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

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

AP42 Section:	11.7
Background Chapter:	4
Reference:	29
Title:	*Stack Emission Evaluation of Beryllium Oxide in a Specialty Ceramic Product Development and Formation Operation*, Accredited Laboratories, Inc., Carteret, NJ, May 1988.

AP-42 Section 11.7
Reference —
Report Sect. 4
Reference 29

Accredited Laboratories
Incorporated

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P.O. Box 369
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Stack Emission Evaluation of Beryllium Oxide in a Specialty Ceramic Product Development and Formation Operation

Prepared for:

Accuratus, Inc.
RD #4, Brass Castle Road
Washington, NJ 07882

Prepared by:

Accredited Laboratories, Inc. (ALI)
a subsidiary of AMAX, Inc.
Carteret, NJ

May 1988

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Attachment I - EPA Method 104

Attachment II - Quality Assurance Data

Attachment III - Field Data, Laboratory Results and Emission Calculations

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1.0 Synopsis

During March 29, April 20 and April 21, 1988 the process fume/dust collection system (i.e., hood-duct-filter system) of Accuratus, Inc., Washington, NJ was monitored at the filter outlet to determine if Beryllium Oxide (BeO) is being emitted to the atmosphere above current air standards. Figure 1 depicts the geographical location of the Accuratus facility. Figure 2 shows the ventilation/emission control system.

Stack sampling and analysis resulted in maximum and average beryllium emissions to the atmosphere of respectively 0.101 and 0.093 grams per 24 hours. The current National Emission Standards for Hazardous Air Pollutants (NESHAPS) as specified for beryllium is 10 grams Be per 24 hours. Therefore, BeO emissions from the facility being investigated are **less** than the NESHAP standard by two orders of magnitude.

2.0 Procedures

2.1 Pretest Survey

Prior to compliance sampling, cyclonic flows at the in-stack sampling points and entrainment potential between the vent stack and attached rain deflector were checked. The absence of cyclonic flow was determined by the procedures described in EPA Method 1, 2.4. Potential entrainment flows in the rain deflector that could cause irregular flows over the sampling plane were determined by hot wire anemometry. The stack outlet/rain deflector arrangement with sampling point positions are shown in Figure 3.

2.2 Compliance Sampling

Stack emission sampling and analysis for BeO were conducted in accordance with <u>EPA Method 104 - Reference Method for Determination of Beryllium Emissions from Stationary Sources</u> (Refer to Attachment 1). The sampling train utilized is shown in Figure 4. Sample train quality assurance procedures and results are given in Attachment 2. Millipore AA filters backed by Whatman 41 filters were used for efficient sample collection, extraction and subsequent analysis. Stack emissions were continuously monitored for

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an 8.33 hour period to obtain an integrated sample capable of being analyzed at detection limits low enough to determine if potential BeO emissions are in compliance with the Be NESHAP Standard.

To insure process and statistical representativeness, sampling was performed on three separate days (i.e., three 8.33 hour tests were conducted) during periods of maximum production. The collected samples of each test were individually digested in an acid solution and analyzed by atomic absorption spectrophotometry.

3.0 Results

Since the sampling grid is situated near the exhaust stack exit plane, sampling point positions do not conform to the criteria given in EPA Method 1. However, the chosen sampling point positions are considered representative of the exhaust flows and resultant emissions as a result of the following:

1. The absence of cyclonic flow at the sampling point positions and minimal turbulence between the rain deflector and exhaust stack are verified by the data given in Table I.

2. Velocity variation over the sampling grid is minimal (i.e., ≈66% of the observations cluster within 90% of the mean value or in other words one standard deviation is only ≈9% of the mean value). Descriptive statistics of the velocity profile are presented in Table II.

Stack sampling parameters and resultant emission factors are presented in Table III. Field data, laboratory results and resultant calculations are included in Attachment 3.

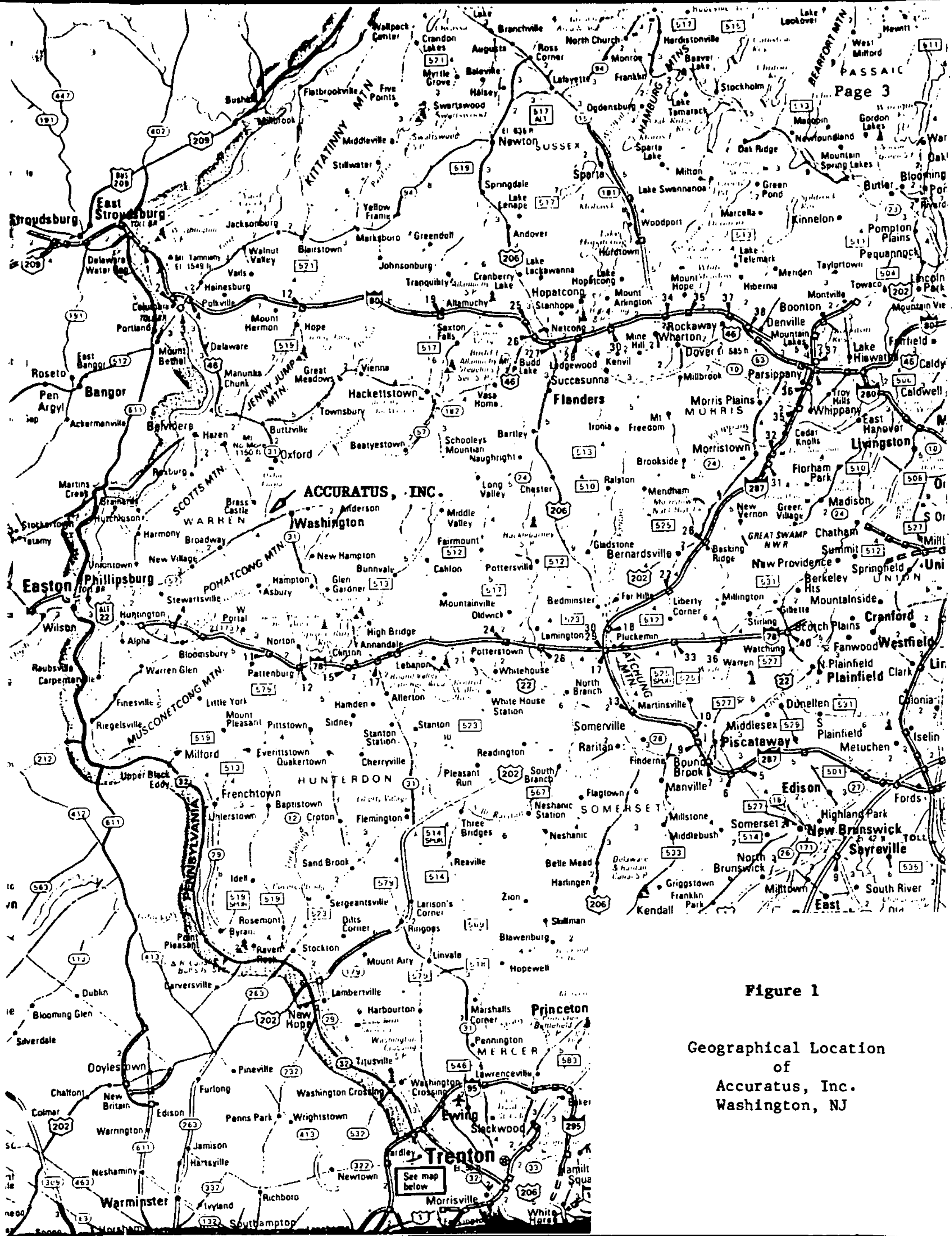


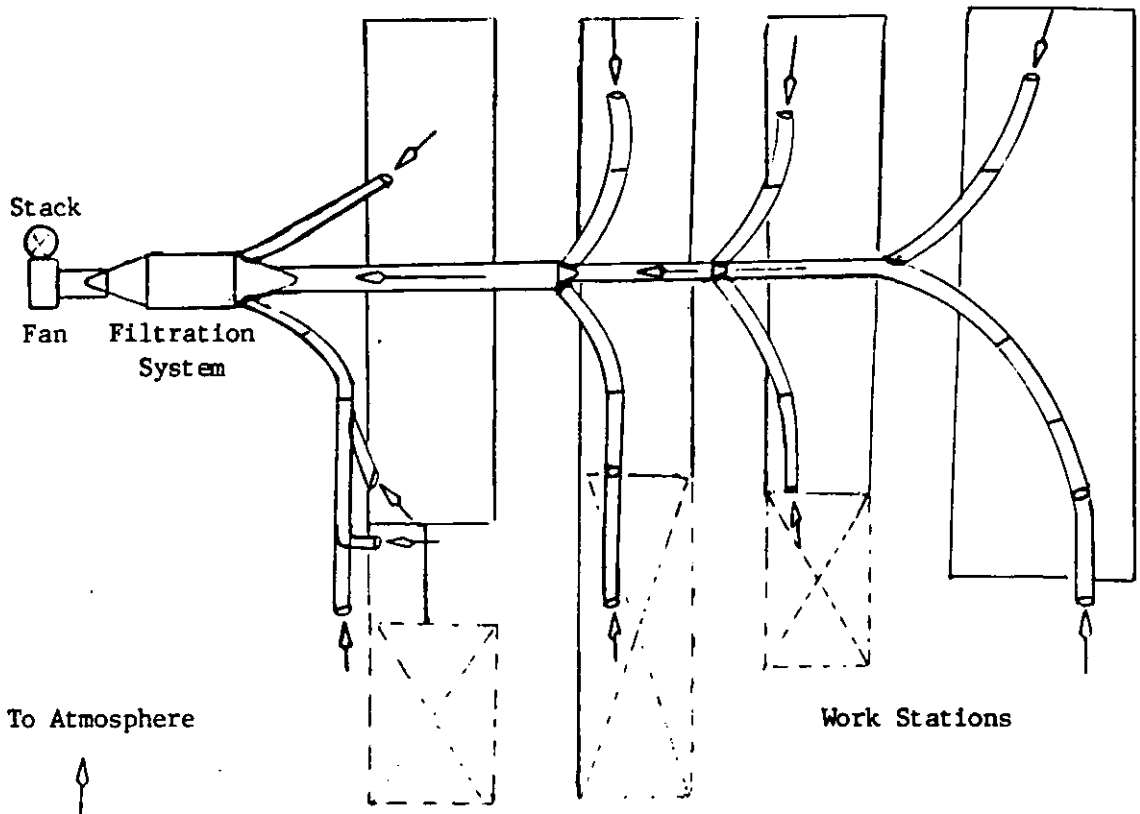
Figure 1

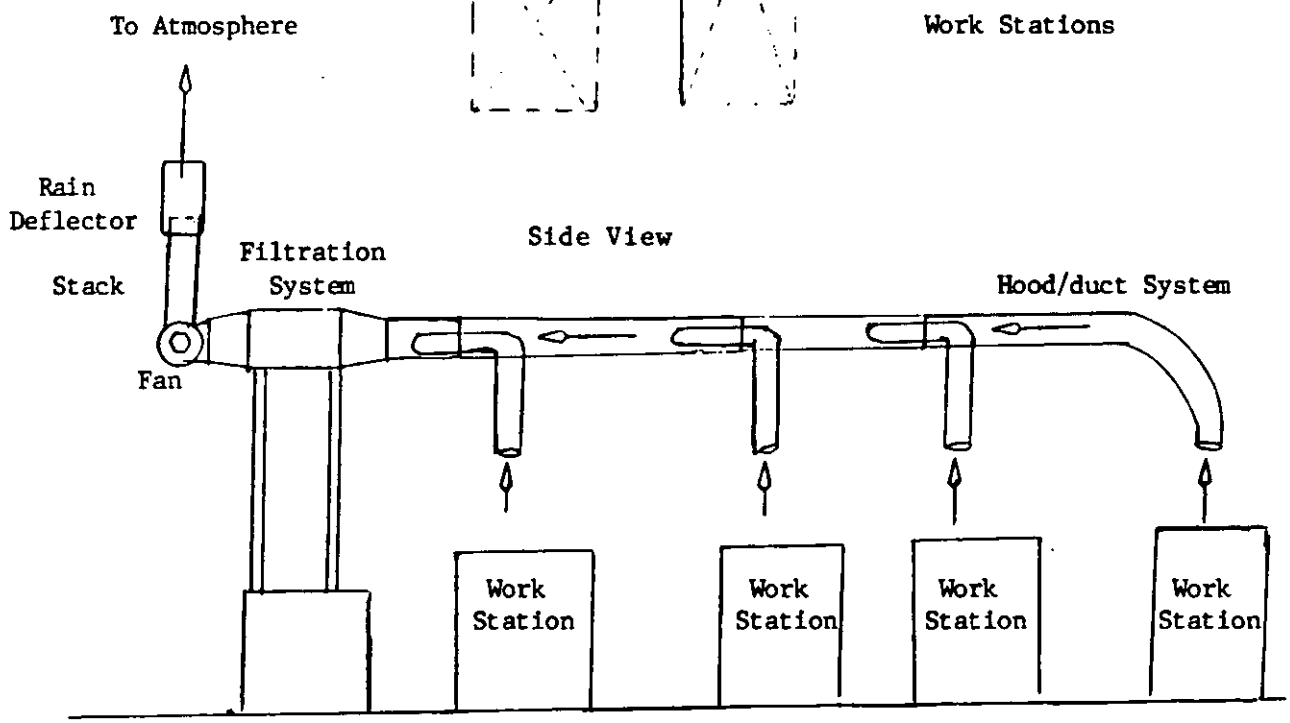
Geographical Location
of
Accuratus, Inc.
Washington, NJ

Figure 2

Ventilation/Air Emission Control System

Top View

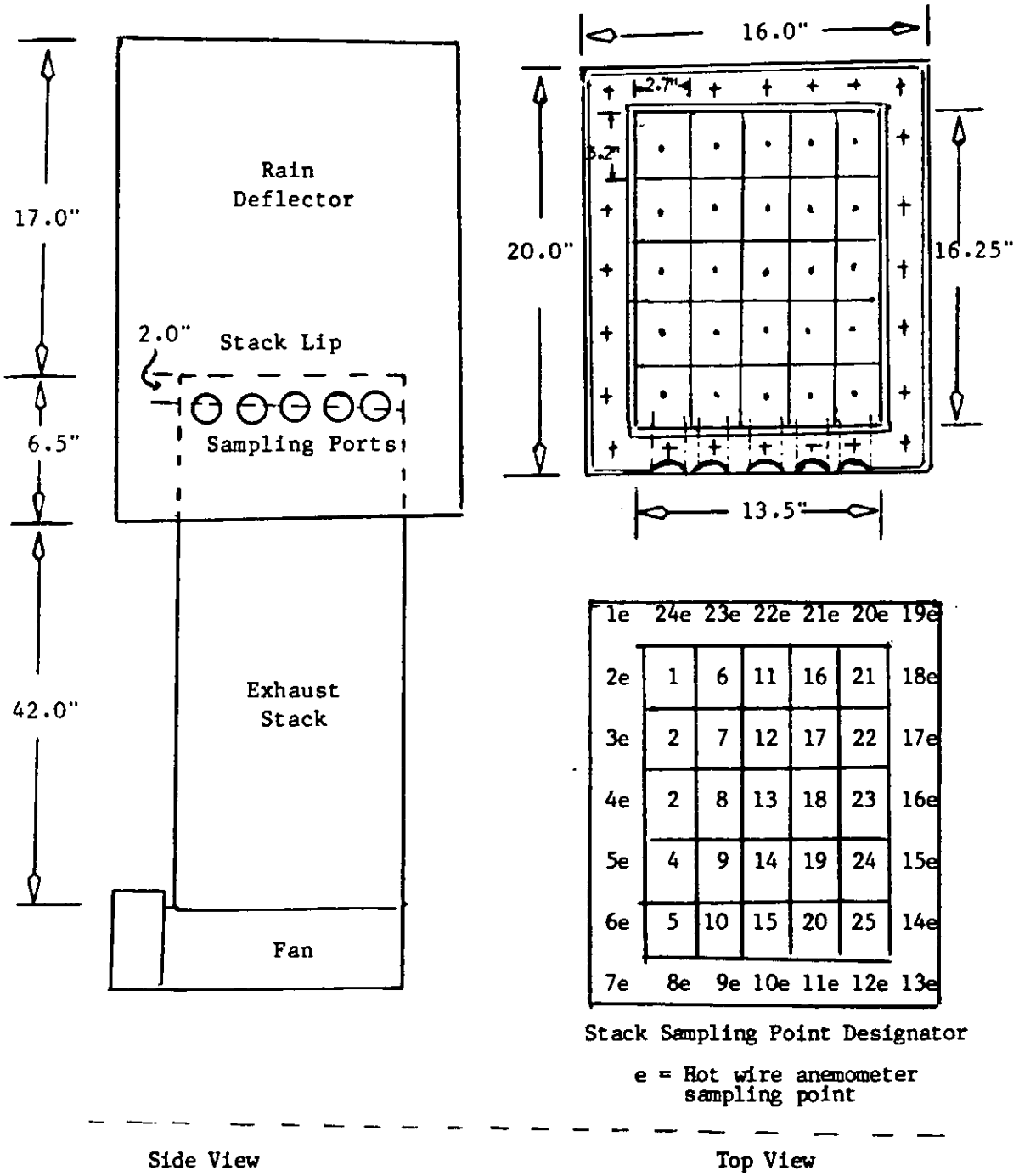




= Ventilation/Emission Control System Air Flow

Figure 3

Ventilation Stack/Rain Deflector Arrangement
and
Emission Sampling Point Positions



Stack Wall Thickness = 0.0625"

Figure 4

Beryllium Stack Sampling System

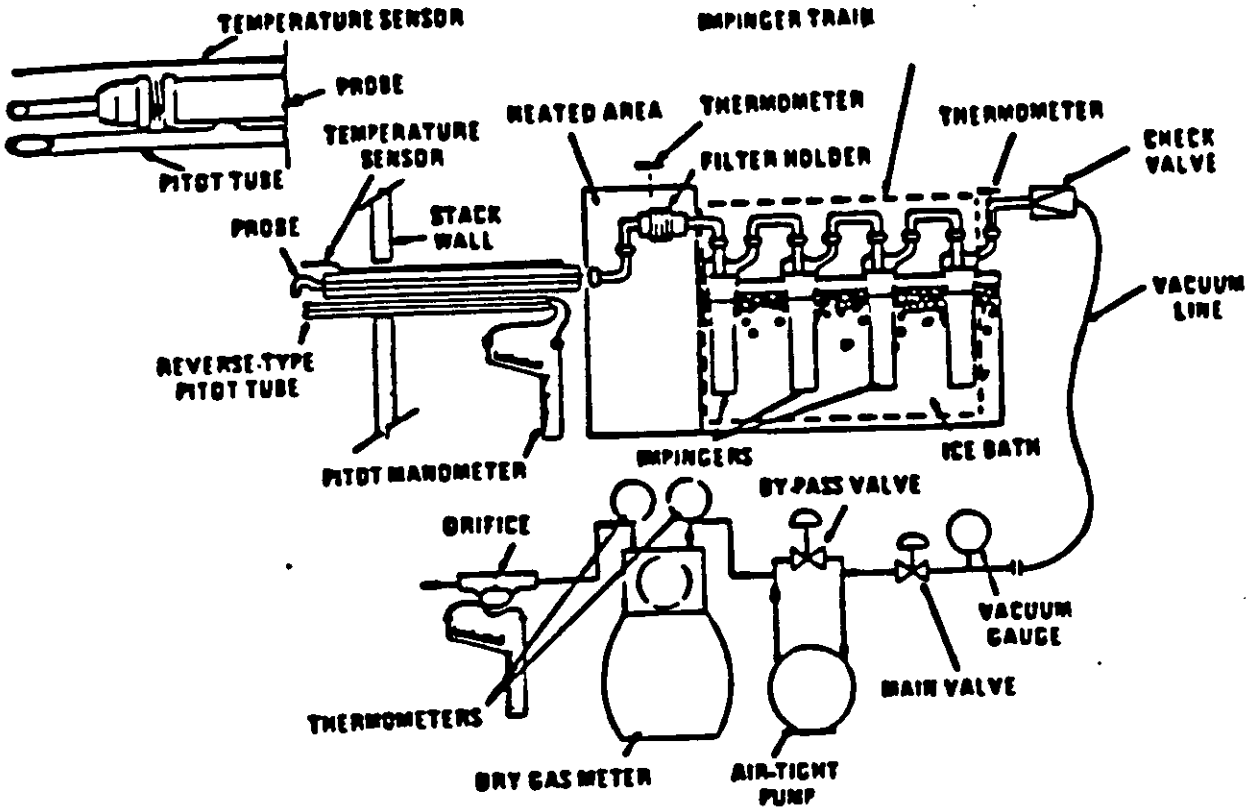


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Table I

Turbulence Characteristics over the Sampling Grid *

Cyclonic Flow			Entrainment Flow	
Sampling Point	Pitot Reading ** ("H_2O)	Yaw Angle *** (°)	Sampling Point	Hot Wire Reading **** (m/sec.)
1	0.0	3	1e	0.05
2	0.0	0	2e	0.02
3	0.0	0	3e	0.03
4	0.0	4	4e	0.00
5	0.0	6	5e	0.00
6	0.0	9	6e	0.01
7	0.0	3	7e	0.02
8	0.0	9	8e	0.03
9	0.0	1	9e	0.06
10	0.0	0	10e	0.08
11	0.0	2	11e	0.10
12	0.0	9	12e	0.07
13	0.0	5	13e	0.03
14	0.0	2	14e	0.01
15	0.0	0	15e	0.00
16	0.0	4	16e	0.00
17	0.0	0	17e	0.00
18	0.0	2	18e	0.00
19	0.0	1	19e	0.02
20	0.0	2	20e	0.04
21	0.0	5	21e	0.08
22	0.0	2	22e	0.15
23	0.0	0	23e	0.15
24	0.0	0	24e	0.05
25	0.0	0		
AVG	0.0 "H_2O	3°	AVG	0.04 m/sec.

* Refer to Figure 3.

** Pitot face openings set perpendicular to the sampling plane are considered at 0° reference.

*** Yaw angle from 0° reference where pitot reading = 0.0 "H_2O. The average deflection is much less than the allowable 20° criterium. Therefore, the absence of cyclonic flow is evident.

**** Hot wire readings outside the perimeter of the exhaust stack opening (i.e., readings are observed in the same plane of the sampling grid in the open area between the rain deflector and exhaust stack). Velocities in this open area or transitional space are only 0.3% of the stack gas velocity and thus can be considered negligible in causing flow disturbance or entrainment of the stack exhaust.

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Table II

Stack and Sample Velocity Variations as determined over the Selected Sampling Plane

Parameter	Variable N = 75 Stack ΔP ("H_2O)	Variable N = 75 Sampler Orifice ΔH ("H_2O)
Mean	0.66	0.67
Standard Deviation	0.06	0.06
Range	0.50-0.79	0.51-0.80
Sum	49.23	50.32
Sum of Squares	32.58	34.03
Covariance	0.003616	0.003567

Correlation Coefficient r = 0.99
N = number of observations

Table III

Stack Sampling Parameters and Resultant BeO Emission Factors

	3/29/88	4/20/88	4/21/88
Run Time (min)	501	500	500
Stack Temperature (°F)	79.0	75.0	76.0
Stack Velocity (ft/sec)	45.26	45.08	44.53
Stack Flow (SCFM) dry	4008.2	3945.0	3876.8
Meter Temperature (°F)	80.8	65.7	63.9
Barometric Pressure ("Hg)	30.27	29.70	29.60
Isokinetic Sampling Variations (%)	104.9	104.8	105.5
Be Emission Rate (grams/day)	0.095	0.082	0.101

Fixed Gas Analysis

CO_2 (%)	O_2 (%)	CO (%)	N_2 (%)
0.04	19.8	0.0	80.16

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Attachment 1

EPA Method 104

Reference Method for Determination

of

Beryllium Emissions from Stationary Sources

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Attachment 2

Stack Sampling System

Quality Assurance

METER CONSOLE CALIBRATION

Name ALI, AMAX, Inc. Date 10 Feb 88

Console no. 036 Dry gas meter no. 83 Dry gas meter correction factor —

Wet test meter no. — Correction factor —

Barometric pressure, P_b 30.38 in. Hg previous calibration and date _____

77.0°F

Orifice manometer setting, ΔH, in. H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet: Meter t_w, °F	Temperature: Dry gas meter: Inlet t_{di}, °F	Temperature: Dry gas meter: Outlet t_{do}, °F	Temperature: Dry gas meter: Average t_d, °F	Time θ min	γ	$\Delta H_@$
0.5	5	87.546 92.640	75.2	75 77	72 73		12:12.03	.98	1.66
1.0	5	94.000 99.054	75.8	77 80	73 74		8:41.73	.98	1.70
2.0	10	99.739 109.920	76.0	85	76		12:29.29	.99	1.73
3.0	10	111.604 121.813	76.0	87	76		10:11.83	.98	1.73
4.0	10.025	122.231 132.040	77.0	90	78		8:52.59	.98	1.74
8.0	10								
						Average		.982	1.71

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H_@$: $\frac{0.0317\ \Delta H}{P_b(t_d + 460)}\left[\frac{(t_w + 460)\theta}{V_w}\right]^2$
0.5	0.0368	.98	1.66
1.0	0.0737	.98	1.70
2.0	0.147	.99	1.73
3.0	0.294	.98	1.73
4.0	0.431	.98	1.74
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.02.

$\Delta H_@$ = Orifice pressure differential that gives 0.75 cfm of air at 68°F and 29.92 inches of mercury, in. H_2O. Tolerance = ± 0.15 inches.

Orifice $\Delta H_@$ should fall between 1.59 - 2.09 inches, or modification may be necessary for some sampling situations.

Figure 4-3. Form for meter console calibration

USMR/AMAX
Temperature Sensor Calibration

Date 8 Mar 88 Thermocouple number 036

Ambient temperature 70.5 °F Barometric pressure 29.90 in. hg

Calibrator T. Hemsel Reference: mercury-in-glass -10 to 140°F

other -4° to 300°F

Reference point number	Source[a] (specify)	thermometer temperature, °F	potentiometer temperature, °F	Temperature difference,[b] %
Ambient	Reference Thermometer	70.5	71.0	0.09 < 1.5
Ice bath	"	32.5	33.0	0.10 < 1.5
Heated oil	calibrated thermocouple	206.0	208.0	0.30 < 1.5
Amb.				
Ice Bath				
Heated Oil				

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp °F} + 460) - (\text{test thermom temp, °F} + 460)}{\text{ref temp, °F} + 460}\right] 100 \leq 1.5\%.$

USMR/AMAX

Pitot Tube Calibration

8 Mar 88

	"A" SIDE CALIBRATION			
RUN NO.	ΔPstd em H_2O (in. H_2O	Δp(s) em H_2O (in. H_2O)	Cp(s)	DEVIATION Cp(s) - $\overline{C}p$(A)
1	0.20	0.245	0.816	-0.003
2	0.50	0.610	0.820	0.001
3	1.10	1.34	0.821	0.002
		$\overline{C}p$ (SIDE A)	0.819	

	"B" SIDE CALIBRATION			
RUN NO.	ΔPstd em H_2O (in. H_2O)	Δp(s) em H_2O (in. H_2O)	Cp(s)	DEVIATION Cp(s) - $\overline{C}p$(B)
1	0.20	0.243	0.823	0.002
2	0.50	0.608	0.822	0.001
3	1.10	1.345	0.818	-0.003
		$\overline{C}p$ (SIDE B)	0.821	

$$\text{AVERAGE DEVIATION} = \sigma(\text{A OR B}) = \frac{\sum_{1}^{3} |Cp(s) - \overline{C}p(\text{A OR B})|}{3} \leftarrow \text{MUST BE} < 0.01$$

$|\overline{C}p\ (\text{SIDE A}) - \overline{C}p\ (\text{SIDE B})| \leftarrow$ MUST BE <0.01

$\sigma(B) = 0 < 0.01$

$\sigma(A) = 0 < 0.01$

AMAX, INC.

8 Mar 88

	1 Date	2 Initial "H_2O	3 Final "H_2O	4 Initial Time	5 Final Time	6 Accept	7 Reject	8	9	
1	8 Mar 88	3.6	3.6	1000	1030	✓				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
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24										
25										
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27										
28										
29										
30										
31										

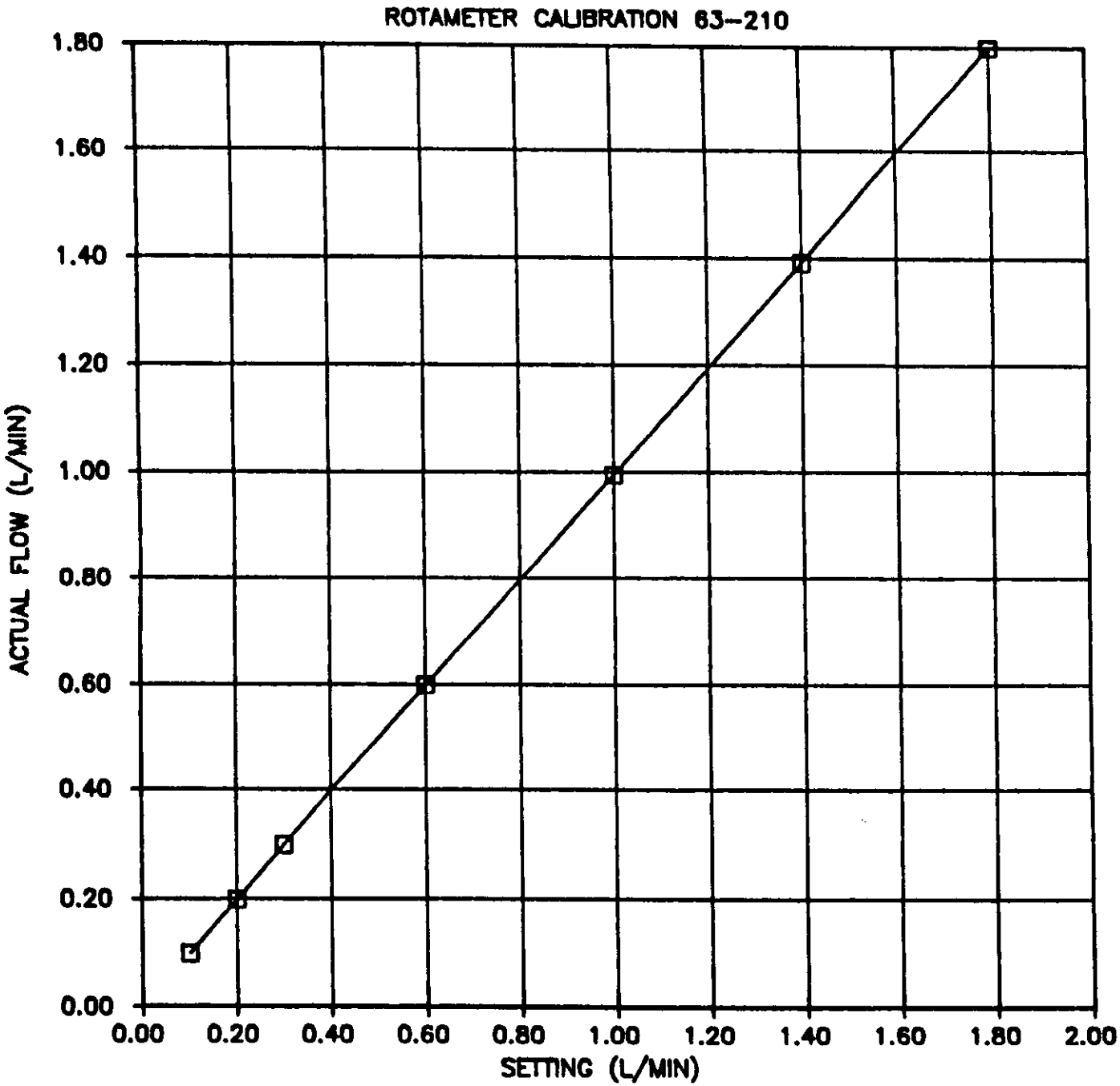
EFFICIENCY LINE No. 2036

8 Mar 88

Gas Sampling Rotometer Calibration

Temp. 77°F BP 30.38 Serial #63-210

Rotometer Setting	Cal Read 1	Cal Read 2	Cal Read 3	AVG
1.8	1.804	1.804	1.804	1.803
1.7	1.697	1.703	1.705	1.700
1.6	1.602	1.600	1.599	1.600


ROTAMETER CALIBRATION 63-210
ACTUAL FLOW (L/MIN)
SETTING (L/MIN)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
1.80
2.00

10 Feb 1988

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Attachment 3

Field Data

Laboratory Results

Emission Calculations

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Field Data

BUREAU OF AIR [illegible]
TECHNICAL SERVICES SECTION

SAMPLING DATA

DATE	3-29-88	RUN	1
(INLET)	(OUTLET)		

COMPANY	ACCURATUS	N.J. NO.	
STACK			

DESICCANT		IMPINGER		FILTER	WASH-OUT BOTTLE

TEST STARTED	8:35 (AM) (PM)	TEST FINISHED	16:56 (AM) (PM)
ACTUAL SAMPLING TIME (MINUTES)	501	NOZZLE DIAM. (INCHES)	.18
CONDENSATE (ml)		PERCENT MOISTURE BY VOLUME (%)	

PORT	POINT	ΔP	ΔH	T_s	T_m in	T_m out	Vac
8:35	1	.66	.67	72.5	57	56	6
8:55	2	.64	.66	75.0	62	59	6
9:15	3	.64	.66	75.0	62	60	6
9:35	4	.72	.74	75.0	61	60	7
9:55	5	.63	.65	74.0	63	61	7
10:15	6	.72	.74	75.0	68	65	7
10:35	7	.76	.78	77.0	72	69	7
10:55	8	.72	.74	79.0	74	71	7
11:15	9	.67	.69	82.0	76	73	7
11:35	10	.66	.67	80.0	78	75	7
11:55	11	.66	.67	80.0	78	76	7
12:15	12	.66	.67	81.0	78	76	7
12:35	13	.72	.74	81.0	82	78	7
12:55	14	.79	.80	81.0	86	81	7
13:15	15	.69	.71	83.0	89	85	7
13:35	16	.57	.59	83.0	92	89	7
13:55	17	.75	.78	84.0	93	92	7
14:15	18	.70	.72	80.0	94	95	7
14:35	19	.65	.67	81.0	96	97	7
14:55	20	.63	.66	82.0	97	99	7
15:15	21	.59	.62	81.0	97	100	6
15:35	22	.58	.60	79.0	96	99	6
15:55	23	.67	.70	80.0	96	99	7
16:15	24	.71	.74	78.0	94	98	7
16:35	25	.53	.55	77.0	92	97	6

STACK DATA	
AVG. T_s (°F)	79.0
$\overline{\Delta P}$ (in.H_2O)	.67
A (ft.^{2})	1.49
Pst (in.H_2O)+	-0.
P_s (in.Hg)	30.2
G_d	

METER DATA	
FINISH (CF)	404.
START (CF)	151.9
V_m (CF)	252.
AVG. T_m (°F)	80.8
AVG. ΔH (in.H_2O)	.69
P_b (in.Hg)	30.

AVG. VELOCITY (fps)	ACFM	@ °F	SCFM	@	
TEST BY		REVIEWED BY		DATE	

+Record in In.H_2O as read

APPE

SAMPLING DATA

DATE 4-20-88 | RUN 2 | (INLET) (OUTLET)

COMPANY ACCURATUS | N.J. NO.

STACK

DESICCANT | IMPINGER | FILTER | WASH-OUT BOTTLE

TEST STARTED 9:10 (AM) (PM) | TEST FINISHED 5:30 (PM)

ACTUAL SAMPLING TIME (MINUTES) 500 | NOZZLE DIAM. (INCHES) .18

CONDENSATE (ml) | PERCENT MOISTURE BY VOLUME (%)

PORT	POINT	ΔP	ΔH	T_s	T_m in	T_m out	VAC
9:10	1	.65	.68	71	54	55	7
9:30	2	.64	.66	72	53	56	7
9:50	3	.69	.72	70	54	57	7
10:10	4	.72	.73	72	58	59	7
10:30	5	.62	.63	71	59	60	7
10:50	6	.67	.68	71	60	61	7
11:10	7	.79	.80	78	61	62	7
11:30	8	.72	.73	74	62	63	7
11:50	9	.66	.67	74	62	63	7
12:10	10	.67	.68	76	60	62	7
12:30	11	.66	.67	76	63	62	7
12:50	12	.68	.69	75	65	63	7
13:10	13	.73	.74	76	67	65	7
13:30	14	.77	.78	74	67	67	7
13:50	15	.61	.62	74	68	68	7
14:10	16	.63	.64	73	69	69	7
14:30	17	.68	.69	74	66	68	7
14:50	18	.65	.66	77	72	71	7
15:10	19	.61	.62	79	75	74	6
15:30	20	.59	.60	78	72	75	6
15:50	21	.60	.61	80	75	76	6
16:10	22	.60	.61	79	74	76	6
16:30	23	.65	.66	77	73	76	6
16:50	24	.69	.70	77	71	75	7
17:10	25	.53	.54	76	70	73	6

STACK DATA	
AVG. T_s(°F)	75/53
$\overline{\Delta P}$ (in.H_2O)	.66
A (ft.^{2})	1.491
Pst (in.H_2O)+	-.35
P_s (in.Hg)	29.67
G_d	

METER DATA	
FINISH (CF)	648.9
START (CF)	405.45
V_m (CF)	243.44
AVG. T_m(°F)	65.7/525
AVG. ΔH (in.H_2O)	.67
P_b (in.Hg)	29.7

AVG. VELOCITY (fps) | ACFM | @ °F | SCFM | @

TEST BY | REVIEWED BY | DATE

+Record in In.H_2O as read

 .04 @ 10"

025735

APPEND

TECHNICAL SERVICES SECTION

SAMPLING DATA

DATE	7 [illegible] 77	RUN 3	(INLET) (OUTLET)
COMPANY	[illegible]		N.J. NO.
STACK			
DESICCANT		IMPINGER	FILTER	WASH-OUT BOTTLE
TEST STARTED	8:20 (AM) (PM)	TEST FINISHED	16:40 (AM) (PM)
ACTUAL SAMPLING TIME (MINUTES)	500	NOZZLE DIAM. (INCHES)	.18
CONDENSATE (ml)		PERCENT MOISTURE BY VOLUME (%)	

PORT	POINT	ΔP	ΔH	T_s	T_m in	T_m out	VAC	
		.62	.65	74	54	53	4	
8:20	1	.61	.65	73	55	54	4	
8:40	2	.65	.67	71	57	55	4	
9:00	3	.68	.69	73	57	56	4	
9:20	4	.64	.65	72	56	57	4	
9:40	5	.64	.65	72	56	57	4	
10:00	6	.74	.75	73	56	56	4	
10:20	7	.69	.70	71	55	55	4	
10:40	8	.64	.65	76	57	56	4	
11:00	9	.64	.65	77	60	60	4	
11:20	10	.64	.65	77	61	60	4	
11:40	11	.61	.65	78	65	64	4	
12:00	12	.69	.70	79	67	66	4	66.5
12:20	13	.76	.77	78	68	67	5	67.5
12:40	14	.67	.68	78	68	67	5	67.5
13:00	15	.54	.55	78	68	68	5	68
13:20	16	.72	.73	79	68	68	5	68
13:40	17	.64	.65	78	69	69	5	69
14:00	18	.63	.64	79	69	69	5	69
14:20	19	.60	.61	81	70	70	5	70
14:40	20	.56	.57	79	73	73	4	73
15:00	21	.57	.58	79	72	73	4	72.5
15:20	22	.64	.65	77	72	73	4	72.5
15:40	23	.65	.66	75	74	74	4	74
16:00	24	.50	.51	75	74	74	4	74
16:20	25	.64	.65	76				63.9

STACK DATA	
AVG. T_s (°F)	76/530
$\overline{\Delta P}$ (in.H_2O)	.64
A (ft.^{2})	1.497
Pst (in.H_2O)+	-.35
P_s (in.Hg)	29.57
G_d	

METER DATA	
FINISH (CF)	894.0
START (CF)	650.4
V_m (CF)	243.6
AVG. T_m (°F)	63.9/63
AVG. ΔH (in.H_2O)	.65
P_b (in.Hg)	29.60

AVG. VELOCITY (fps) | ACFM | @ °F | SCFM | @

TEST BY | REVIEWED BY | DATE

Baron. Press. 29.60

+Record in In.H_2O as read

APPENI

Accredited Laboratories
incorporated

Foot of Pershing Avenue, P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2025

Laboratory Results

Give results to John Telar C-800242

Accredited Laboratories

CHAIN OF CUSTODY RECORD

MAR 3 0 REC'D

NAME OF FACILITY AND ADDRESS: ALI

PROJECT - ACCURATUS
WASHINGTON N.J

SAMPLE NUMBER	NUMBER OF CONTAINERS	DESCRIPTION OF SAMPLES		mg/l
5	1	ACC-1	Deionized Water BLANK	BeO <.007
6	1	ACC-2	Acetone Blank	BeO <.00[illegible]
7	1	ACC-3	PROBE WASH	BeO <.00[illegible]
8	1	ACC-4	IMPINGER SOLUTIONS + WASHING	BeO <.00[illegible]
9	1	ACC-5	FILTER RUN #1	BeO <.5[illegible]
0	1	ACC-6	FILTER BLANK	BeO <.5[illegible]
		RUN #1		

PERSON ASSUMING RESPONSIBILITY FOR SAMPLE: | TIME | DATE

SAMPLE NUMBER	RELINQUISHED BY:	RECEIVED BY:	TIME	DATE	REASON FOR CHANGE OF CUSTODY
	C. Geil	[signature]	11:20	3-30-88	ANALYSIS

Accredited Laboratories
Incorporated

Foot of Pershing Avenue P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2005

May 10, 1988

Sample ID No: 881875
Field ID : ACC-1
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< .007	.007	mg/l

Accredited Laboratories
Incorporated

Foot of Pershing Avenue, P.O. Box 369
Garfield, New Jersey 07026-0369
Telephone (201) 541-2025

May 10, 1988

Sample ID No: 881876
Field ID : ACC-2
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< .007	.007	mg/l

Accredited Laboratories
Incorporated

Fox at Pershing Avenue P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2000

May 10, 1988

Sample ID No: 881877
Field ID : ACC-3
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< .007	.007	mg/l

Accredited Laboratories
Incorporated

Foot of Pershing Avenue, P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2005

May 10, 1988

Sample ID No: 881878
Field ID : ACC-4
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< .007	.007	mg/l

Accredited Laboratories
incorporated

Foot of Pershing Avenue, P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2025

May 10, 1988

Sample ID No: 881879
Field ID : ACC-5
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< 0.5	< 0.5	ug

Accredited Laboratories
Incorporated

Foot of Pershing Avenue, P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2005

May 10, 1988

Sample ID No: 881880
Field ID : ACC-6
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< 0.5	0.5	ug

RD #4
Brass Castle Rd.
Washington, N.J. 07882

Accredited Laboratories

CHAIN OF CUSTODY RECORD

NAME OF FACILITY AND ADDRESS: ACCURATUS, Inc. WASHINGTON NJ

SAMPLE NUMBER	NUMBER OF CONTAINERS	DESCRIPTION OF SAMPLES	
882371	1	PROBE RINSE; RUN #2	BeO
882372	1	IMPINGER SOLUTIONS + RINSES; RUN #2	BeO
882373	1	MILLIPORE + BACKING FILTER; RUN #2	BeO
882374	1	PROBE RINSE; RUN #3	BeO
882375	1	IMPINGER SOLUTIONS + RINSES; RUN #3	BeO
882376	1	MILLIPORE + BACKING FILTER; RUN #3	BeO
882377	1	ACETONE BLANK	BeO
882378	1	DISTILLED H_2O BLANK	BeO
		RUN #2 + #3	

PERSON ASSUMING RESPONSIBILITY FOR SAMPLE: | TIME | DATE

SAMPLE NUMBER	RELINQUISHED BY:	RECEIVED BY:	TIME	DATE	REASON FOR CHANGE OF CUSTODY
	C Geib	S Renshaw	13:20	4-25-88	ANALYSIS

APR 25 REC'D 1:20 C-800335

Accredited Laboratories
Incorporated

Foot of Pershing Avenue
PO Box 369
Carteret, New Jersey
07008-0369
Telephone (201) 541-2025

ANALYTICAL DATA REPORT

for

Accuratus, Inc.
RD #4
Brass Castle Rd.
Washington, NJ 07882

ACCREDITED LABS CASE No. C-880335
DATE RECEIVED: 4/26/88

Client Sample ID	Field Sample #	Laboratory Sample #
liquid	#2	882371
"	"	882372
filter	"	882373
liquid	#3	882374
"	"	882375
filter	"	882376
liquid	Blank	882377
"	"	882378

Accredited Laboratories, Inc. New Jersey Certification Number 12486 This data has been reviewed and accepted by:

Suzanne S. Weidman
Laboratory Manager

SSW:jp
4/25/88

Accredited Laboratories
Incorporated

Foot of Pershing Avenue P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2035

May 10, 1988

Sample ID No: 882371
Description : Probe Rinse Run 2
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	<.007	.007	mg/l

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Foot of Pershing Avenue P.O. Box 369
Carteret, New Jersey, 07008-0369
Telephone (201) 541-2025

May 10, 1988

Sample ID No: 882372
Description : Impinger Solns & Rinses Run 2
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	<.007	.007	mg/l

Accredited Laboratories
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Foot of Pershing Avenue P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2035

May 10, 1988

Sample ID No: 882373
Description : Millipore & Backing Filter Run 2
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< 0.5	0.5	ug

Accredited Laboratories
Incorporated

Foot of Pershing Avenue P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2025

May 10, 1988

Sample ID No: 882374
Description : Probe Rinse Run 3
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< .007	.007	mg/l

Accredited Laboratories
Incorporated

Foot of Pershing Avenue P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2025

May 10, 1988

Sample ID No: 882375
Description : Impringer Solns & Rinses Run 3
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< .007	.007	mg/l

Accredited Laboratories
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Foot of Pershing Avenue P.O. Box 369
Carteret, New Jersey, 07008-0369
Telephone (201) 541-2025

May 10, 1988

Sample ID No: 882376
Description : Millpore & Backing Filter Run 3
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	< 0.5	0.5	ug

Accredited Laboratories
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Foot of Pershing Avenue, P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2005

May 10, 1988

Sample ID No: 882377
Description : Acetone Blank
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	.008	.007	mg/l

Accredited Laboratories
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Foot of Pershing Avenue P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2025

May 10, 1988

Sample ID No: 882378
Description : Distilled Water Blank
Client : Accuratus

Parameter	Results	MDL	Units
Priority Pollutant			
Beryllium	<.007	<.007	mg/l

Accredited Laboratories
Incorporated

Foot of Pershing Avenue, P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2005

Emission Calculations

1. Date _____
2. Time 9:10 Am - 5:30 pm
3. Run No. 2
4. Pitot Tube Constant, C_p ..... .82
5. Impinger Solution Volume Gain ..... 2 (ml)
6. Silica Gel Weight Gain (1 ml of H_2O weight 1 g) 24.5 (g)
7. Total Volume H_2O Collected, V_{H_2O} =(5.)+(6.) 26.5 (ml)
8. Average Gas Meter Temperature, T_m ..... 65.7 (°F)
(For temperature corrected meters use the corrected temperature)
9. Meter Volume Sampled, V_m ..... 243.493 (acf)
10. Total Sampling Time, θ ..... 500 (min)
11. Barometric Pressure, P_{bar} ..... 24.70 (in Hg a)
12. Stack Pressure, P_s ..... 24.67 (in Hg a)
13. Average Stack Temperature, T_s ..... 75.0 (°F)
14. Average Orifice Meter Pressure Drop, $(\Delta H)_{avg}$ .67 (in H_2O)
15. Square Root Average Pitot Tube Pressure Drop, $(\sqrt{\Delta P})_{avg}$ ..... .812 ($\sqrt{in\ H_2O}$)
16. Average Pitot Tube Pressure Drop, $(\Delta P)_{avg}$ .. .66 (in H_2O)
17. Volume of water as gas at STP,

$$V_{wsc} = 0.472\ V_{H_2O}$$

1.251 (scf)

18. Meter Volume at STP,

$$V_{msc} = 17.65\ V_m \left(\frac{P_{bar} + \frac{\Delta H_{avg}}{13.6}}{T_m + 460} \right)$$

243.203 (scf)

19. Stack Moisture Content,

$$B_{ws} = \frac{V_{wsc}}{V_{wsc} + V_{msc}} (100)$$

.51 (%)

%CO = 0.0 (%)
Total % = 19.84 (%)
100 − Total % = %N_2 = 80.16 (%)

21. Dry Molecular Weight,

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

28.80 (g/gmole)

22. Stack Molecular Weight,

$$M_s = 0.18\ (B_{ws}) + \frac{M_d}{100}\ (100 - B_{ws})$$

28.74 (g/gmole)

23. Average Stack Velocity,

$$V_{avg} = 85.48\ C_p\ (\sqrt{\Delta P})_{avg} \sqrt{\frac{T_s + 460}{P_s M_s}}$$

45.08 (ft/sec)

24. Stack Area,

$$A = \frac{\pi D_s^2}{4}$$ where D_s = duct diameter (ft)

or A = L W

1.4977 (ft²)

25. Stack Flow Rate,

$$Q_{SA} = 60\ V_{avg}\ A$$

4050.98 (acfm)

26. Stack Flow Rate,

$$Q_{SD} = 17.65 \left(\frac{P_s}{T_s + 460} \right) Q_{SA}$$

3965.7 (dscfm wet)

3944.78 (dscfm dry)

28. Nozzle Diameter, D_n ..... .18 (inches)

29. % Isokinetic Variation,

$$I = \frac{1731\ (T_s + 460)\ V_{wsc}}{\theta\ V_{avg}\ P_s\ D_n^2\ B_{ws}}$$

104.8 (%)
$90 \le I \le 110$
Acceptable Results

30. Mass of Particulate Collected on Filter, M_f .. _____ (g)
31. Mass of Particulate Collected in Probe and Cyclone _____ (g)
32. Total Mass of Particulate, M_n = (30.) + (31.) . _____ (g)
33. Percentage of Total Particulate Collected on Filter,

$$\frac{M_f}{M_n}\ (100)$$

_____ (%)

34. Stack Particulate Concentration,

$$C_s = 15.43\ \frac{M_n}{V_{msc}}$$

_____ (gr/scf)

35. Particulate Mass Rate,

$$p_{mr} = 0.008591\ (C_s)\ Q_{SD}$$

_____ (lbs/hr)

APPENDIX B EPA METHOD 5 CALCULATIONS

Using STP as 68° and 29.92 in Hg a

1. Date 4-21-88
2. Time 8:20-16:40
3. Run No. 3
4. Pitot Tube Constant, C_p ..... .82
5. Impinger Solution Volume Gain ..... 7.0 (ml)
6. Silica Gel Weight Gain (1 ml of H_2O weighs 1 g) 24.7 (g)
7. Total Volume H_2O Collected, V_{w_2O} =(5.)+(6.) 25.7 (ml)
8. Average Gas Meter Temperature, T_m ..... 63.9 (°F)
(For temperature corrected meters use the corrected temperature)
9. Meter Volume Sampled, V_m ..... 243.69 (acf)
10. Total Sampling Time, θ ..... 500 (min)
11. Barometric Pressure, P_{bar} ..... 29.6 (in Hg a)
12. Stack Pressure, P_s ..... 29.57 (in Hg a)
13. Average Stack Temperature, T_s ..... 76 (°F)
14. Average Orifice Meter Pressure Drop, $(\Delta H)_{avg}$ .65 (in H_2O)
15. Square Root Average Pitot Tube Pressure Drop,
$(\sqrt{\Delta P})_{avg}$ ..... .8 ($\sqrt{in\ H_2O}$)
16. Average Pitot Tube Pressure Drop, $(\Delta P)_{avg}$ .. .64 (in H_2O)
17. Volume of water as gas at STP,

$$V_{wc} = 0.472\ V_{w_2O}$$

1.213 (scf)

18. Meter Volume at STP,

$$V_{mc} = 17.65\ V_m \left(\frac{P_{bar} + \frac{\Delta H_{avg}}{13.6}}{T_m + 460} \right)$$

243.405 (scf)

19. Stack Moisture Content,

$$B_{ws} = \frac{V_{wc}}{V_{mc} + V_{wc}} (100)$$

.50 (%)

20. Stack Gas Analysis ..... % CO_2 = .04 (%)
% O_2 = 19.8 (%)
% CO = 0.0 (%)
Total % = 19.84 (%)
100 − Total % = % N_2 = 80.16 (%)

21. Dry Molecular Weight,

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

28.80 (g/gmole)

22. Stack Molecular Weight,

$$M_s = 0.18\ (B_{ws}) + \frac{M_d}{100}\ (100 - B_{ws})$$

28.75 (g/gmole)

23. Average Stack Velocity,

$$V_{avg} = 85.48\ C_p\ (\sqrt{\Delta P})_{avg} \sqrt{\frac{T_s + 460}{P_s M_s}}$$

44.53 (ft/sec)

24. Stack Area,

$$A = \frac{\pi D_s^2}{4}$$ where D_s = duct diameter (ft)

or A = L W

1.4977 (ft^2)

25. Stack Flow Rate,

$$Q_{sA} = 60\ V_{avg}\ A$$

4001.5 (acfm)

26. Stack Flow Rate,

$$Q_{sw} = 17.65 \left(\frac{P_s}{T_s + 460} \right) Q_{sA}$$

3896.3

[illegible] (dscfm wet)

dscfm Dry

$$Q_{sd} = \left(\frac{100 - B_{ws}}{100} \right) Q_{sw}$$

3876.8 (dscfm dry)

28. Nozzle Diameter, D_n ..... .18 (inches)

29. % Isokinetic Variation,

$$I = \frac{1731\ (T_s + 460)\ V_{wc}}{\theta\ V_{avg}\ P_s\ D_n^2\ B_{ws}}$$

105.5 (%)

$90 \le I \le 110$
Acceptable Results

30. Mass of Particulate Collected on Filter, M_f .. _____ (g)
31. Mass of Particulate Collected in Probe and Cyclone _____ (g)
32. Total Mass of Particulate, M_n = (30.) + (31.) . _____ (g)
33. Percentage of Total Particulate Collected on Filter,

$$\frac{M_f}{M_n}\ (100)$$

_____ (%)

34. Stack Particulate Concentration,

$$C_s = 15.43\ \frac{M_n}{V_{mc}}$$

_____ (g/scf)

35. Particulate Mass Rate,

$$p_{mr} = 0.008591\ (C_s)\ Q_{sd}$$

_____ (lbs/hr)

ACCURATUS - Washington, NJ

RUN #1 - March 29, 1988

	Pretest	Post Test
Wt of silica gel	150 g	-
Wt of silica gel, impinger, insert	594.3 g	618.3 g
Wt of water collected	-	24.0 g
Impinger #1	100 mℓ	81.0 mℓ
Impinger #2	150 mℓ	169.0 mℓ
Impinger #3	0 mℓ	3.0 mℓ
	250 mℓ	253.0 mℓ

Moisture collected - 24 grams from silica gel + 3 mℓ H_2O = 27 mℓ

Washing Vol. - 180 mℓ (probe)
Final Impinger Vol and Washings - 525 mℓ

LAB RESULTS

Probe Wash - <0.007 mg/ℓ
Impinger Vol + Wash - <0.007 mg/ℓ
Filters - <0.5 μg

$$\text{TOTAL WT} = (180\ m\ell)(0.007\ mg/\ell)\left(\frac{\ell}{1000\ m\ell}\right)\left(\frac{1000\ \mu g}{mg}\right) = 1.26\ \mu g$$

$$+ (525\ m\ell)(0.007\ mg/\ell)\left(\frac{\ell}{1000\ m\ell}\right)\left(\frac{1000\ \mu g}{mg}\right) = 3.675\ \mu g$$

$$+ 0.5\ \mu g \qquad = 0.5\ \mu g$$

$$\text{Total Wt} \quad 5.435\ \mu g$$

Be Emission Rate EQ. 104-1

$$R = \frac{K\ \ Wt\ \ Vs(Avg)\ As\ (86400)(10^{-6})}{[Vm(std) + Vw(std)]\ (TS/Ps)}$$

$$= \frac{\left(17.64\frac{or}{"Hg}\right)(5.435\mu g)(45.26 Pt/sec)(1.4977\ ft^2)\left(86{,}400\frac{sec}{day}\right)\left(\frac{1\ gram}{10^6\ \mu g}\right)}{[249.529 + 1.274]\ ft^3\ \left(\frac{539\ or}{30.25\ "Hg}\right)}$$

$$= 0.126\ g/day$$

Since plant operates 18 hr/day

$$0.126\ g/day \times \frac{18\ hr}{24\ hr} = 0.095\ g/day$$

ACCURATUS - Washington, NJ

RUN #3 - April 21, 1988

	Pretest	Post Test
Wt of silica gel	150.0 g	150.0 g
Wt of silica gel, impinger, insert	615.5 g	640.4 g
Wt of water collected	-	24.7 g
Impinger #1	100 mℓ	-
Impinger #2	150 mℓ	-
Impinger #3	0 mℓ	-
	250 mℓ	251.0 mℓ

isture collected - 24.7 from Silica Gel + 1 mℓ = 25.7 mℓ

shings

Probe - 171 mℓ

Impinger solution + washings - 594 mℓ

B RESULTS

Probe Wash - <0.007 mg/ℓ

Impinger Wash & Solutions - <0.007 mg/ℓ

Filters - <0.5 μg

$$\text{AL WT} = (171\ \text{m}\ell)(0.007\ \text{mg}/\ell)\left(\frac{\ell}{1000\ \text{m}\ell}\right)\left(\frac{1000\ \mu\text{g}}{\text{mg}}\right) = 1.197\ \mu\text{g}$$

$$+ (594\ \text{m}\ell)(0.007\ \text{mg}/\ell)\left(\frac{\ell}{1000\ \text{m}\ell}\right)\left(\frac{1000\ \mu\text{g}}{\text{mg}}\right) = 4.158\ \mu\text{g}$$

$$+ \qquad = 0.5\ \mu\text{g}$$

$$\text{Total Wt} \quad 5.86\ \mu\text{g}$$

Emission Rate EQ. 104-1

$$R = \frac{(17.64)(5.86)(44.53)(1.4977)(86400)\left(\frac{1}{10^6}\right)}{[243.405 + 1.213]\ (536/29.57)}$$

$$= 0.134\ \text{g/day}$$

e plant operates 18 hr/day

$$0.134\ \text{g/day} \times \frac{18\ \text{hr}}{24\ \text{hr}} = 0.101\ \text{g/day}$$

[illegible] CA[illegible]TION

Using [illegible] at 68° and 29.92 in Hg a

1. Date 3/27/88
2. Time 8:35-16:56
3. Run No. 1
4. Pitot Tube Constant, C_p ..... .82
5. Impinger Solution Volume Gain ..... 3 (ml)
6. Silica Gel Weight Gain (1 ml of H_2O weighs 1 g) .24 (g)
7. Total Volume H_2O Collected, V_{H_2O} =(5)+(6) .27 (ml)
8. Average Gas Meter Temperature, T_m ..... 80.8 (°F)
(For temperature corrected meters use the corrected temperature)
9. Meter Volume Sampled, V_m ..... 252.158 (acf)
10. Total Sampling Time, θ ..... 501 (min)
11. Barometric Pressure, P_{bar} ..... 30.27 (in Hg a)
12. Stack Pressure, P_s ..... 30.25 (in Hg a)
13. Average Stack Temperature, T_s ..... 79 (°F)
14. Average Orifice Meter Pressure Drop, $(\Delta H)_{avg}$ .69 (in H_2O)
15. Square Root Average Pitot Tube Pressure Drop, $(\sqrt{\Delta P})_{avg}$ ..... .82 ($\sqrt{\text{in } H_2O}$)
16. Average Pitot Tube Pressure Drop, $(\Delta P)_{avg}$ .. .67 (in H_2O)
17. Volume of water as gas at STP,

$V_{wm} = 0.472\, V_{H_2O}$

1.274 (acf)

18. Meter Volume at STP,

$$V_{mm} = 17.65\, V_m \left(\frac{P_{bar} + \frac{\Delta H_{avg}}{13.6}}{T_m + 460} \right)$$

249.529

~~249.529~~ (acf)

19. Stack Moisture Content,

$$B_{wm} = \frac{V_{wm}}{V_{wm} + V_{mm}} (100)$$

0.51 (%)

Stack C[illegible] = ([illegible]

% O_2 = 19.80 (%)

% CO = 0.00 (%)

Total % = 19.84 (%)

100 − Total % = % N_2 = 80.16 (%)

21. Dry Molecular Weight,

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

28.80 (g/gmole)

22. Stack Molecular Weight,

$$M_s = 0.18\,(B_{wm}) + \frac{M_d}{100}\,(100 - B_{wm})$$

28.74 (g/gmole)

23. Average Stack Velocity,

$$V_{tavg} = 85.48\, C_p\, (\sqrt{\Delta P})_{avg} \sqrt{\frac{T_s + 460}{P_s M_s}}$$

45.26 (ft/sec)

24. Stack Area,

$A = \frac{\pi D_s^2}{4}$ where D_s = duct diameter (ft)

or A = L W

1.4977 (ft²)

25. Stack Flow Rate,

$Q_{SA} = 60\, V_{tavg}\, A$

4067.1 (acfm)

26. Stack Flow Rate,

$$Q_{SW} = 17.65 \left(\frac{P_s}{T_s + 460} \right) Q_{SA}$$

4028.7 (acfm wet)

27. Stack Flow Rate,

$$Q_{SD} = \left(\frac{100 - B_{wm}}{100} \right) Q_{SW}$$

4008.2 (acfm dry)

28. Nozzle Diameter, D_n ..... .18 (inches)

29. % Isokinetic Variation,

$$I = \frac{1731\,(T_s + 460)\, V_{wm}}{\theta\, V_{tavg}\, P_s\, D_n^2\, B_{wm}}$$

104.9 (%)

$90 \le I \le 110$
Acceptable Results

30. Mass of Particulate Collected on Filter, M_f .. _____ (g)
31. Mass of Particulate Collected in Probe and Cyclone _____ (g)
32. Total Mass of Particulate, M_n = (30.) + (31.) . _____ (g)
33. Percentage of Total Particulate Collected on Filter,

$$\frac{M_f}{M_n}\,(100)$$

_____ (%)

34. Stack Particulate Concentration,

$$C_s = 15.43\, \frac{M_n}{V_{mm}}$$

_____ (gr/scf)

35. Particulate Mass Rate,

$\mu_{mr} = 0.008591\,(C_s)\, Q_{SD}$

_____ (lbm/hr)

Ref. 29

Let's protect our earth

State of New Jersey

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

JORGE H. BERKOWITZ, Ph.D.
DIRECTOR

(609) 292-5383

August 3, 1988

MEMORANDUM

TO: Don Patterson

FROM: Edward Choromanski

SUBJECT: Accuratus Ceramic Corporation - Washington, N.J.
APC Plant I.D. No. 85106
N.J. Stack No. 001

Emission tests were conducted at the above referenced facility. The purpose of the tests was to determine if the source was within the allowable beryllium emission rate specified in Permit No. P-76693 and the National Emission Standards for Hazardous Air Pollutants (Neshaps)- Subpart C - National Emission Standard for Beryllium (40 CFR - Part 61).

John Vereb and Frank Papp reviewed the final test report. Their review indicates that the beryllium emissions from the source were within the standards stated on Permit No. P-76693 and Neshaps Subpart C. Although the source was within the allowable standards, they were only operating an average of 6 sources out of 12 during the testing period. Since the emission emitted from the source were roughly one-half of the allowable permit standards, it may be possible that the emissions may reach the permit allowable. Based on this fact, the permit should be amended to reflect a maximum number of sources to be operated at any one time. Once the permit is amended, a five year operating certificate should be granted.

c. Milt Polakovic
Lou Mikolajczyk
Harold Christiff
Mike Papp (N.R.O.)
Frank Papp
John Vereb

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Let's protect our earth

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

JORGE H. BERKOWITZ, Ph.D.
DIRECTOR

(609) 292-5383

July 19, 1988

MEMORANDUM

TO: Edward Choromanski

THROUGH: Frank Papp FP.

FROM: John Vereb JV

SUBJECT: Accuratus Inc., Washington N.J.
Permit/Certificate Number 076693
APC Plant ID 85106
N.J. Stack Number 001

On the dates of March 29, April 20, and April 21, stack tests for Beryllium Oxide were conducted on the ventilation/emission control system of Accuratus Inc., Washington, N.J., by Accredited Laboratories Inc. of Carteret, N.J. The results reported are as follows:

STACK SAMPLING PARAMETERS
and
RESULTANT BeO EMISSIONS

	RUN 1	RUN 2	RUN 3	ALLOWABLES NJDEP P & CT.	ALLOWABLES NESHAPS SUBPART C
Run Time (min)	501	500	500	--	--
Stack Velocity (ft/sec)	45.3	45.1	44.5	--	--
% Isokinetics	104.9	104.8	105.5	--	--
Be Emission Rate					
(grms/day)	.095	.082	.101	--	10
(lb/hr) x 10^{-6}	8.73	7.53	9.3	23	--

* Allowable based on an hourly average of 5.56 grinders operating out of 12 possible.

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Technical Services calculations using the raw data supplied produced substantially the same results as reported by Accredited Laboratories Inc..

Allowable emissions of Beryllium Oxide under National Emission Standards for Hazardous Air Pollutants is 10 grams of Beryllium for a 24 hour period. Allowable emissions of Beryllium Oxide under NJDEP Permit 076693 is 2.3×10^{-5} lbs per hour. Emissions for Beryllium Oxide were in compliance with NJDEP Permit No. 076693 and NESHAPS Subpart C during all three test runs.

A representative sample was required to obtain adequate results, therefore eight hour tests were run. Tests were run during the primary cycle of the production process due to the higher emission rates occurring then. According to David Kmetz of the Northern Regional field office, and average of 5.6 machines were being used at one time which is below the twelve machine specification on the permit, this was due to the nature of the production.

Form DEQ-079
3.86

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR POLLUTION CONTROL

EMISSION TEST OBSERVATION FORM

1) COMPANY Aquaratus Ceramic Corp

N.J. STACK NO. 001 DEP I.D. NO. 85106

PLANT LOCATION Washington (Warren Co.)

2) PLANT CONTACT Ray Tsao, President EMISSION TEST DATE(S) 4/20/88 4/21/88

3) SOURCE BEING TESTED "BeO" stack PERMIT CERTIFICATE NO 76693

DESCRIPTION OF SOURCE various machines handling BeO parts

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

N.J.A.C. 7:27 _____ EPA NSPS Subpart _____ EPA NESHAPS Subpart A F

5) TYPE OF CONTROL EQUIPMENT (if applicable) filters

CONTROL EQUIPMENT OPERATING PARAMETERS (During each test) none

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

6) SOURCE OPERATING PARAMETERS (During each test) #'s of machines in operation -- see diagram on reverse of p. 2 -- followed by total (no.) in operation

TIME ~~PARAMETER~~	4/20/88 RUN NO. 2	TIME ~~RUN NO. 2~~	4/21/88 RUN NO. 3
0910	(startup)	0810	(startup)
0920	8, 5, 4, 12, 13 (5)	0930	1, 8, 9, 12, 13 (5)
0935	3, 4, 5, 8, 12, 13 (6)	0945	1, 4, 7, 8, 9, 12, 13 (7)
0950	3, 4, 5, 8, 9, 12, 13 (7)	1000	1, 2, 4, 7, 9, 12, 13 (7)
1005	5, 13 (break) (2)	1015	8, 9, 12, 13 (4)
1020	3, 4, 5, 8, 9, 12, 13 (7)	1030	1, 2, 4, 7, 8, 9, 12, 13 (8)
1035	3, 4, 8, 12, 13 (5)	1045	4, 7, 9, 12 (4)
1050	3, 4, 5, 8, 12, 13 (6)	1100	4, 8, 9, 12, 1, 2 (6)
1105	3, 4, 8, 9, 12, 13 (6)	1115	2, 8, 12, 13 (4)
1120	3, 8, 12, 13 (4)	1130	1, 2, 4, 9, 12, 13 (6)
1135	3, 4, 5, 8, 9, 12, 13 (7)	1145	1, 2, 4, 9, 12, 13 (6)
1150	4, 5, 9, 12, 13 (5)	1200	7, 9, 12, 13 (4)
1205	3, 5, 8, 12, 13 (5)	1215	7, 9, 12, 13 (4)
1220	5, 8, 12, 13 (4)	1230	4, 7, 8, 9, 12, 13 (6)
1235	3, 4, 5, 8, 9, 12, 13 (7)	1245	1, 2, 4, 7, 8, 9, 12, 13 (8)
1250	4, 5, 8, 9, 12, 13 (6)	1300	2, 4, 7, 9, 12, 13 (6)
1305	4, 5, 8, 12, 13 (5)	1315	2, 4, 7, 9, 12, 13 (6)
AVG. NO OF MACHINES IN OPERATION DURING RUN (4-HR AVG.)	5.5		5.7

7) TYPE OF FUEL BEING FIRED (if applicable)

MOUNT OF FUEL BEING FIRED DURING EACH TEST N. A.

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

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

Run No. 1 _____

Run No. 2 _____

Run No. 3 _____

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

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

TYPE	RUN NO.	LOCATION	SAMPLE NUMBERS	COMMENT

0) ANY PROCESS OR CONTROL EQUIPMENT PROBLEMS DURING ANY TEST? ☐ YES ☑ NO

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

RUN NO.	PROBLEM

1) EMISSION TESTS CONDUCTED BY ☐ DEP ☑ COMPANY CONSULTANT

INSPECTOR'S SIGNATURE David J. Kmetz

REGIONAL OFFICE REPRESENTED Northern