AP42 Section: 13.2.6

Background Chapter 4

Reference: 6

Title: Summary of Source Test Results, Poly Engineering, Richmond, CA,

Bay Area Air Quality Management District, San Francisco, CA,

November 19, 1990.

SECTION 4
REFERENCE 6

DISTRIBUTION:

Firm
Permit Services
Enforcement
Technical Services
Source Inventory
Planning
Requester
DAPCO

BAY AREA
AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street
San Francisco, California 94109
(415) 771-6000

SUMMARY OF SOURCE TEST RESULTS

Report No. 91077

Test Date: 11/2/90

Test Times:

Run A: 0935-1109 (56 min)

Run B: 1121-1309 (48 min)

Run C: 1320-1419 (48 min)

SOURCE INFORMATION

Firm Name and Address
POLY ENGINEERING
701 Erlandson Street
Richmond, CA 94804

Firm Representative and Title
Mr. Dan Lynch
General Manager
Phone No. (415)233-1420

Source:
S-1
Sandblast Booth
Plant No. 2503
Operates 8 hr/day & 260 days/yr

Permit Conditions
None

BAAQMD REPRESENTATIVES

Source Test Engineers
C. McClure/H. Doi/K. Kunaniec

Permit Services Division / Enforcement Division
N. Yee

Test Requested by:
D. Nelson

Operating Parameters:

Pneumatic blast room operated intermittently during testing utilizing an average of 1740 lb/hr of abrasive to blast 700 lb/hr of parts. Abrasive is C.A.R.B. certified 30/40 mesh garnet conveyed by 60 to 70 psi air.

Applicable Regulations: 6-310, 6-311

VN Recommended: NO

Source Test Results and Comments:

METHOD:	TEST	RUN A	RUN B	RUN C	AVERAGE	LIMIT
ST-17	Stack Volume Flowrate, SDCFM				2520	
	Stack Gas Temperature °F	70	75	80	75	
	Water Content, Volume %				1.0*	
ST-15	Particulate, gr/SDCF	.040	.066	.058	.055	.15
	Particulate, lb/hr	.9	1.4	1.2	1.2	4.7
	Isokinetic Ratio, Act/Theo.	1.01	1.00	0.98		

* Determined Psychrometrically

Source Test Team Leader	Date	Senior Source Test Engineer	Date	Approved by Source Test Manager	Date
C. McClure	11/16/90	K. Kunaniec	11/19/90	G. Karels	11/19/90

Form: Summary of Source Test Results

FSSTS: ej: 15 July 88

ISOKINETICS — POLY ENGINEERING #2503

S-1 11/2/90

$$R_I = \frac{(T_s)(V_m)(100)}{(60)(100-\%H_2O)(A_n)(V_s)(TIME)(T_m)}$$

$D_n = 4.5mm = .45cm$

$A_n = 0.0002691\,\pi\,(D_{n\,cm})^2 ft^2$

$A_n = 0.0002691\,\pi\,(.45cm)^2 ft^2$

$A_n = 0.0001712\,ft^2$

$A_n = 1.712 \times 10^{-4}\,ft^2$

RUN A) $T_s = 529.6°R$ $V_m = 25.996\,ft^3$ $V_s = 46.34 FPS$ $TIME = 56 MIN$ $T_m = 517.1°R$

$\%H_2O = 1\%$ $100-\%H_2O = 99$

$$R_{I_A} = \frac{(529.6)(25.996)(100)}{(60)(99)(1.712\times10^{-4})(46.34)(56)(517.1)} = 1.009$$

$\boxed{R_{I_A} = 1.01}$

RUN B) $T_s = 535.25°R$ $V_m = 22.95\,ft^3$ $V_s = 48.21 FPS$ $TIME = 48 MIN$ $T_m = 523.4°R$

$100-\%H_2O = 99$

$$R_{I_B} = \frac{(535.25)(22.95)(100)}{(60)(99)(1.712\times10^{-4})(48.21)(48)(523.4)} = 0.997$$

$\boxed{R_{I_B} = 1.00}$

RUN C) $T_s = 540.9°R$ $V_m = 22.44\,ft^3$ $V_s = 47.39 FPS$ $TIME = 48 MIN$ $T_m = 537°R$

$100-\%H_2O = 99$

$$R_{I_C} = \frac{(540.9)(22.44)(100)}{(60)(99)(1.712\times10^{-4})(47.39)(48)(537)} = 0.977$$

$\boxed{R_{I_C} = 0.98}$

ADL ENGINEERING #2503
S-1 11/2/90

GRAIN LOADING:

$$G_{gr/SDCF} = 15.43 \cdot \frac{W_p}{V_o}$$

$W_{PA} = 0.0694g$

$$G_A = 15.43\left(\frac{0.0694}{26.84}\right) = \underline{0.0399}$$

$W_{PB} = 0.1004g$

$W_{PC} = 0.0833g$

$G_A = 0.040 gr/SDCF$

$V_{OA} = 26.84 SDCF$

$$G_B = 15.43\left(\frac{0.1004}{23.41}\right) = \underline{0.0662}$$

$V_{OB} = 23.41 SDCF$

$G_B = 0.066 gr/SDCF$

$V_{OC} = 22.31 SDCF$

$$G_C = 15.43\left(\frac{0.0833}{22.31}\right) = \underline{0.0576}$$

$G_C = 0.058 gr/SDCF$

$G_{AVG} = 0.055 gr/SDCF$

MASS EMISSIONS:

$$M = \frac{G \cdot Q}{116.67} \; LB/HR$$

$Q = 2521 SDCFM$

$$M_A = \frac{(0.0399)(2521)}{116.67} = \underline{0.9 LB/HR}$$

$$M_B = \frac{(0.0662)(2521)}{116.67} = \underline{1.4 LB/HR}$$

$$M_C = \frac{(0.0576)(2521)}{116.67} = \underline{1.2 LB/HR}$$

$M_{AVG} = 1.2 LB/HR.$

SOURCE TEST LAB DATA SHEET

PLANT: POLY ENGINEERING
SOURCE OPERATION: SANDBLASTING BAGHOUSE
SOURCE TEST NO.:
FILTER MEDIA: 110mm FLAT GLASS FIBRE

PAGE 1 OF 1
INITIAL CM
TEST DATE 11/2/90

Drying Procedure: 105 °C 24 hours before and after test, desiccated

FILTER DATA

RUN NO.	FILTER NO.	TARE WEIGHT (g) 9/6/90 AM	9/7/90 AM	FINAL WEIGHT (g) 11/6/90 AM	11/8/90 AM	SAMPLE WEIGHT (g)
A	443	.7154	.7155	.7339	.7341	0.0184
B	444	.7067	.7069	.7307	.7308	0.0238
C	445	.7137	.7137	.7347	.7349	0.0210

PROBE & NOZZLE RINSE DATA (total all runs)

RUN NO.	FILTER NO.	JAR SAMPLE FINAL WEIGHT (g)	FILTER SAMPLE FINAL WEIGHT (g)	SAMPLE WEIGHT (g)
A	443	0.0510	0.0184	0.0694
B	444	0.0766	0.0238	0.1004
C	445	0.0623	0.0210	0.0833

PROBE & NOZZLE RINSE DATA (each run)

RUN NO.	PROBE/NOZZLE NOS.	JAR TARE WEIGHT (g) 10/30/90 AM	10/31/90 AM	JAR FINAL WEIGHT (g) 11/1/90 AM	11/9/90 AM	JAR SAMPLE WEIGHT (g)
A	11	54.5158	54.5157	54.5668	54.5669	0.0510
B	23	54.9315	54.9312	55.0081	55.0083	0.0766
C	24	56.2977	56.2980	56.3603	56.3604	0.0623

IMPINGER DATA

SOLUTION	NO.	A TARE WEIGHT	B FILLED WEIGHT	C FINAL WEIGHT	C-A SAMPLE WEIGHT	C-B CONDENSATE WEIGHT
						OK @ AM 11/13/90

Form: "Source Test Lab Data Sheet"

PLABDATA | RJ | June 23, 1989

SANDSAMPLE 30-40 GARNET 1-17.5 ... WEIGH PARTS HANDRAILS --2-35

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, Calif. 94109 • 771-6000

Source Test Data Sheet

Source Operation: SAND BLAST BOOTH
Plant: POLY ENGINEERING
Sample Type: PARTICULATE
Process Cycle: BAGHOUSE
Duct Size: 11 3/4 X 11
Duct Pressure: -.30" H_2O
ASSUMED H_2O: 1%

65-70 PSI

Source Test No.:
Run No.: I & A
Date: 11/2/80

18.64 SEC IN BUCKET 7.

4.5 mm — Nozzle Diameter
0.85 — Pitot Tube
AMBIENT — Gas Collector No.
30.15 — Barometric Pressure
0.004 cfm — Leak Rate @ 15" Hg
7 — TIME EACH POINT
8 — # OF POINTS
56 — TIME EACH RUN

Sampling Train: PROBE ⇒ FILTER # 443 ⇒ IMP# P-1 IMP# P-2 ⇒ PUMP# D684 ⇒ METER# 1039704 ⇒ EXH.

34 RAILS DONE AT 0930
34 DONE THIS RUN

Traverse Point (T_s=68°F)	Dist. From inches (ΔP_{2nd})	Initial Traverse Duct Temp °F	Initial Traverse ΔP H_2O	Traverse Point	h H_2O	V_s FPS	Time (0935)	Meter Rate CFM	Meter Temp °F	Meter Volume Ft^3	Vac "Hg	Sat'd Gas Temp °F	T_s Duct Temp °F	ROTO CFH	V_m/POINT
							0			351.364					
A .50	.65	PROCESS STOPPED	→	A_1	.65	45.70	7	.4577	56	54.57 / 354.52	6	32	68	27.5	
B .35	.50			B_2	.66	45.7	14	.4577	56	57.72 / 357.71	6	35	68	27.5	
C .70	.90			B_1	.45	38.29	21	.3805	56	60.37 / 360.40	4	35	69	22.8	
D .78	.75	STOPPED	→	B_2	.38	34.98	28	.3496	56	62.85 / 362.89	4	34	69	20.9	
	STOPPED	→		C_1	.90	53.88	35	.5376	56	66.65 / 366.68	7	34	70	22.2	
				C_2	.90	53.88	42	.5376	59	70.44 / 370.49	7	35	70	32.3	
				D_1	.75	49.23	49	.4903	59	73.92 / 373.93	6	36	71	29.4	
ΔP=.70				D_2	.75	49.28	56	.4898	59	77.36 / 377.36	6	37	72	29.4	
T_s = 522 °R						46.34	56		57.125 / 517.125	25.996	5.75	34.75	69.6 / 529.6		

EQUADIA = 11.36 FOR 8 PTS 34 RAILS BLASTED THIS RUN

$$D_n = 13.7 \left[\frac{T_s + 460}{V_s (100 - \%H_2O)} \right]^{1/2} = 4.58 \text{ mm}$$
(522; 47.16; 99)

Condensate (g)
V_o 26.84 SCF
$\%H_2O$

B-STATION

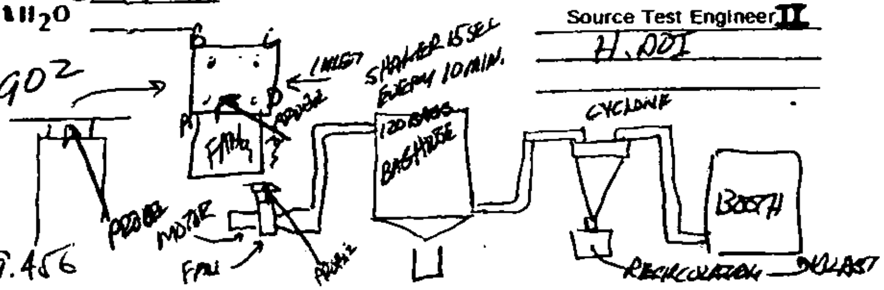
$$Q_m = \left[(2.638 \times 10^{-3}) (100 - \%H_2O) D^2_{mm} \right] \frac{V_s}{T_s}$$
(2.902; 85; 99; (4.5)) = 2.902

$$V_s = (K)(C_p)\sqrt{T_s \cdot \Delta P''}$$
(85.49)

$$K = \frac{85.49}{\sqrt{(P_b \pm \frac{P_s}{13.6}) MW}}$$
$(30.15 - \frac{.20}{13.6})(28.80)$ — 30.127 — 29.456

$$V_o = \frac{17.71 (V_m)(P_b)}{T_m \text{ °R}} = 26.84$$
(25.996; 30.15; 517.1)

Source Test Team
CHUCK McCLURE
Source Test Engineer II
H. DOI



BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, Calif. 94109 • 771-6000

Source Test Data Sheet

Source Operation: SAND BLAST BOOTH
Plant: POLY ENGINEERING
Sample Type: PARTICULATE
Process Cycle: BAGHOUSE
Duct Size: 11.75 X 11
Duct Pressure: −.30" H_2O
ASSUMED H_2O: 1%

Source Test No.:
Run No.: B
Date: 11/2/90

TOTAL = 15 RAILS + 11 SLIDES → 75# + 40#

4.5 mm Nozzle Diameter
.85 Pitot Tube
AMBIENT Gas Collector No.
30.15 Barometric Pressure
0.002 at 20 Leak Rate @ 15" Hg
6 TIME EACH POINT
8 # OF POINTS
48 TIME EACH RUN

Sampling Train: PROBE ⇒ FILTER # 444 ⇒ IMP # P-3 IMP # P-4 ⇒ PUMP # 0684 ⇒ METER # 103970A ⇒ EXH.

15 RAILS + 4 MISC LARGE PARTS + 2 PIPE SECTIONS (NO WASHERS, NO SLIDES) SAMPLING

Traverse Point	Dist. From (inches)	INITIAL TRAVERSE: Duct Temp °F	ΔP H_2O	√h	Traverse Point	h H_2O	V_s FPS	Time	METER: Rate CFM	Temp °F	Volume Ft^3	Vac "Hg	Sat'd Gas Temp °F	T_s Duct Temp °F	REMARKS: ROTO CFH	Vm/POINT
								(1121) 0			379.02					
					A_1	.70	47.7	6	.4741	60	81.86 385.87	8	35	70	28.4	
					A_2	.70	47.65	12	.4728	60	84.71 394.72	8	36	73	28.4	
		STOPPED → STOPPED STOPPED			B_1	.5	40.2	18	.4003	62	87.12 387.18	7	33	71	24.0	
					B_2	.65	46.09	1224	.4539	62	89.90 389.90	8	36	77	27.2	
					C_1	.90	54.23	18.30	.5341	64	93.10 393.10	9	37	77	32.0	
					C_2	.90	54.23	24.36	.5341	65	96.38 396.30	9	38	77	32.0	
					D_1	.70	47.87	30.42	.4706	66	99.13 399.14	8	38	78	28.2	
					D_2	.70	47.92	(1300) SLAB	.4701	68	101.96 401.97	8	39	79	28.2	
							48.21			63.4	22.95	8.125	36.5	75.25		
										523.4				535.25		

B-STATION

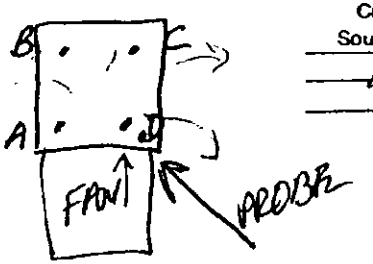
$$D_n = 13.7\left[\frac{T_s + 460}{V_s(100 - \%H_2O)}\right]^{1/2}$$

$$Q_m = \left[(2.638 \times 10^{-3})\,(100 - \%H_2O)\,D_{nozz}^2\right]\frac{V_s}{T_s}$$

$$V_s = (K)(C_p)\sqrt{T_s \cdot \Delta P''} \qquad K = \frac{85.49}{\sqrt{(P_b \pm \frac{P_g}{13.6})\,MW}}$$

$$V_o = \frac{17.71\,(Vm)(P_b)}{Tm\ °R}$$

Condensate (g)
V_o SCF
$\%H_2O$



Source Test Team
CHUCK McCLURE
Source Test Engineer II
H.DOT

1139

$W_B = 55°F$
$D_B = 68°F$
} 1% H_2O

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, Calif. 94109 - 771-6000

Source Test Data Sheet

Source Operation SAND BLASTBOOTH
Plant POLY ENGINEERING
Sample Type PARTICULATE
Process Cycle BAGHOUSE
Duct Size 11.75 x 11
Duct Pressure -.30" H_2O
ASSUMED H_2O 1%

DONE 21 + 20 PLANNED

Source Test No. _____
Run No. C
Date: 11/2/90

4.5 mm Nozzle Diameter
0.85 Pitot Tube
AMBIENT Gas Collector No.
30.15 Barometric Pressure
.005 @ 21 Leak Rate @ 15"Hg
6 TIME EACH POINT
8 # OF POINTS
48 TIME EACH RUN

Sampling Train: PROBE ⇒ FILTER # 745 ⇒ IMP # P-5 IMP # P-6 ⇒ PUMP # 0684 ⇒ METER # 103970A ⇒ EXH.

ALL RAILS BLASTED THIS RUN SAMPLING

Traverse Point	Dist. From inches	INITIAL TRAVERSE Duct Temp °F	INITIAL TRAVERSE ΔP H_2O	INITIAL TRAVERSE $\sqrt{h}$	Traverse Point	h H_2O	V_s FPS	Time 1320	METER Rate CFM	METER Temp °F	METER Volume Ft^3 402.24	Vac "Hg	Sat'd Gas Temp °F	T_s Duct Temp °F	REMARKS Roto CFH	REMARKS Vm/POINT
					A-1	.65	46.09	6	.4539	70	4.96 / 404.99	5.5	37	77	27.2	
					A-2	.70	48.0	12	.4693	74	07.80 / 407.83	6	37	81	28.1	
					B-1	.50	40.57	18	.3966	76	10.21 / 410.24	5	37	81	23.8	
					B-2	.45	38.99	24	.3763	78	12.50 / 412.56	4	37	81	22.6	
					C-1	.85	52.90	30	.5171	79	15.66 / 415.68	6	38	81	31.02	
		STOPPED →			C-2	.87	53.57	36	.5227	79	18.52 / 418.86	7	40	82	31.4	
		STOPPED →			D-1	.76	49.74	42	.4853	80	21.77 / 421.77	6	40	82	29.1	
					D-2	.75	49.74	1A1948	.4853	80	24.57 / 424.68	6	41	82	29.1	
							47.39			77	22.44	5.7	38	80.9		
										537				540.9		

$$D_n = 13.7\left[\frac{T_s + 460}{V_s(100-\%H_2O)}\right]^{1/2}$$

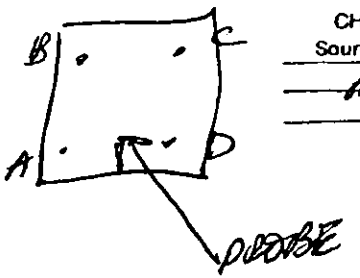
$$Q_{std} = \left[(2.638 \times 10^{-3})\,(100-\%H_2O)\,D_{nun}^2\right]\frac{V_s}{T_s}$$

$$V_s = (K)(C_p)\sqrt{T_s \cdot \Delta P''} \qquad K = \frac{85.49}{\sqrt{(P_b \pm \frac{P_g}{13.6})\,MW}}$$

$$V_o = \frac{17.71\,(V_m)(P_b)}{T_m\ ^\circ R}$$

Condensate (g)
V_o _____ SCF
$\%H_2O$ _____

B-STATION



Source Test Team
CHUCK McCLURE
Source Test Engineer II
A.DOZ

PROCESS DATA

PDI:- ENGINEERING

11/2/90 S-1 #2583

GARNET

804.1g
859.4g
952.4g
967.1g
509.3g

4092.3g

SAMPLE TIME = 18.6 SEC

453.6 gm/1Lb.

$$4092.3g \cdot \frac{1Lb}{453.6g} = \frac{9.02Lb}{18.6\,SEC} = 0.485\,Lb/SEC$$

$$0.485\,\frac{Lb}{SEC} \times 60\,\frac{SEC}{MIN} \times 60\,\frac{MIN}{HR} = 1746\,\frac{Lb}{HR} > SAND\ IN.$$

PARTS IN:

1 RAIL = 17.5 LbS

RUN A) 34 RAILS at 17.5 Lb/RAIL = 595 LbS

RUN B) 15 RAILS at 17.5 Lb/RAIL = 262.5 Lb + 115 LbS MISC PTS
= 377.5 LbS

RUN C) 41 RAILS AT 17.5 Lb/RAIL = 717.5 LbS

AVERAGE
595.0 LbS
377.5 LbS
717.5 LbS
1690 LbS

3 | 1690 LbS

563.33 Lb/RUN $\times \frac{1\,RUN}{0.8\,HR}$ = 704.2 Lb/HR AVERAGE

~~1690 LbS / 0.8 HRS~~ = ~~2112.5~~ LbS/HR.

48 MIN

PDL - ENGINEERING

SO: 1746 Lb/HR SAND IN 11/2/90 S-1 #2503

+ 704.2 Lb/HR PARTS PROCESSED

2450 Lb/HR > PROCESS

$E_{MAX} = 4.10\ (P_{TON/HR})^{0.67}$

$2450\ Lb/Hr \cdot \frac{1\ TON}{2000\ Lb} = 1.22\ TON/Hr$

$E_{MAX\ Lb/HR} = 4.10(1.22)^{.67} = 4.7\ Lb/HR$

SOURCE TEST LAB DATA SHEET

PLANT: POLY ENGINEERING
SOURCE OPERATION: SAND BLASTING BAGHOUSE
SOURCE TEST NO.:
FILTER MEDIA: H_2O IMPINGERS

PAGE 1 OF 1
INITIAL CM
TEST DATE 11/2/96

Drying Procedure: 105 °C 24 hours before and after test, desiccated

FILTER DATA

RUN NO.	FILTER NO.	TARE WEIGHT (g)		FINAL WEIGHT (g)		SAMPLE WEIGHT (g)

PROBE & NOZZLE RINSE DATA (total all runs)

RUN NO.	FILTER NO.	JAR SAMPLE FINAL WEIGHT (g)	FILTER SAMPLE FINAL WEIGHT (g)	SAMPLE WEIGHT (g)

PROBE & NOZZLE RINSE DATA (each run)

RUN NO.	PROBE/NOZZLE NOS.	JAR TARE WEIGHT (g)		JAR FINAL WEIGHT (g)		JAR SAMPLE WEIGHT (g)

IMPINGER DATA

SOLUTION	NO.	A TARE WEIGHT	B FILLED WEIGHT	C FINAL WEIGHT	C-A SAMPLE WEIGHT	C-B CONDENSATE WEIGHT	
H2O	P-1	482.0	582.1	581.8	99.8	-<0.3>	-<.5>
↓	P-2	491.7	592.1	591.9	100.2	-<0.2>	
	P-3	486.3	586.5	583.9	97.6	-<2.6>	-<3.0>
	P-4	480.4	580.9	580.5	100.1	-<0.4>	
	P-5	495.1	595.3	593.6	98.5	-<1.7>	<-1.9>
	P-6	501.0	601.4	601.2	100.2	-<0.2>	

EMISSION TEST REPORT REVIEW SUMMARY

Source Category: Abrasive Blasting

Filename: ref16.xls
Ref. No.: 16
Date: 19-Jun-97
Reviewer: BLS

Facility: Poly Engineering
Location: Richmond, CA
Source: Abrasive blasting w/FF
Test date: 02-Nov-90

Emission Data/Mass Flux Rates/Emission Factors

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	AVERAGE
1	Stack temperature	Deg F	69.6	75.25	80.9	75.3
	Pressure	in. Hg				#DIV/0!
	Moisture (assumed 1%)	%	1.0	1.0	1.0	1.0
	Oxygen	%	ND	ND	ND	0.0
	Gas volume sampled	dscf	26.00	22.95	22.44	23.80
	Vol. flow, actual	acfm	ND	ND	ND	0
	Vol. flow, standard*	dscfm	2,520	2,520	2,520	2,520
	Isokinetic variation	%	100.0	99.7	97.7	99.1
	Process rate (specify units)	~~1,000~~ lb/hr	1740	1740	1740	1740
Indicate basis for process rate (feed or production): garnet (abrasive) used						
	Pollutant mass:					
	Filterable PM	grams	0.0694	0.1004	0.0833	0.0844
	Pollutant concentrations:					AVERAGE
	Filterable PM	gr/dscf	0.0412	0.0675	0.0573	0.0553
	Pollutant mass flux rates:					AVERAGE
	Filterable PM	lb/hr	8.90E-01	1.46E+00	1.24E+00	1.20E+00
	Emission factors (ENGLISH UNITS):					AVERAGE
	Filterable PM	lb/unit	5.11E-04	8.38E-04	7.11E-04	6.87E-04

*DSCFM BASED ON A STANDARD TEMPERATURE OF 68 DEGREES FAHRENHEIT