards for particulate concentration, emission rate and opacity. Flash Dryer #2 was then re-configured to discharge to atmosphere through one stack instead of two stacks as was the case in the first two compliance programs. A third compliance program was scheduled after this modification was made.

The field portion of the ~~second~~^{third} compliance re-test program was performed March 26, 1998. The major on-site representatives that participated in the program and their respective affiliations were:

OMYA, Inc.

Neil Jordan - Environmental Engineer

State of Vermont Agency of Natural Resources, Air Pollution Control Division

Dave Manning - Environmental Technician

Air Quality Technical Services, Inc.

John Jasko - Project Director

Tim Tomasi - Environmental Technician

Simon Majahad - Environmental Technician

2.0 SUMMARY OF RESULTS

Particulate matter was measured as a non-filterable sample fraction collected by a filter media and preceding section of sample train. This fraction includes particulates greater than or equal to the particle cut point size of the filter media (0.3 μ).

Visible emissions were measured as the density of the plumes observed at 15 second intervals over the course of a one hour time period.

2.1 FLASH DRYER 2

2.1.1 Particulate Matter

The concentrations of PM for the three test runs conducted were 0.0019, 0.0031, and 0.0047 gr/dscf, respectively, with an average of 0.0032 gr/dscf. The corresponding emission rates of PM were 0.11, 0.18 and 0.28 lbs/hr with an average of 0.19 lbs/hr.

2.1.2 Visible Emissions

The highest average opacities determined for the highest 6 minute period during each hour of observation were 1.7, 1.3, and <1 percent.

A summary of the PM and VE test determinations for Flash Dryer 2 is presented in Table 2-1.

TEST DATA SUMMARY**FLASH DRYER 2**

PARTICULATE MATTER				
Test Run	1-1	1-2	1-3	Average
Date	03/26/98	03/26/98	03/26/98	----
Clock Time (24 hour)	0921-1036	1107-1235	1315-1441	----
Test Duration (minutes)	72	72	96	----
Test Measurements				
Isokinetics (%)	106	105.7	94.6	----
Moisture Content (%)	30.1	30.1	29	29.7
Temperature (°F)	301.8	298.9	296.3	299
Gas Composition - CO ₂ (%)	2	2	2	2
O ₂ (%)	16.5	16.5	16.5	16.5
CO (%)	0	0	0	0
N ₂ (%)	81.5	81.5	81.5	81.5
Gas Velocity (fps)	49.4	48.5	47.6	48.5
Gas Volumetric Flow (dscfm)	7028	6926	6929	6961
(acfm)	14550	14285	14020	14285
Emission Determinations				
Particulate:				
Concentration (gr/dscf)	0.0019	0.0031	0.0047	0.0032
(mg/dscm)	4.26	7.06	10.76	7.36
(lbs/dscf)	2.66x10 ⁻⁷	4.41x10 ⁻⁷	6.72x10 ⁻⁷	4.60x10 ⁻⁷
Emission Rate (lbs/hr)	0.11	0.18	0.28	0.19
VISIBLE EMISSIONS				
Test Run	1-1	1-2	1-3	Average
Date	03/26/98	03/26/98	03/26/98	----
Clock Time (24 hour)	0922-1022	1155-1255	1400-1500	----
Emission Determinations				
Highest Average Opacity (%)	1.7	1.3	<1	----
Number of Readings >7% Limit	0	0	0	----

Table 2-1

3.0 COMPLIANCE PROCEDURES

The procedures used in the source emission compliance/evaluation programs were conducted in accordance with standard methods described in 40 CFR 60 (revised July 1, 1995), **Standards of Performance for New Stationary Sources, Appendix A - Test Methods.**

The specific EPA methods are referenced as follows:

- Method 1 - Sample Velocity Traverses for Stationary Sources;
- Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube);
- Method 3 - Gas Analysis for Determination of Dry Molecular Weight;
- Method 4 - Determination of Moisture Content in Stack Gas
- Method 5 - Determination of Particulate Emissions from Stationary Sources;
- Method 9 - Visual Determination of the Opacity of Emissions from Stationary Sources.

3.1 SAMPLING LOCATION

The sampling ports were positioned according to Method 1 - Sample and Velocity Traverses for Stationary Sources (40 CFR 60, App. A, pp. 489 - 495).

3.1.1 Flash Dryer #2

The inside diameter of the stack at the sample location was 30 inches. Two sample ports were located approximately 198 inches from the discharge of the ID fan and approximately 30 inches from the outlet of the stack. These dimensions place the sample ports 6.6 diameters downstream and 1.0 diameters upstream from respective flow disturbances.

In accordance with Method 1 a minimum of twenty-four sample points were required for a particulate traverse. Twelve traverse points positioned at 1.0, 2.0, 3.5, 5.3, 7.5, 10.7, 19.3, 22.5, 24.7, 26.5, 28.0 and 29.0 inches from the stack wall were sampled through each port.

3.2 PARTICULATE

Sample collection and analysis was performed according to procedures outlined in Method 5 - Determination of Particulate Emissions from Stationary Sources (40 CFR 60, App. A, pp. 541 - 565).

A total of three test runs were conducted for the purpose of determining compliance. Each test run had a sample duration of 96 minutes and collected a volume close to or in excess of the 60 dscf required by 40 CFR Part 60, Subpart OOO for PM concentration determination (§ 60.675 Test Methods and Procedures). A sampling rate, +/- 10 percent of the isokinetic rate, was maintained over the course of each test run.

3.2.1 Sampling Apparatus

3.2.1.1 Particulate

The PM sample train consisted of:

- a) a stainless steel nozzle sized to maintain isokinetic sampling;
- b) a borosilicate glass-lined probe at ambient temperature;
- c) an encased glass fiber filter at ambient temperature;
- d) a sample/moisture condensing unit with four 500 ml glass impingers immersed in an ice water bath:
 - 1 modified Greenburg-Smith type containing 100 ml of H₂O,
 - 1 Greenburg-Smith type containing 100 ml of H₂O,
 - 1 modified Greenburg-Smith type empty; and,
 - 1 modified Greenburg-Smith type containing 200 grams of silica gel;
- e) an umbilical; and,
- f) a metering console with: main valve and by-pass valve for flow adjustment, leak-free pump, calibrated dry gas meter with inlet and outlet temperature gauges, calibrated orifice, and inclined manometer.

The typical sampling apparatus is depicted in Figure 3-1.

Method 5 - Particulate Sampling Train

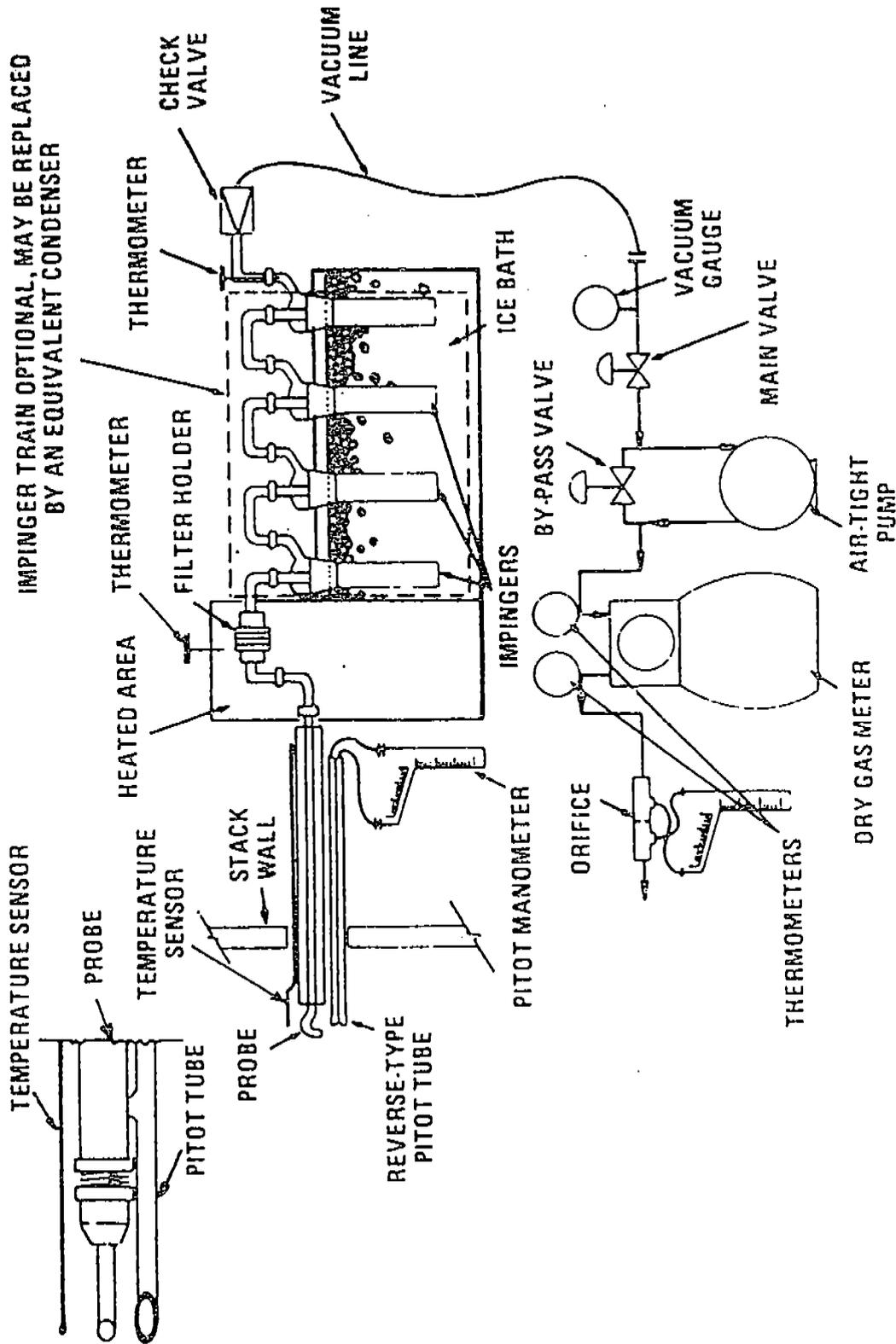


FIGURE 3 - 1

3.2.2 Sample Recovery

3.2.2.1 Field

The samples were handled or recovered in the field using the procedures outlined below:

Filter - The filter holder was removed from the sample box, sealed, labeled for identification, and secured for transport.

Front half - The nozzle and probe were internally brushed and rinsed with acetone to remove any particulate matter which may have been deposited during a test run. The rinse was collected in a glass jar, sealed with a Teflon lined cap, labeled for identification noting the volume of the contents, and secured for transport.

Impinger catch - The volumes in the first three impingers were measured, recorded, and discarded.

Silica gel - The silica gel was transferred from the last impinger to a tared container, weighed, and the weight was recorded.

3.2.2.2 Laboratory

The samples were recovered in the laboratory using the procedures outlined below:

Filter - The filter was removed from the filter holder and placed in the original container.

Front half - The front half of the filter holder was internally brushed and rinsed with acetone, and the filter support frit gasket was scraped off under an acetone rinse to recover any adhering filter media; this rinse was combined with the front half acetone rinse collected in the field.

3.2.3 Sample Analysis

3.2.3.1 Particulate

Prior to use in the program, glass fiber filters were marked with an identifying number, desiccated for a minimum of 24 hours, weighed, re-desiccated for a minimum of 6 hours, re-weighed to establish a final constant weight (<0.5 mg difference), and, sealed in individual plastic petri dish containers that were labeled with the identifying number and tare weight of the filter.

After use in the program, the filters were placed in a dessicator, desiccated for a minimum of 24 hours, weighed, re-dessicated for a minimum of 6 hours, re-weighed to establish a final constant weight (<0.5 mg difference).

The front half acetone washes were transferred to tared beakers, evaporated, desiccated for a minimum of 24 hours, weighed, re-dessicated for a minimum of 6 hours, re-weighed to establish a final constant weight (<0.5 mg difference).

3.3 GAS VELOCITY/VOLUMETRIC FLOW

Measurements of stack gas velocity and volumetric flow were performed according to procedures outlined in Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate (40 CFR 60, App. A, pp. 489 - 495).

3.3.1 Measurement Apparatus

The apparatus used to measure stack differential pressure and temperature profiles consisted of:

- a) a Type S (Stausscheibe) pitot tube with an assigned design coefficient of 0.84 connected to an inclined manometer; and,
- b) Type-K thermocouple probe connected to a digital pyrometer.

3.4 GAS COMPOSITION

Carbon dioxide (CO₂) and oxygen (O₂) sample collection and analyses was performed according to procedures outlined in using EPA Test Method 3 - Gas Analysis for the Determination of Dry Molecular Weight (40 CFR 60, App. A, pp. 523 - 527).

A single-point grab sample was taken and analyzed with Fyrite analyzers to measure the CO₂ and O₂ concentrations. The balance of the gas composition was considered N₂. The results were used to determine the dry molecular weight of the effluent stream.

3.5 VISIBLE EMISSIONS

Visible emission (VE) evaluation was performed according to procedures outlined in using EPA Test Method 9 - Visible Determination of the Opacity of Emissions from Stationary Sources (40 CFR 60, App. A, pp. 656 - 662).

Visible emission observations were made by a certified observer at the point of greatest opacity in that portion of the plume where condensed water vapor was not present. The observer was situated so the plume was viewed against the best available contrasting background while the sun was positioned within a 140° sector to his back. In accordance with Subpart 000 requirements the minimum distance between the observer and the emission source was 15 feet. A total of three test runs of 60 minute duration were performed. A run will consisted of 10 sets of 24 consecutive observations, recorded to the nearest 5 percent, made at 15 second intervals.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Air Quality Technical Services, Inc. maintains a QA/QC program to ensure sampling techniques and analytical procedures are valid and data generated from test programs are accurate.

4.1 CHAIN OF CUSTODY

AQTS utilizes chain-of-custody procedures. While in the field, samples collected during each test run are sealed in appropriate sample vessels, labeled and identified by field number, and placed in secure containers. Storage containers are the responsibility of the project director or assigned personnel. Upon return to AQTS facilities, samples are logged in and assigned sample identification numbers. Samples are safely and properly stored until processed and/or shipped to an outside laboratory.

4.2 EQUIPMENT CALIBRATIONS

Dry gas meters and orifices undergo semi-annual calibration according to procedures outlined in Method 5, Section 5 - Calibration (§5.3 Metering System, §5.3.1 Calibration Prior to Use). After completion of compliance programs, dry gas meter calibrations are rechecked for accuracy according to procedures outlined in Method 5, Section 5 - Calibration (§5.3 Metering System, §5.3.2 Calibration After Use).

Prior to use in compliance programs, probe nozzles are calibrated according to procedures outlined in Method 5, Section 5 - Calibration (§5.1 Probe Nozzle).

Thermometers and barometers are calibrated according to Method 6, §5.2 and §5.4.

Prior to field use, pitot tube assemblies are checked for conformity with the design specifications listed in Method 2 (4. Calibration, §4.1 Type S Pitot Tube, §4.1.1 Type S Pitot Tube Assemblies).

Thermocouple probes undergo annual calibration according to procedures outlined in the Quality Assurance Handbook, Section 3.1 - Method 2 (§3.1.2 Calibration of Apparatus).

4.3 EQUIPMENT LEAK CHECKS

4.3.1 Particulate Sample Trains

Sample trains are leak checked according to procedures outlined in Method 5, Section 4 - Procedure (§4.1 Sampling, §4.1.4 Leak-Check Procedures). Before the start of each test run, the inlet of the probe nozzle is plugged and a vacuum of approximately 15" Hg is drawn and held. The metering dial is timed for a period of one minute and any movement during that period is noted. At the end of each test run, the same procedure is followed using the highest vacuum attained during the run. In each instance, the maximum acceptable leakage rate is 0.02 cfm.

4.3.2 Pitot Tubes

Pitot tubes are leak checked according to procedures outlined in Method 2 (§3. Procedure, §3.1). The pitot tubes are subjected to leak checks prior to and after a test run. The impact opening of a pitot is blown through until a minimum pressure of 3" H₂O registers on an inclined manometer. The impact opening is then closed off and a pressure reading observed. The reading must remain stable for a period of 15 seconds to be accepted. The same procedure is used to check the static pressure side of the pitot by applying suction to the static opening.

4.4 METHOD BLANKS

Method blanks (filters, absorbing solution, rinses, and digestion media) are handled and processed like actual samples. The blanks are weighed, evaporated, digested, and analyzed accordingly. Blanks reported greater than analytical detection levels are subtracted from sample results.

4.5 DATA REDUCTION AND HANDLING

Data are generally reported in English units, however, metric units are reported as requested by clients or regulatory agencies. The flow of data conforms to standard chain-of-custody procedures. Raw data generated from AQTS emission evaluation and compliance test programs are reduced using Lotus 1-2-3 or data acquisition systems. Calculations generally follow equations found in 40 CFR 60, Appendix A, Test Methods or other air pollution and engineering references. Spreadsheet equations and calculations are frequently verified using scientific calculators. Isokinetic tests are manually recorded on data sheets and/or

Lotus spreadsheets. Isokinetic sample rates are adjusted using a spreadsheet and/or slide rule nomograph.

APPENDIX A

METHOD 5 PARTICULATE EQUATION FORMAT

Volume of dry gas sampled at standard conditions, 68 °F, 29.92 "Hg - $V_{m_{std}}$ (scf):

$$V_{m_{std}} = 17.65 (Vm) (Y) \sqrt{\frac{Pb + \frac{\Delta H}{13.6}}{Tm + 460}}$$

Stack gas moisture condensed at standard conditions - $V_{w_{std}}$ (scf):

$$V_{w_{std}} = 0.04707 (Vlc)$$

Decimal fraction stack gas proportion of water by volume - Bwo

$$Bwo = \frac{V_{w_{std}}}{V_{w_{std}} + V_{m_{std}}}$$

Stack gas dry molecular weight - MW_d (lb/lb-mole):

$$MW_d = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2 + \%CO)$$

Stack gas molecular weight - MW_s (lb/lb-mole):

$$MW_s = MW_d (1 - Bwo) + 18 (Bwo)$$

Pressure of stack - P_s (in. Hg):

$$P_s = Pb + (Pst/13.6)$$

Stack gas velocity at stack conditions - V_s (fps):

$$V_s = 85.49 (Cp) \left(\sqrt{\Delta P} \right)_{avg} \sqrt{\frac{T_s + 460}{(P_s) (MW_s)}}$$

Stack gas volumetric flow rate at standard conditions - Q_{s_s} (scfm):

$$Q_{s_s} = 60 (V_s) (A_s) \left(\frac{528}{T_s + 460} \right) \left(\frac{P_s}{29.92} \right)$$

Stack gas volumetric flow rate at actual conditions - Q_{s_a} (acfm):

$$Q_{s_a} = 60 (V_s) (A_s)$$

Stack gas volumetric flow at dry standard conditions - Q_{s_d} (dscfm):

$$Q_{s_d} = (60) (1 - B_{wo}) (V_s) (A_s) \left(\frac{528}{T_s + 460} \right) \left(\frac{P_s}{29.92} \right)$$

Concentration of particulate matter in stack gas, dry basis, standard conditions - C_s
(gr/dscf)

$$C_s = 15.432 \left(\frac{M_p}{V_{m_{std}}} \right)$$

Emission rate of particulate matter, dry basis, standard conditions - ER (lbs/hr)

$$ER = 0.00857 (Q_{s_d}) (C_s)$$

Isokinetic variation - Iso (%)

$$Iso = \frac{17.33 (T_s + 460) [0.04707 (V_{lc}) + V_{m_{std}}]}{\theta (V_s) (P_s) (D_n^2)}$$

Where:

A_s = Cross section area of stack (ft²)

C_p = Pitot tube coefficient

D_n = Diameter of nozzle (in.)

ΔH = Pressure differential across orifice (in. H₂O)

M_p = Mass of particulate in grams

P_b = Barometric pressure (in. Hg)

P_{st} = Static pressure of stack (in. H₂O)

P_{std} = Standard pressure, 29.92 (in. H₂O)

ΔP = Stack differential pressure (in. H₂O)

T_m = Average temperature of dry gas meter (°F)

T_s = Average stack temperature (°F)

T_{std} = Standard temperature, 68 (°F)

V_{lc} = Volume of liquid condensate (ml)

V_m = Volume of dry gas sample metered (ft³)

Y = Dry gas meter correction factor

θ = Sample duration (min.)

0.00857 = Conversion factor, gr to lbs and min. to hr.

0.04707 = Conversion factor, ml to ft³

0.264 = ratio of O₂ to N₂ in air, v/v

15.432 = Conversion factor, g/ft³ to gr/ft³

17.65 = Conversion factor, standard temperature and pressure

17.33 = Isokinetic constant from factoring

18 = Molecular weight of water

85.49 = Pitot tube constant

APPENDIX B

FIELD DATA TEST RESULTS

CLIENT: OMYA, INC.
 FACILITY: FLORENCE, VT
 PROJECT: 981232
 UNIT: FLASH DRYER 2
 TEST DATE: MARCH 26, 1998
 TEST RUN: 1-2

TEST DATA SUMMARY

INPUT VALUES

Pitot Coefficient - Cp:	0.84	Average Delta P ("H2O):	0.466
Nozzle Diameter - Dn (in):	0.312	Average Delta H ("H2O):	2.398
Dry Gas Meter Cal. (Y):	1.003	Stack Temperature - Ts (°F):	298.9
Stack Area (ft²):	4.909	Meter Temperature - Tm (°F):	86.3
Barometric Press. - Pb ("Hg):	29.85	Average Square Root of Delta P:	0.679
Static Press. - Pst ("Hg):	-0.22	Mass of Particulate Collected - Mp - (g.):	0.0114
Sample Duration (min.):	72		
Volume of Gas Metered - Vm (ft³):	58.976		
Volume of Water Condensed - Vlc (g.):	520.6		
Oxygen - O2 (%):	16.5		
Carbon Dioxide - CO2 (%):	2		
Carbon Monoxide - CO (%):	0		
Nitrogen - N2 (%):	81.5		

OUTPUT VALUES

Dry Gas Volume (Standard) - Vmstd (dscf):	57.016
Volume of Water (Standard) - Vwstd (scf):	24.505
Stack Gas Water Proportion by Volume - Bwo:	0.301
Molecular Weight of Dry Stack Gas - MWd (lb/lb-mole):	28.98
Molecular Weight of Stack Gas - MWs (lb/lb-mole):	25.68
Pressure of Stack - Ps ("Hg.):	29.83
Velocity of Stack Gas - Vs (fps):	48.5
Dry Standard Volumetric Flow of Stack Gas - Qdscfm:	6926
Actual Volumetric Flow of Stack Gas - Qacfm:	14285
Test Isokinetic Sample Rate (%):	105.7
Particulate Concentration of Stack Gas - Cs (gr/dscf):	0.0031
Particulate Emission Rate - ER (lbs/hr):	0.18

FIELD DATA TEST RESULTS

CLIENT: OMYA, INC.
 FACILITY: FLORENCE, VT
 PROJECT: 981232
 UNIT: FLASH DRYER 2
 TEST DATE: MARCH 26, 1998
 TEST RUN: 1-1

TEST DATA SUMMARY

INPUT VALUES

Pitot Coefficient - Cp:	0.84	Average Delta P ("H2O):	0.479
Nozzle Diameter - Dn (in):	0.312	Average Delta H ("H2O):	2.423
Dry Gas Meter Cal. (Y):	1.003	Stack Temperature - Ts (°F):	301.8
Stack Area (ft²):	4.909	Meter Temperature - Tm (°F):	77.8
Barometric Press. - Pb ("Hg):	29.85	Average Square Root of Delta P:	0.69
Static Press. - Pst ("Hg):	-0.22	Mass of Particulate Collected - Mp - (g.):	0.007
Sample Duration (min.):	72		
Volume of Gas Metered - Vm (ft³):	59.025		
Volume of Water Condensed - Vic (g.):	530.1		
Oxygen - O2 (%):	16.5		
Carbon Dioxide - CO2 (%):	2		
Carbon Monoxide - CO (%):	0		
Nitrogen - N2 (%):	81.5		

OUTPUT VALUES

Dry Gas Volume (Standard) - Vmstd (dscf):	57.966
Volume of Water (Standard) - Vwstd (scf):	24.952
Stack Gas Water Proportion by Volume - Bwo:	0.301
Molecular Weight of Dry Stack Gas - MWd (lb/lb-mole):	28.98
Molecular Weight of Stack Gas - MWs (lb/lb-mole):	25.68
Pressure of Stack - Ps ("Hg):	29.83
Velocity of Stack Gas - Vs (fps):	49.4
Dry Standard Volumetric Flow of Stack Gas - Qdscfm:	7028
Actual Volumetric Flow of Stack Gas - Qacfm:	14550
Test Isokinetic Sample Rate (%):	106
Particulate Concentration of Stack Gas - Cs (gr/dscf):	0.0019
Particulate Emission Rate - ER (lbs/hr):	0.11

FIELD DATA TEST RESULTS

CLIENT: OMYA, INC.
 FACILITY: FLORENCE, VT
 PROJECT: 981232
 UNIT: FLASH DRYER 2
 TEST DATE: MARCH 26, 1998
 TEST RUN: . 1-3

TEST DATA SUMMARY

INPUT VALUES

Pitot Coefficient - Cp:	0.84	Average Delta P (" H2O):	0.45
Nozzle Diameter - Dn (in):	0.3125	Average Delta H ("H2O):	1.94
Dry Gas Meter Cal. (Y):	1.003	Stack Temperature - Ts (°F):	296.3
Stack Area (ft²):	4.909	Meter Temperature - Tm (°F):	87.7
Barometric Press. - Pb ("Hg):	29.85	Average Square Root of Delta P:	0.668
Static Press. - Pst ("Hg):	-0.22	Mass of Particulate Collected - Mp - (g.):	0.0208
Sample Duration (min.):	96		
Volume of Gas Metered - Vm (ft³):	70.802		
Volume of Water Condensed - Vlc (g.):	591.8		
Oxygen - O2 (%):	16.5		
Carbon Dioxide - CO2 (%):	2		
Carbon Monoxide - CO (%):	0		
Nitrogen - N2 (%):	81.5		

OUTPUT VALUES

Dry Gas Volume (Standard) - Vmstd (dscf):	68.274
Volume of Water (Standard) - Vwstd (scf):	27.856
Stack Gas Water Proportion by Volume - Bwo:	0.29
Molecular Weight of Dry Stack Gas - MWd (lb/lb-mole):	28.98
Molecular Weight of Stack Gas - MWs (lb/lb-mole):	25.8
Pressure of Stack - Ps ("Hg):	29.83
Velocity of Stack Gas - Vs (fps):	47.6
Dry Standard Volumetric Flow of Stack Gas - Qdscfm:	6929
Actual Volumetric Flow of Stack Gas - Qacfm:	14020
Test Isokinetic Sample Rate (%):	94.6
Particulate Concentration of Stack Gas - Cs (gr/dscf):	0.0047
Particulate Emission Rate - ER (lbs/hr):	0.28

APPENDIX C

OMYA, INC., FLORENCE, VT

PROJECT: 981232

FLASH DRYER #2

PARTICULATE CONCENTRATION AND EMISSION DATA

SAMPLE ID	TEST RUN	GROSS SAMPLE MASS (g)	NET SAMPLE MASS (g)	AIR VOLUME SAMPLED (dscf)	EMISSION CONCENTRATIONS			VOLUMETRIC AIR FLOW (dscfm)	EMISSION RATE (lbs/hr)
					(gr/dscf)	(mg/dscm)	(lbs/dscf)		
C762/C763	1-1	0.0079	0.0070	57.966	0.0019	4.26	2.66E-07	7028	0.11
C764/C765	1-2	0.0123	0.0114	57.016	0.0031	7.06	4.41E-07	6926	0.18
C766/C767	1-3	0.0217	0.0208	68.274	0.0047	10.76	6.72E-07	6929	0.28
C769	BLANK	0.0009							
AVERAGES					0.0032	7.36	4.60E-07	6961	0.19

APPENDIX D

ISOKINETIC STACK CALCULATOR
(Revised 06/03/96)

INPUT PARAMETERS

PITOT COEFFICIENT (Cp):	0.84
METER TEMPERATURE (°F):	70
STACK TEMPERATURE (°F):	300
AVERAGE DELTA P ("H2O):	0.52
MAXIMUM DELTA P ("H2O):	0.64
ESTIMATED MOISTURE (%):	23
METER BOX NUMBER:	1284-239
DELTA H @:	1.949

NOZZLE DIAMETER (Dn) DATA

CALCULATED DIAMETER (in.):	0.2901
SELECTED SIZE (in.):	0.312

CALCULATED PARAMETERS

K FACTOR =	5.0164
ISOKINETIC DELTA H ("H2O) =	2.61
MAX DELTA H ("H2O) =	3.21

SAMPLING PARAMETERS

MINIMUM SAMPLE VOLUME REQUIRED (dscf):	60
SAMPLE TIME REQUIRED (min):	78
SAMPLE RATE > 0.75 CFM	0.87
MAX SAMPLE RATE > 0.75 cfm:	0.96

PROJECT NUMBER: 981232
TEST RUN NUMBER: 1-1

ISOKINETIC STACK CALCULATOR

(Revised 06/03/96)

INPUT PARAMETERS

PITOT COEFFICIENT (Cp):	0.84
METER TEMPERATURE (°F):	70
STACK TEMPERATURE (°F):	300
AVERAGE DELTA P ("H2O):	0.52
MAXIMUM DELTA P ("H2O):	0.64
ESTIMATED MOISTURE (%):	23
METER BOX NUMBER:	1284-239
DELTA H @:	1.949

NOZZLE DIAMETER (Dn) DATA

CALCULATED DIAMETER (in.):	0.2901
SELECTED SIZE (in.):	0.312

CALCULATED PARAMETERS

K FACTOR =	5.0164
ISOKINETIC DELTA H ("H2O) =	2.61
MAX DELTA H ("H2O) =	3.21

SAMPLING PARAMETERS

MINIMUM SAMPLE VOLUME REQUIRED (dscf):	60
SAMPLE TIME REQUIRED (min):	78
SAMPLE RATE > 0.75 CFM	0.87
MAX SAMPLE RATE > 0.75 cfm:	0.96

PROJECT NUMBER: 981232
TEST RUN NUMBER: 1-2

METHOD 5

Barometric Press. - Pb ("Hg): 29.85
 Static Press. - Pst ("H2O): -0.22
 Stack Press. - Ps ("Hg.): 29.83
 Pitot Coefficient - Cp: 0.84
 B-5
 Nozzle Diameter - Dn (in): 0.312
 1284-239
 Meter Box Number: 1.003
 Dry Gas Meter Cal. (Y): 4.909
 Stack area (ft²): 110-782
 Filter Number(s):

CLIENT: OMYA, INC.
 FACILITY: FLORENCE, VT
 PROJECT: 981232
 UNIT: FLASH DRYER 2
 TEST DATE: MARCH 26, 1998
 TEST RUN: 1-2

Run Clock Time (24-Hr.): 72
 Sample Duration (min.): 24
 Number of Sample Points:

Impinger Volume (ml)	
Initial	380
Final	306
1>	100
2>	0
3>	18
Silica Gel (g)	
Initial	200
Final	216.6
4>	520.6
Total Volume>	

Gas Composition	
O2	16.5
CO2	2
CO	0
N2	81.5

Vacuum Leak Check	
Leak Rate (cf)	Vacuum ("Hg.)
Pre-test: 0.003	15
Post-test: 0.01	15

Pitot Leak Checks	
Pre-test:	OK
Post-test:	OK

SAMPLE POINT	CLOCK TIME (24 Hr)	GAS METER READING (cf)	DELTA P (In. H2O)	DESIRED DELTA H (In. H2O)	ACTUAL DELTA H (In. H2O)	STACK	TEMPERATURES (°F)		PERCENT ISO
							DRY GAS METER INLET	OUTLET	
A1	11:07	405.225	0.5	2.51	2.5	305	84	63	100.3
2	11:10	407.77	0.58	2.91	2.9	305	99	66	111.9
3	11:13-11:14	410.22/411.434	0.6	3.01	3.05	304	99	67	103.2
4	11:28-11:30	411.90/413.8	0.55	2.76	2.8	305	107	70	95.4
5	11:28-11:30	413.8	0.53	2.66	2.7	306	108	71	97.5
6	11:33	416.41	0.48	2.41	2.4	305	104	74	97.3
7	11:36	419.03	0.46	2.31	2.3	301	102	74	96.9
8	11:39	421.51	0.43	2.16	2.15	300	100	74	97.9
9	11:42	423.95	0.39	1.96	2	297	99	74	97.2
10	11:45	426.3	0.33	1.66	1.65	285	97	74	99
11	11:48	428.56	0.28	1.4	1.4	279	96	74	92.9
12	11:51	430.64	0.28	1.4	1.4	276	95	74	92.9
END	11:54	432.6	0.28	1.4	1.4	276	95	74	92.9
B1	11:57	434.441	0.52	2.61	2.65	302	92	73	97.5
2	11:59	434.441	0.56	2.81	2.85	301	100	74	97.5
3	12:02	437.01	0.54	2.71	2.85	301	101	74	97.3
4	12:05	439.7	0.56	2.81	2.95	301	103	75	98.2
5	12:08	442.34	0.54	2.71	2.85	302	102	75	98.9
6	12:11	445.08	0.52	2.61	2.75	305	102	76	100.4
7	12:14	447.75	0.5	2.51	2.7	306	102	76	99.4
8	12:17	450.38	0.48	2.41	2.5	306	101	76	97.4
9	12:20	453	0.48	2.41	2.5	304	100	76	99
10	12:23	455.54	0.42	2.11	2.2	297	100	76	99.9
11	12:26	458.03	0.36	1.81	1.9	291	100	76	99.9
12	12:29	460.41	0.3	1.5	1.6	290	98	75	99.6
	12:32	462.64	0.3	1.5	1.6	290	96	75	99.6
		464.668							

ISOKINETIC STACK CALCULATOR
(Revised 06/03/96)

INPUT PARAMETERS

PITOT COEFFICIENT (Cp):	0.84
METER TEMPERATURE (°F):	75
STACK TEMPERATURE (°F):	300
AVERAGE DELTA P ("H2O):	0.52
MAXIMUM DELTA P ("H2O):	0.64
ESTIMATED MOISTURE (%):	30
METER BOX NUMBER:	1284-239
DELTA H @:	1.949

NOZZLE DIAMETER (Dn) DATA

CALCULATED DIAMETER (in.):	0.3006
SELECTED SIZE (in.):	0.3125

CALCULATED PARAMETERS

K FACTOR =	4.338
ISOKINETIC DELTA H ("H2O) =	2.26
MAX DELTA H ("H2O) =	2.78

SAMPLING PARAMETERS

MIMIMUM SAMPLE VOLUME REQUIRED (dscf):	60
SAMPLE TIME REQUIRED (min):	84
SAMPLE RATE > 0.75 CFM	0.81
MAX SAMPLE RATE > 0.75 cfm:	0.9

PROJECT NUMBER: 981232
TEST RUN NUMBER: 1-3

METHOD 5

CLIENT: OMYA, INC.
 FACILITY: FLORENCE, VT
 PROJECT: 981232
 UNIT: FLASH DRYER 2
 TEST DATE: MARCH 26, 1998
 TEST RUN: 1-3

Barometric Press. - Pb ("Hg): 29.85
 Static Press. - Pst ("H2O): -0.22
 Stack Press. - Ps ("Hg.): 29.83
 Pitot Coefficient - Cp: 0.84
 Nozzle Number: A-5
 Nozzle Diameter - Dn (in): 0.313
 Meter Box Number: 1284-239
 Dry Gas Meter Cal. (Y): 1.003
 Stack area (ft²): 4.909
 Filter Number(s): 110-783

Run Clock Time (24-Hr.): 96
 Sample Duration (min.): 24
 Number of Sample Points:

Impinger Volume (ml)	
Initial	Final
1>	100
2>	100
3>	0
Silica Gel (g)	
Initial	Final
4>	200
Total Volume	591.8

Gas Composition	
O2	16.5
CO2	2
CO	0
N2	81.5

Vacuum Leak Check	
Leak Rate (cf.)	Vacuum ("Hg.)
Pre-test:	0.016
Post-test:	0.015
	15
	10

Pilot Leak Checks	
Pre-test:	OK
Post-test:	OK
Positive	OK
Negative	OK
Positive	OK
Negative	OK

SAMPLE POINT	CLOCK TIME (24 Hr)	GAS METER READING (cf)	DELTA P (in. H2O)	DESIRED DELTA H (in. H2O)	ACTUAL DELTA H (in. H2O)	STACK	TEMPERATURES (°F)		PERCENT ISO
							INLET	OUTLET	
A1	13:15	465.215	0.55	2.39	2.4	200	77	64	93.9
2	13:18	468.52	0.5	2.17	2.2	301	87	64	98.6
3	13:21	471.63	0.53	2.3	2.4	301	95	66	97.4
4	13:24	474.82	0.55	2.39	2.3	302	99	67	97.5
5	13:27	478.09	0.53	2.3	2.2	304	99	69	96.9
6	13:30	481.28	0.5	2.17	2.1	305	103	71	97.1
7	13:33	484.4	0.48	2.08	1.95	305	106	72	96.4
8	13:36	487.45	0.45	1.95	1.8	304	105	73	96.9
9	13:39	490.42	0.41	1.78	1.65	302	105	74	97.2
10	13:42	493.27	0.38	1.65	1.6	299	103	75	98
11	13:45	496.04	0.37	1.61	1.5	296	103	76	96.5
12	13:48	498.74	0.35	1.52	1.95	295	101	76	95.8
END	13:51	501.344							
B1	14:05	501.344	0.53	2.3	2.3	296	96	75	97.8
2	14:08	504.59	0.53	2.3	2.3	304	104	76	95.8
3	14:11	507.78	0.53	2.3	2.3	304	106	77	93.5
4	14:14	510.9	0.51	2.21	2.2	303	107	77	95.1
5	14:17	514.02	0.51	2.21	2.2	301	107	79	95.1
6	14:20	517.15	0.48	2.08	2.1	303	108	79	95.5
7	14:23	520.2	0.44	1.91	1.9	304	107	78	96.1
8	14:26	523.13	0.38	1.65	1.65	303	106	79	95.9
9	14:29	525.85	0.36	1.56	1.55	301	103	79	96.8
10	14:32	528.52	0.36	1.56	1.55	298	101	80	95.9
11	14:35	531.17	0.3	1.3	1.3	293	100	79	96.1
12	14:38	533.6	0.27	1.17	1.15	287	98	79	100.2
END	14:41	536.017							

APPENDIX E

FILTER TARE WEIGHT LOG

CLIENT:	OMYA
PROJECT:	981232
FILTER TYPE:	GFF
SIZE:	110 mm

Filter Number	Date/Time	Weight (g)			
110 770	7/3/96 0800	7/3/96 1400			
			0.5852	0.5852	
110 771	7/3/96 0800	7/3/96 1400			
			0.5827	0.5826	
110 772	7/3/96 0800	7/3/96 1400			
			0.5829	0.5829	
110 773	7/3/96 0800	7/3/96 1400			
			0.5849	0.5848	
110 774	7/3/96 0800	7/3/96 1400			
			0.5858	0.5857	
110 775	7/3/96 0800	7/3/96 1400			
			0.5865	0.5865	
110 776	7/3/96 0800	7/3/96 1400			
			0.5858	0.5857	
110 777	7/3/96 0800	7/3/96 1400			
			0.5829	0.5829	
110 778	7/3/96 0800	7/3/96 1400			
			0.5853	0.5852	
110 779	7/3/96 0800	7/3/96 1400			
			0.5846	0.5845	
110 780	7/3/96 0800	7/3/96 1400			
			0.5859	0.5858	
110 781	7/3/96 0800	7/3/96 1400			
			0.5883	0.5883	
110 782	7/3/96 0800	7/3/96 1400			
			0.5892	0.5892	
110 783	7/3/96 0800	7/3/96 1400			
			0.5775	0.5774	
110 784	7/3/96 0800	7/3/96 1400			
			0.5849	0.5848	
110 785	7/3/96 0800	7/3/96 1400			
			0.5771	0.577	
110 786	7/3/96 0800	7/3/96 1400			
			0.5824	0.5824	
110 787	7/3/96 0800	7/3/96 1400			
			0.578	0.5779	
110 788	7/3/96 0800	7/3/96 1400			
			0.5816	0.5817	
110 789	7/3/96 0800	7/3/96 1400			
			0.5768	0.5769	

**PARTICULATE LAB ANALYSIS
SUMMARY SHEET**

Client: OMYA, Inc. Project Number: 981232 Test/Run: 1-1

Sample Identification

Number	Description
C762	GFF 110-781
C763	Front half acetone wash - 210 ml as processed
C769	Acetone blank - 210 ml as processed

Acetone Blank Background Data

Manufacturer: Anachemia Lot/Batch: 690120 Density: 0.7857 g/ml
 C_a = Acetone blank residue concentration (mg/mg)
 m_a = Mass of acetone residue after evaporation (mg)
 V_a = Volume of acetone blank (ml)
 ρ = Density of acetone (mg/ml)

$$C_a = m_a / (V_a \rho_a) = (0.9) / (210)(0.0007857) = \underline{5.455} \text{ mg/mg}$$

Front Half Acetone Wash Data

W_a = Weight of acetone residue in wash (mg)
 V_{aw} = Volume of acetone wash (ml)

$$W_a = C_a V_a \rho_a = (5.455)(210)(0.0007857) = \underline{0.9} \text{ mg}$$

Acetone Wash Data

Beaker Number: <u>15/E</u>	Gross Weight (g):	63.9818
	Tare Weight (g):	63.9702
	Blank Weight (g):	0.0009
	Net Weight (g):	0.0107

Filter Data

Filter Number: <u>110-781</u>	Gross Weight (g):	0.5846
	Tare Weight (g):	0.5883
	Net Weight (g):	-0.0037

Particulate Weight Summary

Weight of particulate in front half wash (g):	0.0107
Weight of particulate on filter (g):	-0.0037
Total weight of particulate catch (g):	0.007

**PARTICULATE LAB ANALYSIS
SUMMARY SHEET**

Client: OMYA, Inc. Project Number: 981232 Test/Run: 1-2

Sample Identification

Number	Description
C764	GFF 110-782
C765	Front half acetone wash - 210 ml as processed

Acetone Blank Background Data

Manufacturer: Anachemia Lot/Batch: 690120 Density: 0.7857 g/ml
 C_a = Acetone blank residue concentration (mg/mg)
 m_a = Mass of acetone residue after evaporation (mg)
 V_a = Volume of acetone blank (ml)
 ρ_a = Density of acetone (mg/ml)

$$C_a = m_a / (V_a \rho_a) = (0.9) / (210) (0.0007857) = \underline{5.455} \text{ mg/mg}$$

Front Half Acetone Wash Data

W_a = Weight of acetone residue in wash (mg)
 V_{aw} = Volume of acetone wash (ml)

$$W_a = C_a V_a \rho_a = (5.455) (210) (0.0007857) = \underline{0.9} \text{ mg}$$

Acetone Wash Data

Beaker Number: 15/F

Gross Weight (g): 65.8445
Tare Weight (g): 65.8318
Blank Weight (g): 0.0009
Net Weight (g): 0.0118

Filter Data

Filter Number: 110-782

Gross Weight (g): 0.5852
Tare Weight (g): 0.5892
Net Weight (g): -0.004

Particulate Weight Summary

Weight of particulate in front half wash (g): 0.0118
Weight of particulate on filter (g): -0.0004
Total weight of particulate catch (g): 0.0114

**PARTICULATE LAB ANALYSIS
SUMMARY SHEET**

Client: OMYA, Inc. Project Number: 981232 Test/Run: 1-3

Sample Identification

Number	Description
C766	GFF 110-783
C767	Front half acetone wash - 210 ml as processed

Acetone Blank Background Data

Manufacturer: Anachemia Lot/Batch: 690120 Density: 0.7857 g/ml
 C_a = Acetone blank residue concentration (mg/mg)
 m_a = Mass of acetone residue after evaporation (mg)
 V_a = Volume of acetone blank (ml)
 ρ_a = Density of acetone (mg/ml)

$$C_a = m_a / (V_a \rho_a) = (0.9) / (210) (0.0007857) = \underline{5.455} \text{ mg/mg}$$

Front Half Acetone Wash Data

W_a = Weight of acetone residue in wash (mg)
 V_{aw} = Volume of acetone wash (ml)

$$W_a = C_a V_a \rho_a = (5.455) (210) (0.0007857) = \underline{0.9} \text{ mg}$$

Acetone Wash Data

Beaker Number: <u>15/J</u>	Gross Weight (g):	68.2658
	Tare Weight (g):	68.2536
	Blank Weight (g):	0.0009
	Net Weight (g):	0.0113

Filter Data

Filter Number: <u>110-783</u>	Gross Weight (g):	0.5869
	Tare Weight (g):	0.5774
	Net Weight (g):	0.0095

Particulate Weight Summary

Weight of particulate in front half wash (g):	0.0113
Weight of particulate on filter (g):	0.0095
Total weight of particulate catch (g):	0.0208

APPENDIX F

METER BOX CALIBRATION
(ANNUAL)

METER BOX NUMBER: 1084-239
NEXT CAL DUE: 10-Jul-98

DATE: 08-Jan-98
CALIBRATED BY: John Jasko

BAROMETRIC PRESSURE (in. Hg)	ORIFICE MANOMETER SETTING (in. H ₂ O)	WET TEST METER VOLUME (cf)	DRY GAS METER VOLUME		WET TEST METER (F)	TEMPERATURES		TIME (min)	YI	DELTA H@
			INITIAL (cf)	FINAL (cf)		INLET (F)	OUTLET (F)			
29.56	0.5	5	136.500	141.717	57.5	90	76	13.21	1.009	1.837
29.56	1.0	5	148.998	154.260	57.5	96	80	9.53	1.006	1.899
29.56	1.5	10	154.848	165.410	57.5	92	83	15.90	1.007	1.972
29.56	2.0	10	166.033	176.650	57.5	102	81	13.83	1.004	1.982
29.56	3.0	10	177.140	187.793	57.5	111	84	11.31	1.001	1.983
29.56	4.0	10	188.503	199.260	57.5	96	84	9.89	0.988	2.023
AVERAGE									1.003	1.949

TOLERANCES FROM AVERAGE FOR YI and DELTA H@ ARE <0.02 AND 0.20, RESPECTIVELY

YI	YI DIFF	DELTA H@	DELTA H@ DIFF
1.009	0.006	1.837	-0.112
1.006	0.003	1.899	-0.050
1.007	0.004	1.972	0.023
1.004	0.001	1.982	0.033
1.001	-0.002	1.983	0.034
0.988	-0.015	2.023	0.074

**METER BOX CALIBRATION
(POST-TEST)**

PROJECT: 981232
 DATE: 27-Mar-98
 CALIBRATED BY: John Jasko

METER BOX NUMBER: 1084-239
 PRETEST CAL Y: 1.003

BAROMETRIC PRESSURE (in. Hg)	ORIFICE MANOMETER SETTING (in. H ₂ O)	MAXIMUM VACUUM (in. H ₂ O)	WET TEST METER VOLUME (cf)	DRY GAS METER VOLUME (cf)		WET TEST METER (°F)	TEMPERATURES		TIME (min)	Y
				INITIAL	FINAL		DRY GAS METER INLET (°F)	DRY GAS METER OUTLET (°F)		
29.50	2.20	10.5	10	25.047	35.513	65.0	101	83	13.00	1.005
29.50	2.20	10.5	10	35.513	46.047	65.0	112	86	13.00	1.002
29.50	2.20	10.5	10	46.047	56.602	65.0	102	86	13.00	1.003
							112	88		
							104	89		
							113	89		
									AVERAGE	1.003

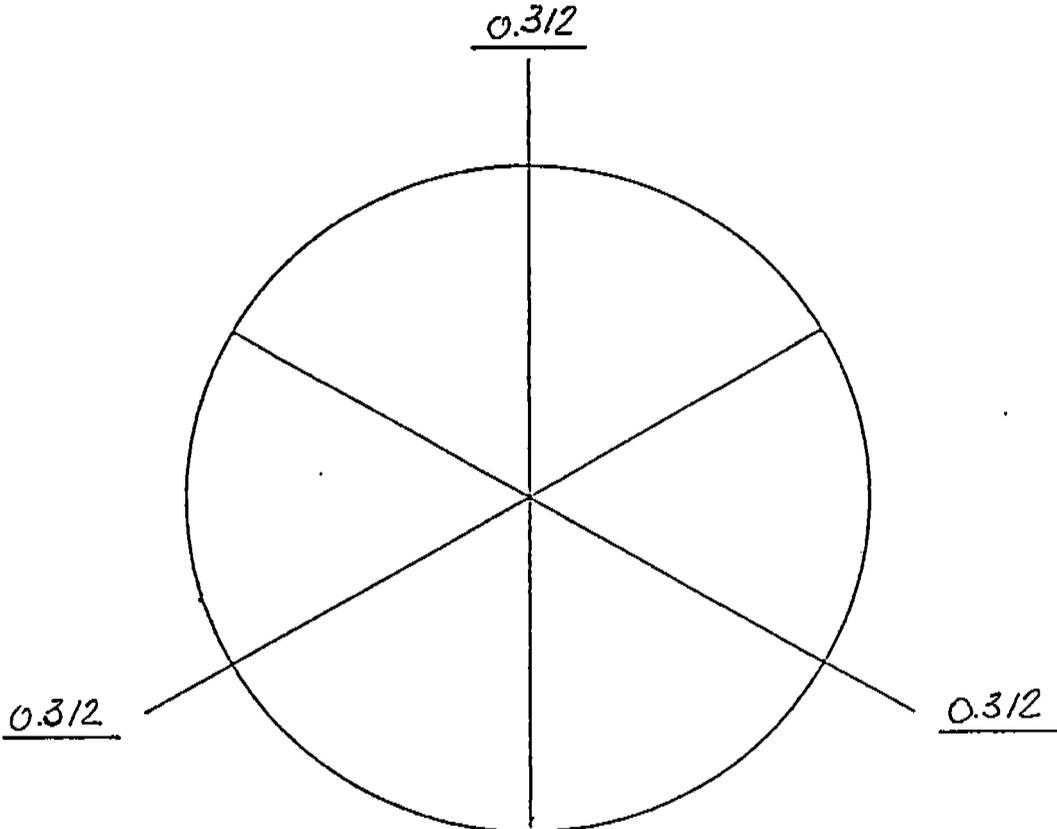
ACCEPTABLE VARIATION IN CALIBRATION
 (Must be less than 5% of Pretest Meter Calibration)

Difference from Pretest Calibration = 0 % >>>> ACCEPTABLE

NOZZLE CALIBRATION DATA FORM

Date: 0. 3/19/98

Calibrated by: (Signature)



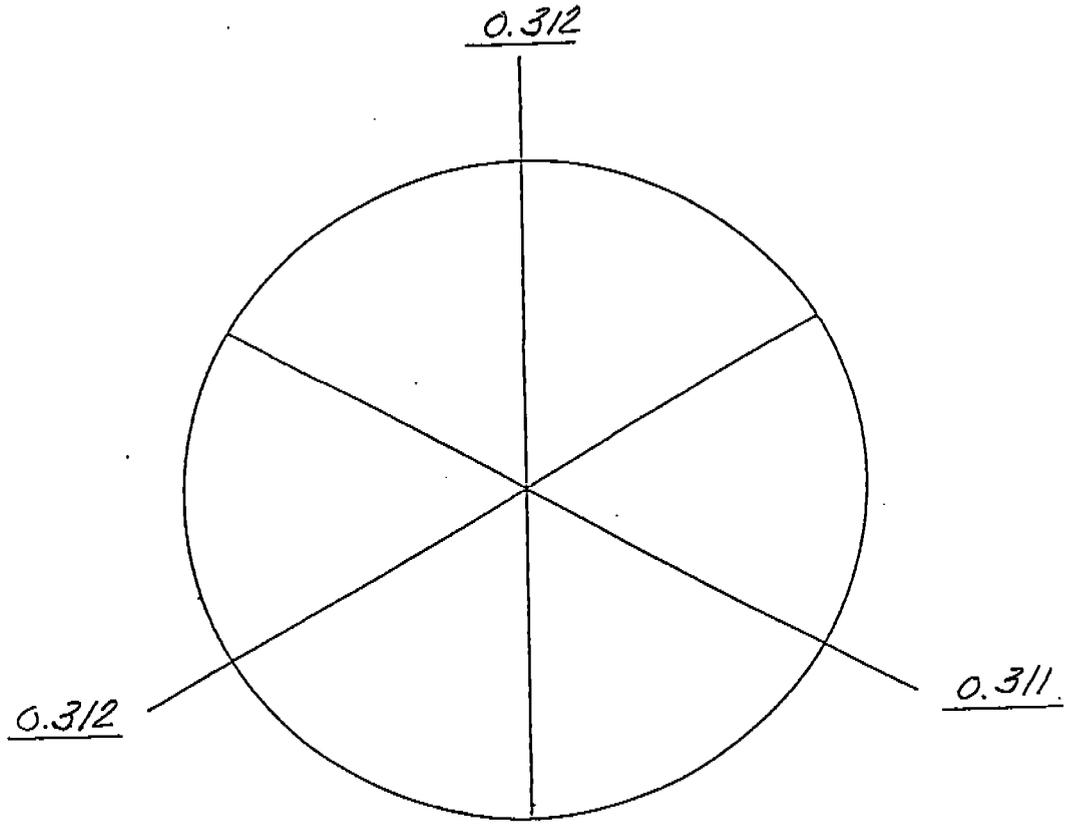
Nozzle Identification Number	Nozzle Diameter ^a			ΔD^b mm (in.)	D_{avg}^c
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
B-5	0.312	0.312	0.312	0	0.312

Where:
a = nozzle diameters b = maximum difference c = average diameter

NOZZLE CALIBRATION DATA FORM

Date: 3/19/98

Calibrated by: (P)



Nozzle Identification Number	Nozzle Diameter ^a			ΔD^b mm (in.)	D_{avg}^c
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
A-5	0.312	0.312	0.311	0.001	0.312

Where:
 a = nozzle diameters b = maximum difference c = average diameter

REQUIREMENTS FOR ASSOCIATED PROBING EQUIPMENT
OF 0.84 TO AN "S" TYPE PITOT TUBE

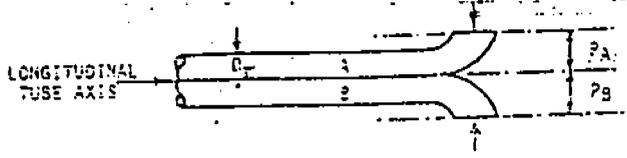
ITOT # FE-104 DATE 3/25/98 OBSERVATIONS BY (K)

) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

- a. External tubing diameter, D_t , 0.23 in. $< D_t < 0.38$ in.
- b. Base to plane opening Distance, P_A and P_B , 0.40 in. $< P_A=P_B < 0.60$ in.

$D_t = 0.375$
 $P_A = 0.49$
 $P_B = 0.49$

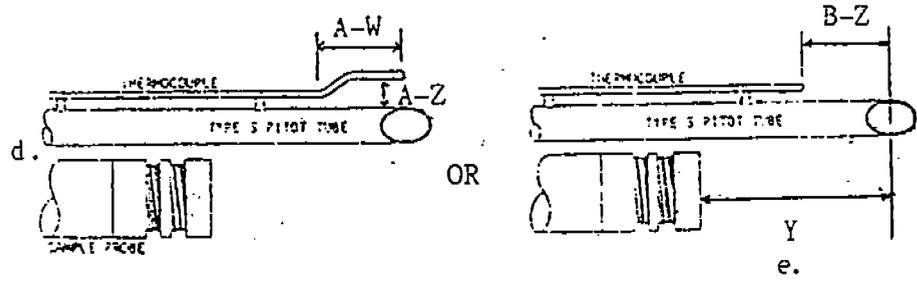
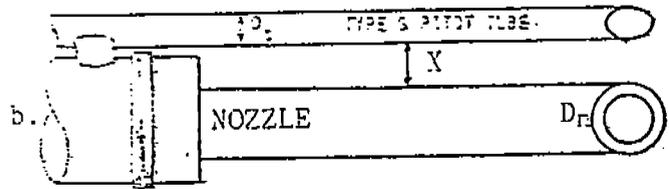
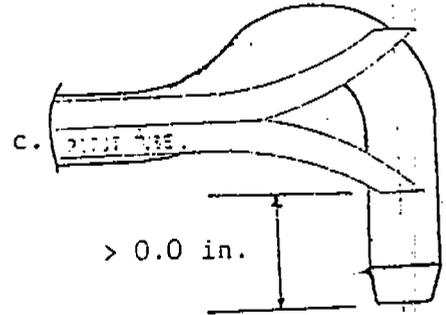


) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

- a. External tubing diameter. See 1.a. above
- b. Pitot / nozzle separation, X , $X \geq 0.75$ in. for nozzle diameter, $D_n = 0.50$ in.
- c. Plane of impact side of pitot in relation to plane of nozzle opening.
- d. Thermocouple placement, Z , $A-Z \geq 0.75$ in., $A-W \geq 3.0$ in., $B-Z \geq 2.0$ in.
- e. Pitot / probe sheath distance, Y , $Y \geq 3.0$ in.

$D_n = 0.312$
 $X = 1.1$
 $Z = 2.1$
 $Y = 3.0$



REQUIREMENTS FOR ASSIGNING A BASELINE VALUE OF 0.84 TO AN "S" TYPE PITOT TUBE

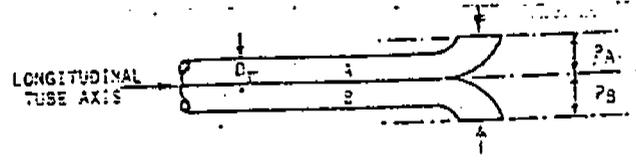
PITOT # FE-103 DATE 3/25/98 OBSERVATIONS BY (B)

.) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

- a. External tubing diameter, D_t , 0.23 in. $< D_t < 0.38$ in.
- b. Base to plane opening Distance, P_A and P_B , 0.40 in. $< P_A=P_B < 0.60$ in.

$D_t = 0.375$
 $P_A = 0.49$
 $P_B = 0.49$

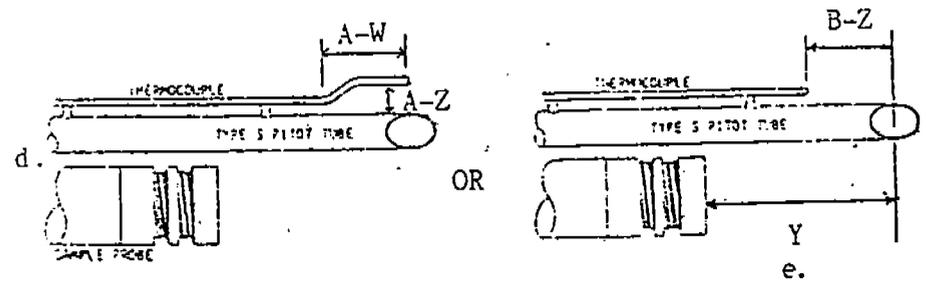
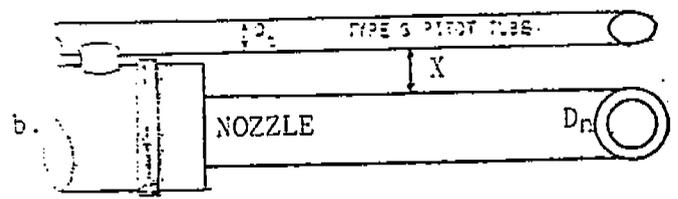
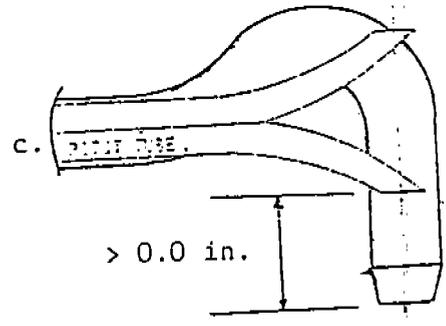


.) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

- a. External tubing diameter. See 1.a. above
- b. Pitot / nozzle separation, X , $X \geq 0.75$ in. for nozzle diameter, $D_n = 0.50$ in.
- c. Plane of impact side of pitot in relation to plane of nozzle opening.
- d. Thermocouple placement, Z , $A-Z \geq 0.75$ in., $A-W \geq 3.0$ in., $B-Z \geq 2.0$ in.
- e. Pitot / probe sheath distance, Y , $Y \geq 3.0$ in.

$D_n = 0.312$
 $X = 1.1$
 $Z = 2.1$
 $Y = 3.6$



APPENDIX G

T/R 1-1

SOURCE:		OBSERVATION DATE:				START TIME:				STOP TIME:					
OMYA, INC		3/26/98				0922				1022					
ADDRESS:		SEC	0	15	30	45	SEC	0	15	30	45				
FLORENCE ROAD		MIN					MIN								
CITY: FLORENCE		1	0	0	0	0	31	0	0	0	0				
STATE: VT		2	0	0	0	0	32	0	0	0	0				
ZIP:		3	0	0	0	0	33	0	0	0	0				
PHONE:		4	0	0	0	0	34	0	0	0	0				
SOURCE ID NUMBER:		5	0	0	0	0	35	0	0	0	0				
PROCESS: FLASH DRYER #2		6	0	0	0	0	36	0	0	0	0				
OPERATING MODE: 8.5 TPH		7	0	0	0	0	37	0	10	0	0				
CONTROL EQUIPMENT: BAGHOUSE		8	5	0	0	0	38	0	0	0	0				
OPERATING MODE: CONTINUOUS		9	10	0	0	0	39	0	5	0	0				
EMISSION POINT DESCRIPTION: STACK		10	0	0	0	0	40	0	0	0	0				
HEIGHT ABOVE GROUND LEVEL: 10' ABOVE ROOF LEVEL		11	0	0	5	0	41	0	5	0	0				
HEIGHT RELATIVE TO OBSERVER: -2'		12	0	0	0	5	42	10	0	0	0				
DISTANCE FROM OBSERVER: 20'		13	10	0	0	0	43	0	0	5	0				
DIRECTION FROM OBSERVER: NE		14	0	0	0	0	44	0	0	0	0				
EMISSION DESCRIPTION: WHITE		15	0	0	5	0	45	0	0	0	0				
PLUME TYPE: DETACHED STEAM		16	0	0	0	0	46	0	0	0	0				
POINT AT WHICH OPACITY WAS DETERMINED: STACK DISCHARGE		17	0	0	0	10	47	0	0	0	0				
BACKGROUND DESCRIPTION: TREES		18	0	0	0	5	48	0	0	5	0				
BACKGROUND COLOR: GREEN		19	0	0	0	0	49	0	10	0	0				
SKY CONDITIONS: OVERCAST		20	5	0	0	0	50	0	0	0	10				
WIND SPEED: LIGHT < 5 mph		21	0	0	0	0	51	0	0	0	0				
WIND DIRECTION: SE		22	0	0	0	0	52	0	0	0	10				
AMBIENT TEMPERATURE: 35°F		23	0	0	5	0	53	5	0	0	0				
WET BULB TEMPERATURE:		24	0	0	0	0	54	0	0	0	0				
OBSERVATION LAYOUT SKETCH:		25	0	0	0	0	55	0	0	5	0				
<p>The sketch shows a building with a stack emitting a plume. An observer is positioned to the left of the stack. Wind direction is indicated as SE. Two points are marked as FDI and FD2. A north arrow points to the right.</p>		26	0	0	0	0	56	0	0	0	5				
		27	0	0	0	0	57	0	0	5	0				
		28	5	0	0	0	58	0	0	0	0				
		29	0	0	5	0	59	0	5	0	0				
		30	0	0	0	0	60	0	5	10	5				
		SUN - ☉		AVERAGE OPACITY FOR HIGHEST PERIOD: 1.7%											
		WIND -		OBSERVERS NAME PRINTED: JOHN J. JASKO											
		PLUME -		OBSERVERS SIGNATURE:				DATE: 3/26/98				OPACITY LIMIT: 7%			
		NORTH -		OBSERVERS AFFILIATION: (AGTS) INC.											
		CERTIFYING AGENCY: NHDES		CERTIFICATION DATE: 10/14/97				NUMBER OF READINGS ABOVE LIMIT: 0				READING RANGE: MINIMUM 10% MAXIMUM			

T/R 1-2

SOURCE:		OBSERVATION DATE:				START TIME:				STOP TIME:			
OMYA		3/26/98				11:53				12:55			
ADDRESS:		SEC	0	15	30	45	SEC	0	15	30	45		
FLORENCE ROAD		MIN											
CITY:		1	0	0	0	0	31	0	0	0	0		
FLORENCE		2	0	0	0	0	32	0	0	5	0		
STATE:		3	0	0	0	0	33	5	0	5	10		
VT		4	0	0	0	0	34	5	0	0	0		
ZIP:		5	0	0	0	5	35	0	0	0	0		
PHONE:		6	0	0	0	0	36	0	0	0	0		
SOURCE ID NUMBER:		7	0	5	0	0	37	0	0	5	0		
PROCESS:		8	0	0	0	0	38	5	0	0	0		
FLASH DEVEE #2		9	0	0	5	0	39	0	0	0	0		
OPERATING MODE:		10	0	0	0	0	40	0	0	0	0		
8.5 TPA		11	0	0	0	0	41	0	5	0	0		
CONTROL EQUIPMENT:		12	0	0	0	0	42	0	0	0	0		
BAGHOUSE		13	0	0	0	10	43	0	0	0	0		
OPERATING MODE:		14	0	0	0	0	44	0	0	0	0		
CONTINUOUS		15	0	0	0	0	45	0	0	0	5		
EMISSION POINT DESCRIPTION:		16	0	0	0	0	46	0	0	5	5		
STACK		17	0	0	0	5	47	0	0	0	0		
HEIGHT ABOVE GROUND LEVEL:		18	0	0	0	5	48	0	0	10	5		
10' ABOVE ROOF LEVEL		19	10	5	0	0	49	0	0	0	0		
HEIGHT RELATIVE TO OBSERVER:		20	0	0	0	0	50	0	0	5	0		
- 2'		21	0	0	0	0	51	5	5	0	0		
DISTANCE FROM OBSERVER:		22	0	0	0	0	52	5	0	0	0		
20'		23	0	0	0	0	53	0	0	5	0		
EMISSION DESCRIPTION:		24	0	0	0	0	54	0	0	0	0		
CALCIUM CARBONATE		25	5	0	0	0	55	0	0	0	0		
EMISSION COLOR:		26	0	0	0	0	56	0	0	0	0		
WHITE		27	0	0	0	0	57	0	0	0	0		
PLUME TYPE:		28	0	0	0	0	58	0	0	0	0		
DETACHED STEAM		29	0	5	0	5	59	0	5	0	5		
POINT AT WHICH OPACITY WAS DETERMINED:		30	5	0	5	0	60	0	0	0	0		
STACK DISCHARGE													
BACKGROUND DESCRIPTION:													
TREES													
BACKGROUND COLOR:													
GREEN													
SKY CONDITIONS:													
OVERCAST -													
WIND SPEED:													
LIGHT < 5 mph													
WIND DIRECTION:													
S													
AMBIENT TEMPERATURE:													
45°F													
WET BULB TEMPERATURE:													
OBSERVATION LAYOUT SKETCH:													
OBSERVER'S NAME PRINTED:		AVERAGE OPACITY FOR HIGHEST PERIOD:											
JOHN J. JASKO		1.3%											
OBSERVER'S SIGNATURE:		DATE:		OPACITY LIMIT:									
[Signature]		3/26/98		7%									
OBSERVER'S AFFILIATION:		NUMBER OF READINGS ABOVE LIMIT:											
AOTS, INC.		0											
CERTIFYING AGENCY:		CERTIFICATION DATE:		READING RANGE:									
NHDES		10/14/97		0 MINIMUM 10% MAXIMUM									

APPENDIX H



State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
64 No. Main Street, P.O. Box 2033, Concord, NH 03302-2033
(603) 271-1370 FAX (603) 271-1381



October 27, 1997

Mr. John Jasko
Air Quality Technical Services Inc.
18 Morse Drive
Essex Junction, Vermont 05452

Subject: N.H. "Visible Emissions Evaluation" Session, Fall 1997

Dear Mr. Jasko:

The New Hampshire Department of Environmental Services, Air Resources Division is pleased to advise you that you have successfully completed the recent "Visible Emissions Evaluation" session held in Concord, New Hampshire on October 14 & 15, 1997. Having participated in the smoke evaluation sessions, you have met the following certification criteria:

- (1) The average deviation for the sets of 25 black smoke and 25 white smoke emissions was less than 7.5%.
- (2) The deviation of each reading was 15%, or less.

This certification is valid until April 15, 1998. A copy of your test sheet will be supplied upon request.

Sincerely,

Kenneth A. Colburn
Director
Air Resources Division

KAC/sec/a:\1997fall\smoke97f.ltr