OAK RIDGE HEALTH STUDIES DOCUMENT SUMMARY FORM

DOCUMENT TITLE: Handwritten Notes of B.F. Rutherford Regarding Y-12 Stack Sampling (22 pages).

Rep # 2988

DOCUMENT NUMBER OR IDENTIFIER: N/A

AUTHOR(S): B.F. Rutherford

DATE DOCUMENT ISSUED: 1956 - 57

COPY REQUEST LETTER NUMBER:

CLASSIFICATION CATEGORY: (UNC) CL* UCNI OUO *Category & Level: RD or NSI or FRD; TS or S or CONF

SITE(S) DOCUMENT ADDRESSES: K X (Y) S ORR MELT CLIN WOC WOL POPL EFPC PCE BEAR WATT

SOURCE/LOCATION OF DOCUMENT: Bldg. 9711-1

DOCUMENT CATEGORY

Primary = (AI) AI (DL dr dc da) (ED ea ew es ef) EP

Optional Secondary = (HO) (HO hp hr hs hw) IN IP (ST) sa sw ss) TM WP

DATE ENTERED INTO DATABASE: REP. DOC. No: BY:

KEYWORDS: Stack sampling, releases

ABSTRACT:

These handwritten notes contain specific information regarding releases of uranium from various stacks at Y-12. These are personal notes which detail calculations used to estimate stack sample quantities. This information is a good example of how estimates of uranium releases were made from stack sample data. This information would need to be validated with supporting documentation and personnel interviews.

2988

COPY REQUESTED ☐

REVIEWER: JEB DATE REVIEWED: 2/9/93

13-25-64
Per C. M. West

TR. MK. REG. U.S. PAT. OFF.

To Convert Stack loss (gms/day) to μc/ml:

gms loss/day x Flow (Stack Flow CFM) x *SA (d/m/μgs) x 1.1 x 10^{-8} = μc/ml.

* Enhanced = 1.4 x 10^{2} d/m/μgs
* Depleted = 1.4 d/m/μgs

To Convert Micrograms to d/m/m^3:

$$\frac{\text{Micrograms} \times SA}{M^3 (\text{Vol. of Air})}$$

2 [4] Min counts

$C^1 + C^2 \div 8$ = Avg. CPM

$$\frac{\text{Avg. CPM}}{\text{Rate} \times \text{Time} \times \text{Avg. Eff.}} = d/m/ft^3$$

$$\frac{d/m/ft^3 \times \text{Stack Rate} \times 1440 \times 3}{143 \times 10^6} = \frac{\text{gms loss}}{24\ \text{hrs}}$$

Fudge Factor

To Convert Stack Loss (gms/day) to μc/ml:

~~loss gms/day x Flow (M³/min) x SA (d/m/μgs) x 1.1 x 10^{-8} = μc/ml~~

gms loss/day x Flow (Stack in CFM) x SA (d/m/μgs) x 1.1 x 10^{-8} = μc/ml

SA = 1.4 x 10^{8} (Enhanced)
1.4 x 10^{6} (Depleted)

SAVE!

(1) To Convert Stack Loss (gms/day) to μc/ml:

gms loss/day x Stack Flow (CFM) x *SA (d/m/μgs) x 1.1 x 10^{-8} = μc/ml.

* Depleted = 1.4 d/m/μgs
Enhanced = 1.4 x 10^{2} d/m/μgs

(2) To Convert Micrograms to d/m/m^3:

$$\frac{\text{Micrograms} \times SA}{M^3 (\text{Vol. of Air})}$$

Two 4 Min Counts

(3) $C^1 + C^2 \div 8$ = Avg CPM

$$\frac{\text{Avg. CPM}}{\text{Rate} \times \text{Time} \times \text{Avg Eff.}} = d/m/ft^3$$

$$\frac{d/m/ft^3 \times \text{Stack Rate} \times 1440}{SA (143 \times 10^6)} \times \text{Fudge}$$

Factor (3) = gms loss/24 hrs

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SPEC. FORM L-1753. PRINTED BY LEFAX, PHILA. 7, PA. U.S.A.

Imp. !!

STACK SAMPLE CALCULATION

$\text{Count}^1 + \text{Count}^2 \div 8 = \text{Avg. Counts/Min}$ (4 min counts)

$\text{Avg. CPM} = \text{d/m/ft}^3$

Rate × Time × Avg. Eff.

$\text{d/m/ft}^3 \times \text{Stack Rate} \times 1440 \times 3 = \frac{\text{gms}}{\text{day}}$

143×10^6 (Specific Activity)

THORIUM CALCULATION

$\frac{.46 \times \mu g's}{\text{Flow Rate} \times \text{Time}}$ (As determined by Chem. Analysis)

$= \text{d/m/m}^3$ (4.4 d/m/m³ is PAV)

~~1.410000~~ ~~$1.4100~~

$\text{m}^3 \times \frac{1\ M^3}{35.3\ ft^3} \times \frac{1}{\text{d/m/µg}} \times 1375\ ft^3/\text{min} \times 1440\ \frac{\text{min}}{\text{day}}$

d/m/ft³ µg/ft³ µg/min µg/day

$\times \frac{1}{35} \times \frac{1}{8} \times 1375 \times 1440 = \frac{3.96 \times 10^6}{280} = 1.41 \times 10^4\ \frac{\mu g}{\text{day}}$ or

$= 14.1\ \frac{\text{mg}}{\text{day}}$

$= .014\ \frac{\text{gms}}{\text{day}}$.

For Estimating Amounts of material per micro gram on 100 cm².

To convert d/m/m² to micro grams

$\frac{d/m/m^3}{S.A.}$ = micro/gram/min

change ft²/min 35.3 ft³/m²

Count in d/m/100cm² = No. Micro gr/100cm²

Spec. Activity

To Convert Micro gram to d/m/M³

$d/m/M^3 = \frac{\text{Micro grams} \times S.A.}{M^3}$

See Succeeding for example

S. Activity

Depletion = 1.254 d/m/gram

Normal = 1.512

Enhanced = 143

Figuring Grams/loss/per day from stack & d/m/m³.

Stack (Carbon burner) Flow through stack is 1,375 CFM

4% Material

8 d/m/microgram is S.A.

$\frac{.12}{8(S.A.)\,|\,1.00}$ = micro/gram/ft²

1375
.12
2750
1375
165.00 micrograms/min

1440 min/day
165
237600 micro/day
or
.2376 grams/loss/day

$\frac{35.3\ ft^3}{d/m/m^3 \text{ of Sample}}$ = micrograms/min

then

S.A. $\sqrt{\text{micro/gram/min}}$ = micrograms/ft³

Complete Formula

$\frac{d/m/m^3}{35.} \times \frac{1}{35.3\ ft/m^3}$

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Depleted – .000381 mc/gram

Enhanced – .054887 "

Normal – .000705 "

[illegible]
2/17/93

"G" Mechanical Operations – Williams

"D" " " – Harding

" " " – Dickens Gray

Participation Effort Range

Less than 70 – Very Unsatisfactory

" " 80 – Unsatisfactory

80 – 87 – Satisfactory

90 – 95 – Very Sat.

95 – 100 – Excellent

these ranges might vary somewhat

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Specific Activity

U^{234} — 12,565 × % =

U^{235} — 4.75 × % =

U^{238} — 0.743 × % =

Spec Activity =

$$\% \, U^{234} = \frac{0.0058}{0.715} \times \% \text{ of } U^{235} =$$

(.008)

$$\frac{\text{Weight in gms} \times \text{S.A.} \times 10^6}{2.22 \times 10^9} = \text{Millicuries}$$

Composition	% 238	% 235	% 234
700	99.3	0.7	0.005
1000	94.0	6.0	0.02
1300	58.0	31.0	1.0
1800	47.0	53.0	0.18
1900	5.1	93.3	1.1

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9660
14840
24440

THORIUM!

μgs Th (from Chem. Analysis) X .46
÷ Total Flow = d/m of Th.

d/m | 100 cm²

.4 = d/m

.41

To Convert μgs (from Chem Analysis) Th to d/m you multiply .46 X the μgs to get d/m.

Aug. 21, 1956

Black Cat Iron
Wing Stack

4.5" θ
2.25 Radius
15.9 Sq ft. Area

Re-Checked 1-19-71
~ 35,000 cfm

6" 18" 27"

3564

3709
3537
3445

3 | 10691 = 3564 Avg ft/min
9
16
15
19
18
17

1519
32076
17820
3564
56667.6

56,500
56,667 cfm
going through Duct

.0164 X d/m/m³ = gm loss/day

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Basement Ducts — Flow

Head House Duct — 24,440 CFM .0091

Dry Chem. (extreme end) East → 24,440 CFM ≈ .0091

Rm. 1010 — ~~[illegible]~~ 13,950 CFM

Factor — .0040

3.065 | .0124 = .0040 13,900 | 42,600 3.065

= (factor for figuring gram loss per day) × d/m/M³

$$\frac{d/m}{M^3} \times \frac{1\,\mu g}{140\ d/m} \times \frac{1440\ min}{day} \times \frac{\text{Rate of Exhaust CFM}}{Min}$$

$$\times \frac{1\,M^3}{35.3\ ft^3} \times \frac{1\,g}{10^6\,\mu g} = \text{grams loss/day}$$

Note: For th. [illegible] change specific [illegible]

3.065 √.0124

.0179 = grams lost per 24 hours

As per M. Sandoval 8/18/58

Room	1005	Vegetable exhaust	3200 CFM
Room	1009	Exhaust Stack	14,000 CFM
Room	1010	[illegible] Exhaust Stack	1,000 CFM

Aug. 21, 1956

Black Cast Iron

D-Wing Stack

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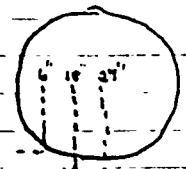
#4 7" 40"

1133
1133
1266
1133
981.0
1133

1130

4.5 θ
2.25 R
*15.9 sq. ft. = Area



2682 ft/min Avg.

6" 18" 24"

2682
15.9
"
42,644 CFM through duct

#5 36"

~~1498~~ 1210

1498
1602
1498
1602
1602
1680

~~1350~~
~~1580~~
1580

1650

9482

Re-checked 1-19-71 ~45,000 CFM

Factor for figuring gm/day.

.0124 X d/m/M³

* A = πrs (π = 3.1416

225² X 3.1416 = 15.9

12-09 - Room 1010 - S.W. Wall

(.520 x d/m/m³ = gms loss)

B. Hair Duct
Grinding

40" x 20" = 5.5 sq ft

(Dispatching Area)

After exit through Hey Hoods

6" = 1699
12 1791
18 = 1879
22 = 1899
28 = 1962
34 = 2042

1875 22 1875 CFM

Point to Filter Hoods 24 sq ft
(Intersection)

24" x 12"

3 3445
6" 3709
9" 3842
15 3669
18 3625
21 3445

3.23 CFM

.365 x d/m/m³ = gms loss/Day

Total minutes in day

M³ of Air that Hi Vol Pulls

No. of ft³ to make one M³

Vol of air sampled.

Micro grams x CFM x Total minutes in day (1440) / 35.3 x Total Vol. of Air = mg/day

Save

Very Imp.

Formula for finding grams escaping ducts or stacks

The following is the calculation for determining the factor for converting d/m/m³ on the sample from the E-Wing dust collector exhaust to g/day loss:

$$\frac{d/m}{M^3} \times \frac{1\,\mu g}{140\,d/m} \times \frac{1440\,min}{day} \times \frac{60{,}000\,ft^3}{min} \times \frac{1\,m^3}{35.3\,ft^3} \times \frac{1\,g}{10^6\,\mu g} = 0.0179\ g/day.$$

28.20

~~Interior of Pressure~~

East Conv. C-Wing Stack –
(Before Scrubber Sys. Attachment)

28" x 20" = 3.9 sq. ft ~~[illegible]~~ Sq. ft. (Area

~~[illegible]~~ 1791 f/m
2832 "
2533 "
3 | 7156 = 2385 Avg. ft/min

.0027 x d/m/m = g/day

~~2385~~ 2385
~~x 560~~ 3.9
9301.5 CFM

9,300 CFM

West Conv. C-Wing Stack
(Before Scrubber Sys. Attachment) Roof

34" x 27" = 918 sq in = 6.4 sq. ft.

1962 f/m
2260 "
2469 "
3 | 6691 = 2230 avg. ft/min
6.4
14,300 CFM

.0041 x d/m/m³ = g/day

C-1 Westfalia Centifuge Exhaust
~~[illegible]~~ 11NF-81
1,000 CFM

51:01

.0004 x d/m/m³ = g/day

East (C-1) Scrubber Stack

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E = 12" in diameter - Pulls

1400 CFM per E. Roberts

West (C-1) Scrubber Stack

W = 14" in diameter - Pulls

2400 ~~2400~~ CFM per ~~[illegible]~~ Blue Print
2400 CFM

~~.0003 x d/m/m³ = g/day~~

.0003 x d/m/m³ = g/day

HeadHouse Stack (21,200)

1330 ft/min
16 sq ft
21,280 CFM

4' x 4' = 16 sq ft.

	1st Reading	2nd	3rd
5" -	1266	1133	1266 - ft/m
10" -	1387	1266	1340
15" -	1387	1266	1387
20 -	1498	1387	1387

1330 ft/m

Aug. 16, 1956

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Thur. - Aug. 31 N - 1.06 grams
Tues. - Sep. 4 D - .89 "
Friday - Sept. 7 D - .3 "
Thur. - Sept. 7 N - .3 "
Mon. Sept. 10 D - 3.0 "
Tues. - Sep. 11 D - .6 "
Mon. Night " " N - 2.0 "

E-Wing Exhaust Duct

Duct 5' X 5' = 25 sq ft.

Treverse Reading

At	1st Ck	2nd Ck.
6"	2335 F/min	2335 F/min
12"	2403 "	2403 "
18"	2403 "	2403 "
24	2469 "	2469 "

4) 9610 = 2402 Avg. F/min.

2402 Feet/minute
25 sq ft (Size of Duct)
12010
4804
60,050 CFM (Amount of Air going through Duct.)
62,000 CFM

Notes:
1. Sample from center
2. Take Treverse

Per C.M. west / Bob Slosher

d/m/m³ X ~~.0174~~ = grams lost
.0179 = Per 24 hours.
(For E-Wing "Hershey" stack only)

$C = \pi d = 22'' \quad 21.5$

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LEFAX, PHILADELPHIA 7, PA. MADE IN U.S.A.

Stack Sampling (Cont'd)

Date	Location	Stack No.	Start	Finish	Total Min	Avg Flow	Vol of Air	No. Hours Going Per Air Sample
1/15/89	D-CS	1	0:820	1525	425	1.5	637.50	Lab. Mistakes
1/16/89	C-CS	1	0815	1532	427	1.5	640.5	" "
1/19/89	CC-1	1	0:830	1500	390	1.5	585.	97 min .18/hr
1/19/89	HH-1	1	0:830	1530	420	1.5	630.	44 " .06 g/hr
1/21/89	HH-1	1	0:850	1545	435	1.5	652.5	25 " .03
1/22/89	CC-1	1	0:910	1530	380	1.5	570.	100 min .1 g/hr
1/22/89	C-CS	1	0:925	1530	365	1.5	548.	170 min .68
1/24/89	D-CS	1	08:55	1525	390	1.5	585.	60 min .2 g/hr
1/28/89	D-CS	1	10:30	1550	320	1.5	480	30 min .1 g/hr
1/28/89	CSE-1	1	10:30	1550	320	1.0	320	110 min .2 "
1/29	C-CS	1	10:10	1500	290	1.5	435	50 min .06 g/hr
1/29	CSE-1	1	1005	1505	300	1.0	300	290 min .05
1/30	CC #1	1	0930	1550	380	1.5	570	130 min .14 ~~100 min .1 g/hr~~
1/30	CSW #1	1	1000	1500	300	1.0	300	170 min .03
2/1	CSW #1	1	1235	1545	190	1.0	190	160 " .04
2/4	HH 1	1	1000	1530	330	1.5	495	
2/5	HH 1	1	1025	1535	310	1.5	465	65 min .13
2/6	CC #1	1	1005	1450	285	1.5	428	390 min .50
2/7	CC-1	1	1235	1555	200	1.5	300	980 min 1.8
2/8	CCS-1	1	0835	1525	410	1.5	615	
2/11	C-CS-1	1	0835	1230	235	1.5	353	140 min .22
2/11	CSW #1	1	0830	1605	395	1.0	395	140 " .02
2/11	DCS 1	1	1235	1500	145	1.5	218	210 min. 1.6
2/12	W-4	1	0845	1515	390	1.5	585	530 min 1.57
2/13	W-1	1	0935	1535	360	1.5	540	620 " 2.6
2/13	W-1	1	0820	1540	440	1.5	660	320 " 1.2
2/15	W-1	1	0815	1530	435	1.5	653	1,110 " 4.3
2/21	HH-1	1	0910	1530	380	1.5	570	240 " .36
2/22	HH-1	1	0845	1520	395	1.5	593	150 .21

W-1 E-Wing Filtering System
W-2 " " "
W-3 C-Wing Cast Iron Stack
W-4 D-Wing Cast Iron Stack
W-5 East C-Wing Conversion Stack
W-6 West C-Wing Conversion Stack
W-7 West C-Wing Scrubber Stack
W-8 East C-Wing Scrubber Stack
HH Head House

(West)

□ -- HH. Head House

O -- W-7 C Wing Scrubber Stack

(South) □ -- W-6 -- C Wing Conversion West

(North) □ - W-5 - C Wing Conversion East

O W-8 C-Wing Scrubber Stack

© ← Cast Iron Stacks → ⓓ
W-3 W-4

(East)

SPE = Special Processing Duct (Exhaust)

HHE - Head House Exhaust

DCE - Dry Clean Exhaust

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W-1	E-Wing Filtering System
W-2	" " "
W-3	C-Wing Cast Iron Stack
W-4	D-Wing Cast Iron Stack
W-5	East C-Wing Conversion Stack
W-6	West C-Wing Conversion Stack
W-7	West C-Wing Scrubber Stack
W-8	East C-Wing Scrubber Stack

2

		(CFM)
W-1	E-Wing filtering Duct.	62,000
W-3	C-Wing Cast Iron stack	56,500
W-4	D- " " " "	42,600
W-5	East C-Wing Conv. Stack	9,300
W-6	West " " "	14,300
W-7	West C-Wing Scrubber stack	1400
W-8	East " " "	1200
HH	Head House	21,200

Formula for finding grams lost per day

$$\frac{\text{micro grams} \times \text{CFM} \times 1440 \text{ (total min per day)}}{35.3 \times \text{Total Vol. of Air}} = \text{g/day}$$

* E-Wing Lab Stacks 4,500 CFM as per Engineer Blue Prints – Exhaust stacks for Hoods 802 & 915
Blue Print – E-HV-20841

→ d/m/m³ × .0179 = grams lost per 24 hours

Stack Sampling (Cont'd)

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Date	Location	Sample No.	Start	Finish	Total Min	Avg. Flow	Vol. of Air	No. Blue Green Per Air Sample
2/25	HH-1	1	0815	1530	435	1.5	653	96 - .13
2/26	W-6	1	0900	1540	400	1.5	600	380 - .4
2/26	W-7	1	0855	[illegible]	XX	1.0	XXX	Pump failure
2/27	W-6	1	1065	1535	280	1.5	420	280 - .38
2/28	W-7	1	1235	—	—	1.0	—	Pump failure
2/28	W-3	1	1245	15:15	150	1.5	225	60 - .6
3/4	W-3	1	0820	15:15	415	1.5	623	570 - 2.1
3/5	W-4	1	0820	1520	420	1.5	630	50 - .15
3/7	W-4	1	1010	1520	310	1.5	465	190 - .7
3/6	W-6	1	0905	1525	380	1.5	570	950 - 1.
3/29	W-7	1	0855	1520	375	1.0	375	22 - .003
3/29	W-6	1	0900	1225	205	1.5	308	280 - .53
4/3	W-7	1	1015	1515	300	1.0	300	11 - .002
4/3	W-6	1	1020	1510	290	1.5	435	900 - .1
4/4	W-7	1	0830	1525	415	1.0	415	160 - .02
4/10	DCE	1	0915	1515	360	1.8	648	.24 g/m/24 hr
4/11	HHE	1	0920	1530	370	1.8	666	.83 "
4/12	HHE	1	1035	1535	300	1.8	540	330 - .6 gr.
4/15	HHE	1	0900	1525	385	1.8	693	340 - .5 gr.
4/16	DCE	1	1305	1550	165	1.8	297	710 - 2.5 gr.
4/18	DCE	1	1005	1440	275	1.8	495	- .45 gr.
4/22	SPE	1	1325	1540	135	1.8	234	660 1.6 g/loss
4/26	HH-2	1	1040	1455	255	1.5	383	.1
4/29	HH-2	1	1325	1540	135	1.5	203	.17/loss
5/1	HH-2	1	0900	1540	400	1.5	600	
5/20	SPE	1	0900	1540	400	[illegible]	316	.56 d/m/m³
5/21	SPE	2	0815	1540	[illegible]	.79	352	.007 .69 "
5/22	SPE	3	0720	1555	395	.79	312	[illegible] .004
5/23	SPE	4	0955	1530	340	.79	269	.8 .004

Dust & Stack Sampling

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Date	Sample No & Location	Start	Finish	Total Min.	Avg. Flow	Total Vol of Air	No Grams/day
5/24	SPE-5	0930	1530	360	.79	284	1 gm/m² .004
5/27	HHE-1	0830	1550	440	.79	348	2 gm/m² .014
5/28	HHE-2	1030	1550	320	.79	253	.02 " .0001
5/29	HHE-3	1025	1600	335	.79	265	1.0 " .01
5/31	HHE-4	0950	1510	320	.79	253	1.5 .01
6/4	HHE-5	0850	1510	380	.79	200	3.59 .23

into grams per total air through stack/24 hrs.

[Dilute grams x conv x Total Liters in Day / 35.3 (No. of Sec to mins) x Vol of Air sampled]

Product Chemical Stacks & Ducts — 9212

[E-Wing Duct (Outside just past filters), C-Wing, and D-Wing Stacks (Roof)] Also E & West Conversion Stacks, E & W C-1 Scrubber Syst. & N & S E-Wing Log Stk

Date	Location	Sample No.	Start	Finish	Total Min.	Avg. Flow	Vol. of Air	No. Liters Grams Per Air Sample
8/16	E-Wing (2.45)	E-1	10:45	15:45	300	1.5	450	448 (3.6g)
8/17	" 2.2g	E-1	9:45	15:45	360	1.5	540	490 (2.3g)
~~8/20~~	~~[illegible]~~	~~E-1~~	~~9:40~~	~~14:15~~	~~275~~	~~1.5~~	~~412~~	~~4600 (40g)~~
8/21	" 2.5g	E-1	10:15	15:45	330	1.5	495	485 (3.5)
8/22	C-Wing	C-1	12:50	15:45	175	1.5	175	385 (5.0g)
8/22	D-Wing	D-1	10:42	15:45	202	1.5	202	350 (2.0g)
8/23	C-Wing	C-1	9:05	15:45	400	1.5	400	2160 (1.5g)
8/23	D-Wing	D-1	9:10	15:50	400	1.5	400	810 (3.5g)
8/27	E-Wing 2.5	E-1	13:08	15:50	162	1.5	243	335 (5.0g)
8/29	E-Wing 2.5	E-1	08:30	15:40	430	1.5	643	155 (6.8g)
9/19	D-Wing	D-1	14:30	16:00	90	1.48	133	800 (10.25)
10/3	D-Wing	D-1	0930	15:30	360	1.5	540	990 (3.2g)
10/4	D-Wing	D-1	0830	14:47	377	1.5	565	240 (.5)
9/20	East Conv. Stack	C-1	0850	9:55	65	.026	1.69	1 (.33g)
9/20	West Conv. Stack	C-2	1007	1047	40	.026	1.04	3 (1.60g)
9/18	C-Wing West	C-1	1345	1500	75	1.48	111	148 (3.0g)
9/20	E & W Scrubber East	C-2	1405	1505	60	.026	1.56	3 (.18g)
9/20	C-1 Scrubber	C-1	1250	1325	35	.026	.91	1 (.37g)
10/5	D-Wing	D-1	0830	1540	430	1.5	645	425 (.76g)
10/9	D-Wing	D-1	0855	1205	190	1.5	285	490 (3.4g)
10/9	C-Wing West	C-1	1220	1600	220	1.5	330	420 (3.4g)
10/10	Conv. Stack West	C-1	0840	1140	180	1.4	252	395 (.98g)
10/10	Conv. Stack West	C-2	1145	1455	190	1.4	266	780 (2.4g)
10/11	Conv. Stack West	C-1	0950	1040	100	1.5	150	223 (1.9g)
10/11	Conv. Stack	C-2	1040	1330	170	1.5	255	90 (.224)
10/12	Conv. Stack East	C-1	1010	1140	90	1.5	135	45 (.12g)
10/12	Conv. Stack East	C-2	1050	1410	160	1.5	225	55 (.08g)

Stack Sampling (Cont'd)

Date	Location	Sample No.	Start	Finish	Total Mins	Avg Flow	Vol of Air	No. Particles Per Air Samp.
10/15	East Conv. Stack	C-1	1205	1430	145	1.5	218	Lab Post
10/15	East Conv. Stack	C-2	1430	1532	62	1.5	93	Lab Post
10/17	West C-1 Scrubber	C1-1	1225	1485	100	.026	2.600	20 (.55 gm)
10/17	West C-1 Scrubber	C1-2	1415	1545	90	.026	2.340	2 (.04 gm)
10/18	West C-1 Scrubber	C1-1	0825	1150	205	.026	5.330	4 (.04 gm)
10/18	West C-1 Scrubber	C1-2	1210	1555	225	.026	5.850	1 (.01 gm)
10/19	East C-1 Scrubber	C1-1	1215	1335	100	.026	2.600	2 (.04 gm)
10/19	East C-1 Scrubber	C1-2	1215	1545	90	.026	2.340	9 (.25 gm)
10/22	East C-1 Scrubber	C1-1	1215	1315	60	.025	1.59	65.0 μg/m³
10/22	East C-1 Scrubber	C1-2	1445	1545	60	.025	1.59	45.0 μg/m³
10/23	D-1 Cast Iron	D-1	0900	1330	270	1.5	405	3,280 (80 gms)
10/23	D-1 Cast Iron	D-2	1330	1530	120	1.5	180	1,550 (10 gms)
10/24	D-1 " "	D-1	0830	1240	230	1.5	345	3.9 gm
10/24	D-2 " "	D-2	1245	1505	140	1.5	210	1.7 gm
10/25	C-1	C-1	1030	1300	150	1.5	225	0.267 gm
10/26	D-1	D-1	1220	1530	190	1.5	285	250 (1.5 gm)
10/29	D-1	D-1	0940	1540	360	1.5	540	3200 (10 gm)
10/30	D-1	D-1	0930	1530	360	1.5	540	290 (.85 gm)
10/31	D-1	D-1	0845	1545	420	1.5	630	220 (.65 gm)
11/1	D-1	D-1	1030	1540	310	1.5	465	220 (.7 gm)
11/7	D-1	D-1	0840	1340	300	1.5	450	140 (.52)
11/23	D-1	D-1	0835	1545	430	1.5	645	3600 (6.7)
11/26	D-1	D-1	0825	1535	430	1.5	645	40 (.107)
11/27	D-1	D-1	0835	1525	370	1.5	555	770 (3.0)
12/10	C-1	C-1	0830	1530	360	1.5	540	1,400 (6.0)
12/11	C-1	C-1	0855	1545	410	1.5	615	1,300 (3.0)
12/17	D-1	D-1	0845	1530	405	1.5	608	240 (.85)
12/18	D-1	D-1	0845	1430	345	1.5	518	120 (.41)

Duct 5' x 5' = 25 sq ft

Aug. 16, 1956

Traverse Readings

	1st Check	2nd Check
6"	2335 F/min	2335 F/min
12"	2403 "	2403 "
18"	2403 "	2403 "
24"	2469 "	2469 "

4) 9610 = 2402 F/min (Average)

25 sq ft (Size of Duct)

12010

4804

60,050 CFM (going through E-Wing Duct.)

E-Wing Exhaust System

Head House Stack

Traverse Readings

4' x 4' = 16 sq ft

	1st	2nd	3rd	
5"	1266	1133	1266	ft/min
10"	1387	1266	1340	
1 "	1387	1266	1387	
20"	1498	1387	1387	

1330 Avg. ft/min

16 sq ft.

21,280 CFM

21,200

Thur - Aug. 2 PN - .06 grams
Tues. Sep 4 D - .89 "
Friday - Sept. 7 D - .3 "
Thurs - Sept. 7 N - .3 "
Mon. Sept. 10 D - 3.0 "
Tues. Sep. 11 D - .6 "
Mon. Night " " N - 2.0 "

Aug. 16, 1956

E-Wing Exhaust Duct

Duct 5' x 5' = 25 sq ft

Treverse Reading

At	1st Ck	2nd Ck.
6"	2335 F/min	2335 F/min
12"	2403 "	2403 "
18"	2403 "	2403 "
24	2469 "	2469 "

4) 9610 = 2402 Avg. F/min.

2402 Feet/minute
25 sq ft (size of Duct)
12010
4804
~~60,050 CFM~~ (Amount of Air going through Duct
62,000 CFM

Notes:
1. Sample from center
2. Take Treverse

Per C.M. west / Bob Slusher

d/m/m³ x ~~.0174~~ .0179 = grams lost Per 24 hours.
(For E-Wing "Hershey" stack only)

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TR.MK. REG. U.S. PAT. OFF

E-1 Dust Collector

3582	2
3669	4
3709	6
3669	8
3755	10
3669	12
3669	14
3709	16
3755	18
3500	20
3755	22
3445	24
3653	

24" ⊖

~~24 × 3.14~~ =

$12^2 \times 3.14$ = Sq inches

~~144 ÷ Sq in~~

Sq. in ÷ 144 - CFM

3.14 Sq. ft. = area

12/44195 = No. readings - Avg. Velocity ft/min.

Total

3653
3.14
= 11,565 CFM

4005 . 26.85 = Reading on Manometer

.85

Sq in

LEFAX, PHILADELPHIA 7, PA. MADE IN U.S.A.

ORIGINAL COPR. 1919 J. C. PARKER

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