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EMISSIONS STUDY OF A FAIRCHILD-HILLER MODEL 1150-300 SILVER REC--ETC(U)
SEP 76 W E NORMINGTON, J W JACKSON

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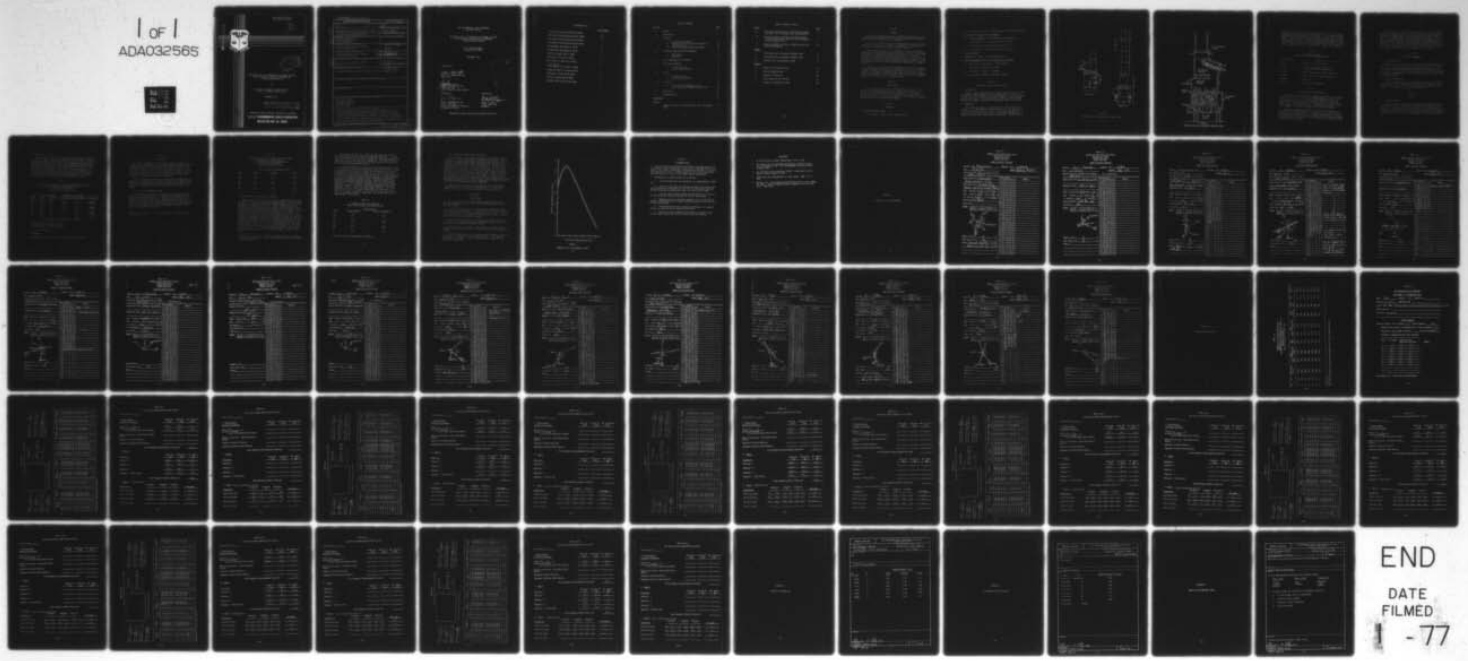

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Prof. Report No 76M-13
(Project No AAF-609)

2

EMISSIONS STUDY OF A FAIRCHILD-HILLER MODEL 1150-300 SILVER RECLAMATION PROCESSOR (INCINERATOR) Wright-Patterson AFB OH

By

William E. Normington, Captain, USAF
Jerry W. Jackson, Captain, USAF

September 1976

Approved for public release; distribution unlimited

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McCLELLAN AFB, CA. 95652

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Particulate emissions from a newly installed Fairchild-Hiller Film Incinerator/Silver Reclamation Processor were determined to evaluate compliance with applicable emission standards. Evidence indicated that a large fraction of the particulate emissions may have been contributed by the refractory lining. Proper curing (operating the unit over a period of time) should eliminate emissions from the lining and eventually reduce total emissions to less than the required standard.

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EMISSIONS STUDY OF A FAIRCHILD-HILLER MODEL 1150-300 SILVER RECLAMATION PROCESSOR (INCINERATOR) Wright-Patterson AFB OH

Prof. Report No 76M-13
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September 1976

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TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

SECTION I

SUMMARY

Particulate emissions from a newly installed Fairchild-Hiller Film Incinerator/Silver Reclamation Processor were determined to evaluate compliance with applicable emission standards.

This unit is subject to two emission standards, an opacity standard and a particulate emission standard. It complied with the opacity standard but exceeded the particulate emission standard.

Evidence indicated that a large fraction of the particulate emissions may have been contributed by the refractory lining. The unit had been recently installed and operated only once prior to the tests. Ash rinsed from the sampling probe contained as much as 3% silicon and aluminum, which are major constituents of the refractory lining. There was reason to suspect that the percentage of silicon and aluminum in the total particulate matter was much greater than indicated by the probe rinse ash.

The authors are of the opinion that emissions from the refractory lining would cease with proper curing (operating the unit over a period of time), and that their elimination might reduce total emissions to less than the standard. Retesting after proper curing of the refractory lining is recommended. To assure proper curing of the primary chamber lining, film must be used as in normal operation.

SECTION II

INTRODUCTION

At the request of AFLC/DEEV and AFLC/SGB, an evaluation of plume opacity and particulate emissions from a newly installed Fairchild-Hiller Film Incinerator/Silver Reclamation Processor, Wright-Patterson AFB was conducted 13 - 19 July 1976. The objective was compliance testing with local air pollution regulations. This testing was required by the Regional Air Pollution Control Agency.

SECTION III

PERSONNEL

1. Wright-Patterson AFB OH:

   a. Mr Thomas E. Shoup - DEEV, Project Officer

b. 1Lt Frank T. Lubozynski - SGPB, Base Bioenvironmental Engineer

2. Regional Air Pollution Control Agency OH:

a. Mr Jerry Shoemaker - Air Pollution Control Specialist

b. Mr Ben Dutcher - Air Pollution Control Specialist

c. Mr Tom Clark - Air Pollution Control Specialist

d. Mr Jim Buchanan - Air Pollution Control Specialist

3. Fairchild-Hiller:

Mr Benjamin F. McLean - Service Representative

4. USAF Environmental Health Laboratory, McClellan AFB CA:

a. Capt William E. Normington - Project Officer

b. Capt Jerry W. Jackson - Consultant

c. Capt Marlin L. Sweigart - Engineer

d. Sgt William W. Conway - Laboratory Technician

SECTION IV

INCINERATOR DESCRIPTION AND OPERATION

1. Description:

Figures 1 and 2 show the basic design of the Fairchild-Hiller Film Incinerator/Silver Reclamation Processor Model 1150-300. The unit consists of a large cylindrical combustion chamber, a small afterburner section, and a stack. The entire system is refractory lined (an 84" extension was added to the top of the refractory stack for testing).

2. Operation:

The combustion chamber is loaded with film. After purging the chamber with air and preheating the afterburner section, the film is ignited by two primary burners located in the combustion chamber. The film is volatilized by partial oxidation achieved by operating the combustion chamber under starved oxygen conditions. The gas velocity

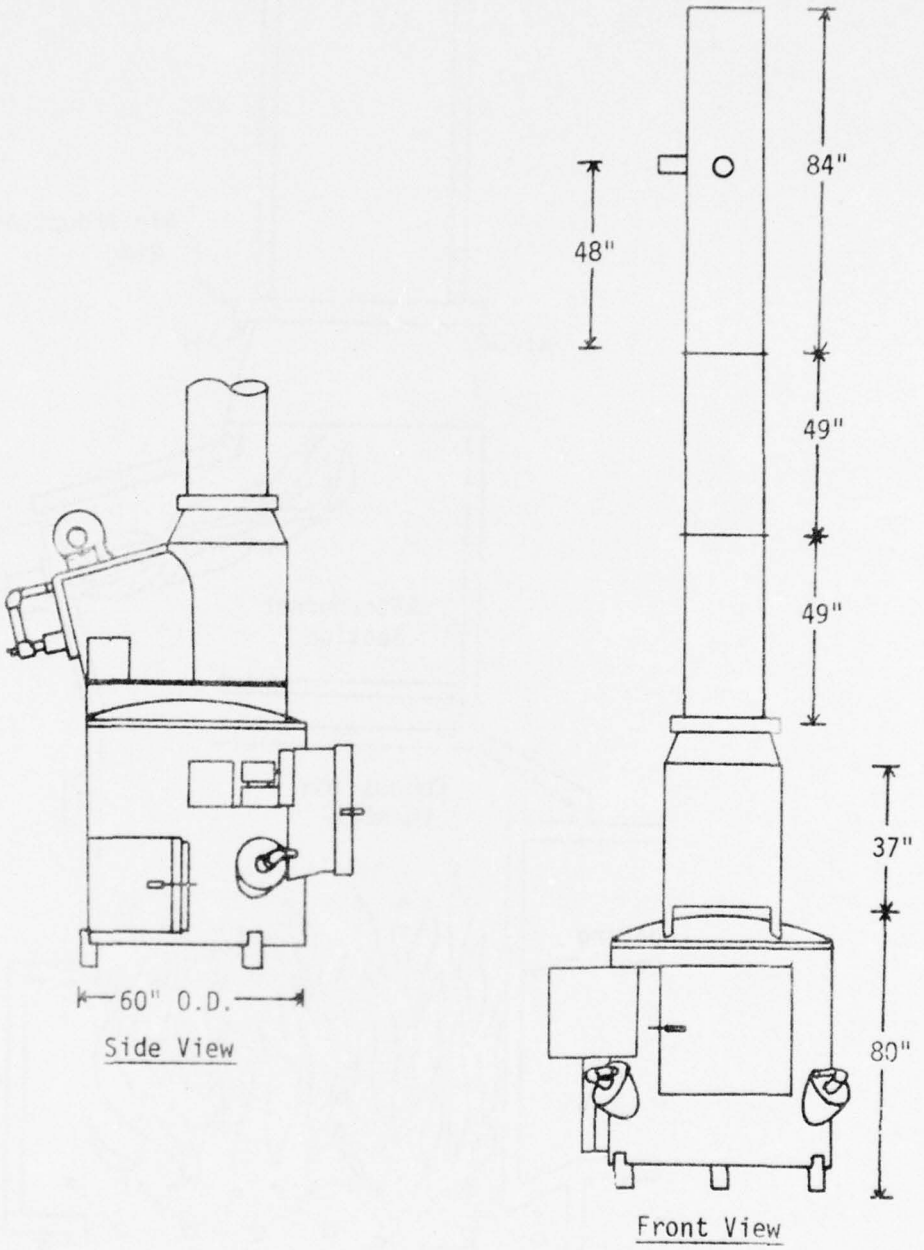


FIGURE 1

FAIRCHILD-HILLER INCINERATOR (EXTERNAL VIEW)

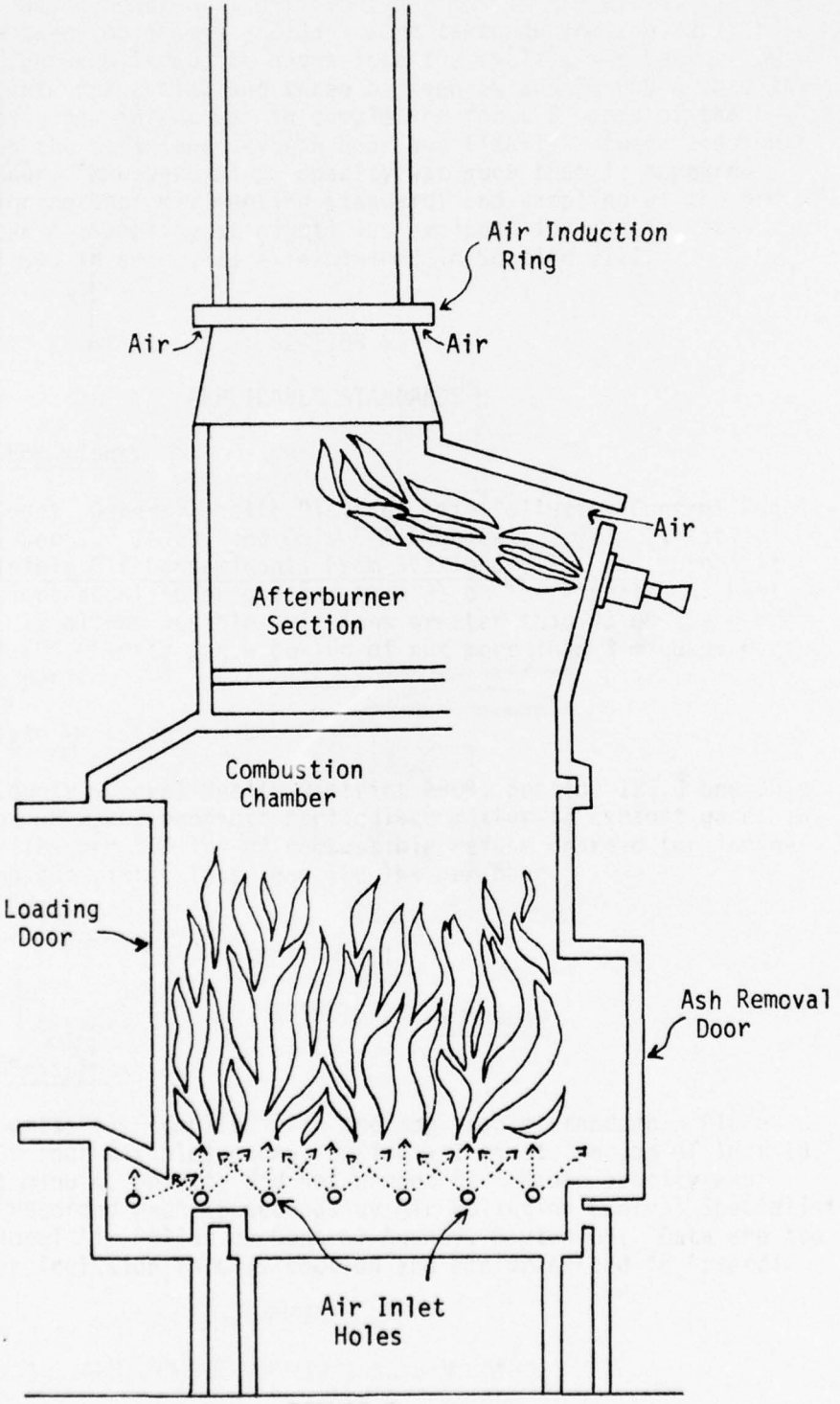


FIGURE 2

FAIRCHILD-HILLER INCINERATOR (INTERNAL VIEW)

leaving the combustion chamber is relatively low to limit the quantity of particulates entering the afterburner section. The unburned gases and particulates from the combustion chamber are passed into the afterburner flames and mixed with additional air to complete the combustion process. Additional air is introduced into the gas stream at the top of the afterburner section for cooling and velocity stabilization in the stack. The entire combustion cycle requires 12 hours for a rated film charge of 800 pounds (lbs). A typical cycle is described in Table I.

TABLE I

SEQUENCE OF EVENTS
FAIRCHILD-HILLER SILVER RECLAMATION UNIT

Time Into Cycle	Event
0 Hour	Afterburners on for preheat
1/2 Hour	Primary burners ignite and begin starved oxidation of charge (film)
1¼ Hours	Primary burners off (blowers remain on)
12 Hours	Afterburners off (blowers remain on)
20 Hours	Blowers off
24 Hours	Silver and ash recovered

SECTION V

SAMPLING METHODS AND PROCEDURES

All sampling and calculations were done according to the procedures in the Appendix to Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), Methods 1,2,3 and 5. Both the State and local regulations prescribed the American Society of Mechanical Engineers Power Test Code - PTC-27, dated 1957, entitled, "Determining Dust Concentrations in a Gas Stream," or equivalent method. The methods and procedures in 40 CFR 60, dated 1 July 1974 are equivalent to the PTC-27 Method.

To establish isokinetic sampling rates during the first test a dry gas fraction of 0.93 was assumed. This was in lieu of making a preliminary moisture determination in accordance with Method 4, 40 CFR 60. The true dry gas fraction for each test, determined from water collected during sampling, was used for all final calculations including verification of isokinetic sampling.

Sampling was conducted at different periods in the cycle. Three samples (each taken on a separate day) were taken during the early part of the cycle (between 1½ and 3½ hours into the cycle), one between 3½ and 5½ hours into the cycle, and three between 5½ and 7½ hours into the cycle. The original intent was to sample the first 2 hours of the cycle, between the fifth and seventh hour and finally between the tenth and twelfth hour. However, plume opacity was such that it appeared certain the incinerator was meeting standards and sampling at the end of the 12 hour cycle (sampling at night) was excluded for safety reasons. This protocol was in error, as is explained in Section VIII.

SECTION VI

APPLICABLE STANDARDS

1. Visible Emissions:

Greene County General Health District, Air Pollution Control Regulations (APCR), Section 140.0, and Ohio EPA Regulation AP-3-07, Titled Control of Visible Air Contaminants From Stationary Sources, prohibit visible emissions equal to or greater than #1 on the Ringelmann Chart or 20% opacity. It allows visible emissions greater than #3 on the Ringelmann Chart or 60% opacity for a period of not more than 3 minutes during any 60 minute period.

2. Particulate Emissions:

Greene County General Health District APCR, Section 125.0 and Ohio EPA Regulation AP-3-10, prohibit particulate matter in exhaust gases in excess of 0.2 lbs per 100 lbs of combustible refuse charged for incinerators having capacities less than 100 lbs per hour.

SECTION VII

RESULTS

1. Visible Emissions:

Visible emissions complied with the applicable standard. Plume opacity was 0% (not visible) except during a 1 minute period of Test 1B. During this 1 minute, opacity did not exceed 5%. Plume opacity was observed and recorded each 15 seconds by Air Pollution Control Specialists from the Regional Air Pollution Control Agency, Dayton OH. Data are too voluminous for inclusion in this section and are presented in Appendix A.

2. Particulate Emissions:

Results of the particulate emission tests are presented in Table II. Emissions during all but one of seven individual tests exceeded the applicable standard. The average emission rate for all seven tests was 0.31 lbs/100 lbs of film incinerated. The standard deviation was 0.2 lb/100 lbs. (The apparently large standard deviation is caused by the excessively large quantity of particulates found in test No 1A. It is probable that the high value in the first test was caused by spalling from an uncured refractory surface, and is quite likely anomalous. Lacking proof, the measurement may not be rejected; however, remedies may be proposed on the basis that the above assumption is correct, as discussed later.) All sampling data are presented in Appendix B.

TABLE II

PARTICULATE EMISSION RATES, FAIRCHILD-HILLER MODEL 1150-300
FILM INCINERATOR/SILVER RECLAMATION UNIT
WRIGHT-PATTERSON AFB OH
TESTED 15,17,18 & 19 JULY 1976

Test[1]	Charge (lbs)	Burn Rate[2] (lbs/hr)	Particulate Emissions[3] (lbs/hr)	(lbs/100 lbs Burned)	Compliance[4]
1A	568	49	0.32	0.65	Failed
1B	568	49	0.16	0.33	Failed
2A	622	54	0.09	0.17	Passed
2B	622	54	0.12	0.22	Failed
3A	604	53	0.12	0.23	Failed
3B	604	53	0.11	0.21	Failed
4	607	53	0.19	0.36	Failed
		Average and Standard Deviation		0.31±0.2	

[1]A Test started ~1½ hours into cycle.
B Test started ~5½ hours into cycle.
Test 4 started ~3½ hours into cycle.

[2]11.5 hours burn time.

[3]EPA Method 5

[4]Allowable emission rate is 0.2 lbs per 100 lbs of film burned.

SECTION VIII

DISCUSSION

For reasons discussed in this section, we feel that these test results are not representative of continuous operation and that the unit should be operated for an extended period of time (at least 90 days), and then be retested. This opinion is based upon evidence that indicates the refractory lining may have contributed a substantial portion of the particulate emissions, and that these emissions may be reduced sufficiently to bring the unit in compliance with standards as the refractory lining cures with continuous operation.

Also, the sampling procedure and the applicable standard will be discussed. An average burn rate based on a "worst case" situation had to be used to convert stack emissions from lbs/hr to the units in the applicable standard, lbs of particulates emitted per 100 lbs of film burned.

1. Emissions From Refractory Lining:

The percentage by weight of silicon and aluminum (major constituents of the refractory lining)+ in the ash rinsed from the sampling probe is presented in Table III. In four tests (1A,1B,2A and 4), a substantial portion of the ash was silicon and aluminum, and since natural gas and film do not contain these elements, it is probable that they were contributed by the refractory lining.* Excessive spalling of the lining during tests 1A, 1B and 4 may account for the very high emissions during these three tests.

---

* Ambient air (combustion air) was eliminated as a potential source.
+ See Appendix E.

TABLE III

PERCENT BY WEIGHT OF ELEMENT IN PROBE RINSE ASH
FAIRCHILD-HILLER MODEL 1150-300
FILM INCINERATOR/SILVER RECLAMATION UNIT
WRIGHT-PATTERSON AFB OH
TESTED 15,17,18 & 19 JULY 1976

	Percent Element In Probe Rinse Ash*		
Test	Silicon	Aluminum	Total
1A	7.2	1.1	8.3
1B	6.4	1.1	7.5
2A	5.8	0.9	6.7
2B	1.6	0.3	1.9
3A	2.8	0.5	3.3
3B	0.9	0.3	1.2
4	4.2	0.5	4.7

* Analytical data are presented in Appendix C.

Although particulate emissions exceeded the standard (Table II) by a greater percentage than silicon and aluminum found in the probe rinse ash (Table III), and the elimination of these elements at this percentage would not reduce emissions to less than the standard, we have reason to suspect that the particulate matter collected on the filter may have contained a much larger percentage of silicon and aluminum than the probe rinse ash, and that the elimination of these elements may indeed reduce emissions to less than the standard. At this point it is necessary to explain that the filter samples were analyzed for silver content and subsequently inadvertently disposed of before the refractory problem was suspected. Consequently, the filter samples could not be analyzed for silicon and aluminum. Our suspicion that the filter catch may have contained more of these elements was based upon the fact that the percentage by weight of silver in the particulate matter collected on the filter substantially exceeded that in the probe rinse ash in all tests (Table IV). If silicon and aluminum followed this trend their percentage by weight in the total particulate matter could be substantial.*

---

* Note: While "silicon" and "aluminum" are referred to as the elements, they were present as silica (Si_iO_2) and aluminum silicate, rather than in the elemental form.

Emissions during the first, second and last test (1A, 1B and 4) were significantly greater than during the other four tests. Silicon and aluminum were also significantly greater in the probe rinse ash from these tests than in the other tests (except 2B). This could indicate that excessive spalling (cracking, stressing, chipping) of the refractory was occurring during these tests.

It should be pointed out that this unit was operated only one time prior to the first test and the refractory lining was not cured. It may be possible that the refractory cement lining characteristic of these incinerators is not adequate to withstand the conditions occurring during film incineration; even though new, the lining cracked and pieces fell into the firebox during the course of testing. If this hypothesis is true, it is likely that none of these incinerators can meet the particulate requirement even after curing. Two other similar units tested in 1972 exceeded standards and had highly irregular emission rates (Ref. 5). It is, however, advisable to cure and retest, in the interest of economy, rather than assuming an inadequately resistant refractory lining, and replacing them without retesting. It is also possible that oxides of nitrogen formed from high-temperature air, from film emulsion, or perhaps nitrocellulose film, may cause an acid attack on the upper portions of the stack. This possibility will be investigated in future tests.

TABLE IV

PERCENT BY WEIGHT OF SILVER IN
PROBE RINSE ASH AND FILTER COLLECTED ASH*

Test	Percent Silver	
	Probe Rinse Ash	Filter Collected Ash
1A	0.6	1.9
1B	1.6	4.2
2A	1.3	5.6
2B	1.0	4.2
3A	2.4	3.8
3B	0.7	8.8
4	0.5	4.6

* Analytical data are presented in Appendix D.

2. Test Procedures, Determining A Burn Rate:

The application of an average burn rate (lbs of film/11.5 hour burn cycle) as used in these tests to convert stack emission in lbs/hr to units of the applicable standard (lbs particulates/100 lbs film) is questionable because the burn rate varies with time. As the plot of carbon dioxide versus time in Figure 3 indicates, maximum oxidation occurred early in the burn cycle during the A tests. It then tapered off as the cycle continued. The most accurate procedure, and the one intended for use in these tests, is to take 2 hour samples throughout the burn cycle, plot the emission rates in lbs/hr, integrate the curve, and then divide by the weight of initial charge in hundreds of pounds. This procedure was not used in these tests because samples were not taken from the latter part of the burn cycle. These latter samples were not taken because the visible emission observations (0% opacity) led us to believe the incinerator was meeting standards.

Unfortunately, the nature of the emissions was such that even though they were not visible, they were present. This fact tends to confirm the hypothesis that they were mainly refractory particles.

SECTION IX

CONCLUSIONS

1. Emissions from this unit complied with the applicable visible emission standard but did not comply with the applicable particulate emission standard.

2. A significant fraction of the particulate emission may have been contributed by the incinerator's refractory lining. These emissions may or may not cease with time depending upon the characteristics of the refractory material. The elimination of these emissions may or may not decrease total emissions below the standard.

3. Because of the probable emissions from the refractory lining and the possibility that they would cease after proper curing of the refractory, these tests should be considered invalid.

4. The unit should be retested but only after it is operated for an extended period of time, say 90 days, to assure curing of the refractory lining.

5. If the incinerator fails upon retesting, and the presence of refractory particles is proved to be the cause of failure, a more adequate refractory must be sought, unless a variance for this class of incinerator can be obtained.

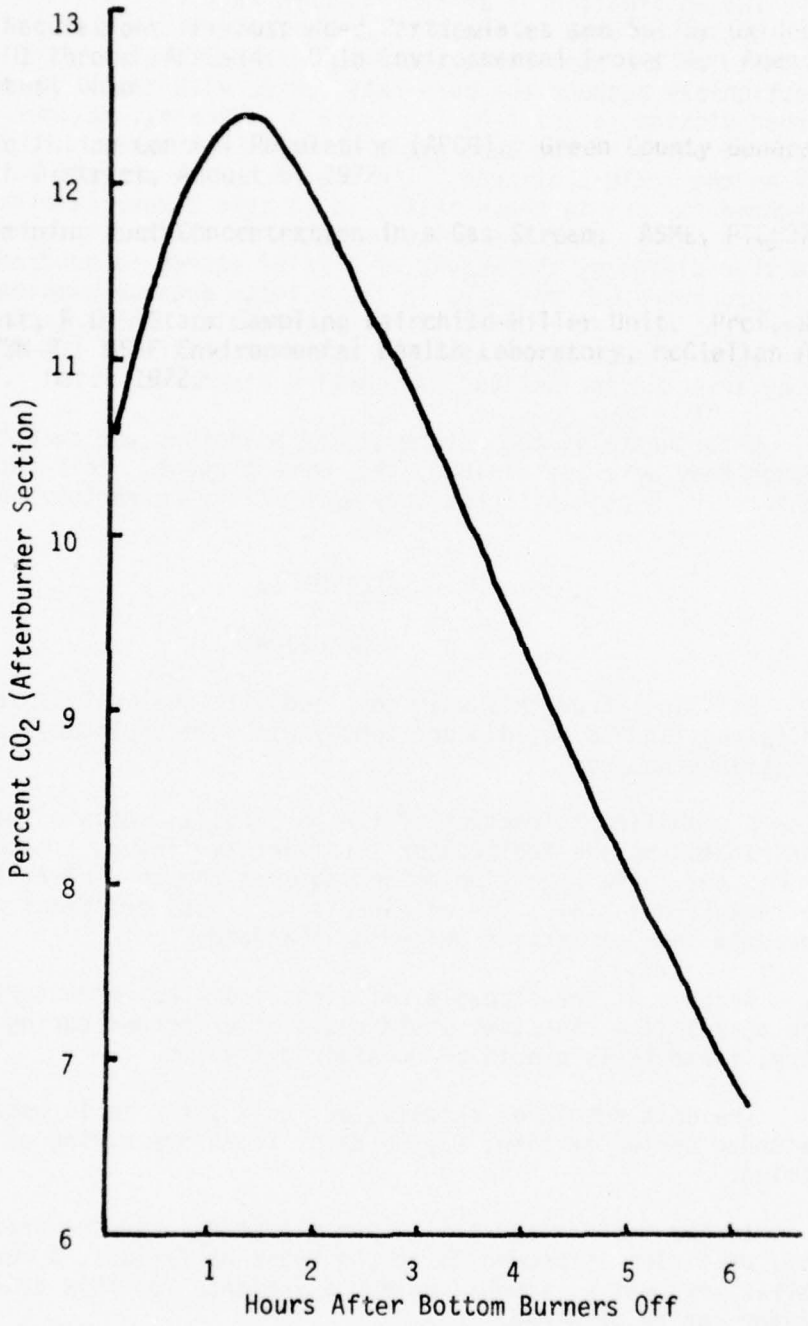


FIGURE 3

AVERAGE OF ALL CO_2 READINGS VS TIME

SECTION X

RECOMMENDATIONS

1. The unit should be retested but only after it has been operated for a sufficient time to assure proper curing of the refractory lining. An expert in the field of refractory lining should be consulted to establish the required curing time. A normal charge of film must be used during these curing burns to assure high primary chamber temperature.

2. Procedures for retesting should be as follows:

   a. The incinerator should be charged to its rated capacity of 800 lbs.

   b. Emission tests should be conducted throughout the 12 hour burn cycle and emissions integrated over this period. This would eliminate the need to assume an average burn rate, i.e., 800 lbs/11.5 hours.

   c. Both the filter collected sample and the probe rinse sample of particulate matter should be analyzed for silicon and aluminum.

   d. Samples of the film should be analyzed (if it is possible to obtain a sample because of the highly classified nature of the film) for silicon and aluminum.

   e. Background emission tests should be conducted, i.e., operate the unit as usual but do not charge it with film.

   f. Particles should be measured with optical or electron microscope to determine why they are not visible (size distribution).

REFERENCES

1. 40 CFR 60 (Code of Federal Regulations), July 1, 1975.

2. Ohio Regulations for Suspended Particulates and Sulfur Oxides, AP-3-01 through AP-3-14. Ohio Environmental Protection Agency, Columbus, Ohio.

3. Air Pollution Control Regulation (APCR). Green County General Health District, August 5, 1972.

4. Determining Dust Concentration in a Gas Stream. ASME, PTC 27, 1957.

5. Burnett, R.D. Stack Sampling Fairchild-Hiller Unit. Prof. Report No. 72M-7. USAF Environmental Health Laboratory, McClellan AFB, Calif. March 1972.

APPENDIX A

REPORTS OF VISIBLE EMISSIONS

TABLE A-I

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER J. Buchanan

DATE 7/15/76

OBSERVATION BEGAN 10:31 ENDED 11:01

Test 1 RUN 1

LOCATION: NAME WPAFB

ADDRESS Bldng #294

SOURCE DESCRIPTION Consumat Incinerator - film

OBSERVATION POINT 70 feet from Stack 50° From North see below

STACK: Distance From 70 Height ~22 ft.

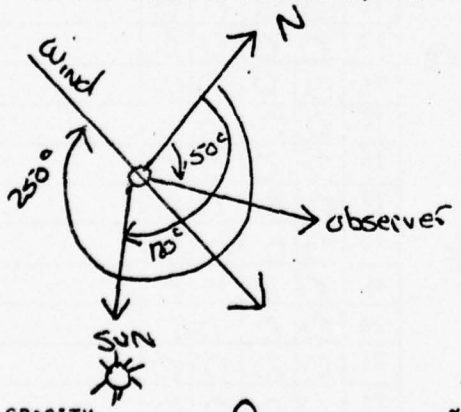
WIND: Direction 250° Speed ~5 mph

SKY CONDITION Clear Air Temp. 88 °F

PLUME BACKGROUND Blue

PLUME COLOR

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 30 min.

REMARKS Preheat started 9:23
lower burners ON 10:05

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
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23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	

TABLE A-II

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER Jerry L Shoemaker LOCATION: NAME WPAFB

DATE Jul 15, 1976 ADDRESS Bldg. 294

OBSERVATION BEGAN 11:00 AM ENDED 11:30 AM w/ sunglasses

TEST RUN 1

SOURCE DESCRIPTION Fairchild Incinerator

OBSERVATION POINT NNE of stack

STACK: Distance From 70 ft. Height 22 ft.

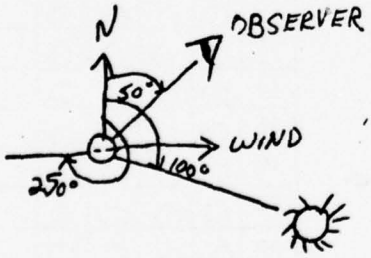
WIND: Direction W Speed 5 mph

SKY CONDITION clear Air Temp. 86 °F

PLUME BACKGROUND solid blue sky

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 30 min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
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09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
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15	0	0	0	0	
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20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	

TABLE A-III

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER Dutchor, Ben W. LOCATION: NAME WPAFB

DATE July 15 1976 ADDRESS Bldg 294

OBSERVATION BEGAN ~~10 31~~ 1132 ENDED 1147

Test 1 Run 1

SOURCE DESCRIPTION Fanehill (Consumat) Sturd Air Silver Reclamation Incinerator, nat'l gas

OBSERVATION POINT NE of stack

STACK: Distance From 10 Height ~22 ft.

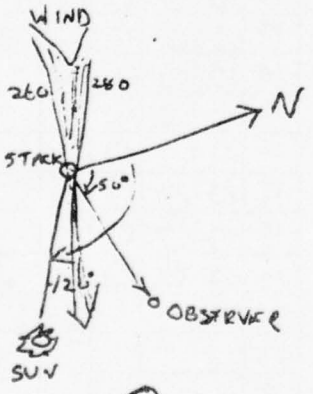
WIND: Direction 260 Speed 3-5 mph

SKY CONDITION clear Air Temp. 90 °F

PLUME BACKGROUND blue sky

PLUME COLOR none

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 15 min.

REMARKS E68 lb charge - roughly
photo. film

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0				
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					

TABLE A-IV

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER B. W. [illegible] LOCATION: NAME WPAFB

DATE July 15 1976 ADDRESS BLDG 294

OBSERVATION BEGAN 323 ENDED 343
Test 1 Run 2

SOURCE DESCRIPTION Fairchild (Cont[illegible]) Silver Reclamation Incinerator

OBSERVATION POINT SW of stack

STACK: Distance From 50 Height ~22 ft.

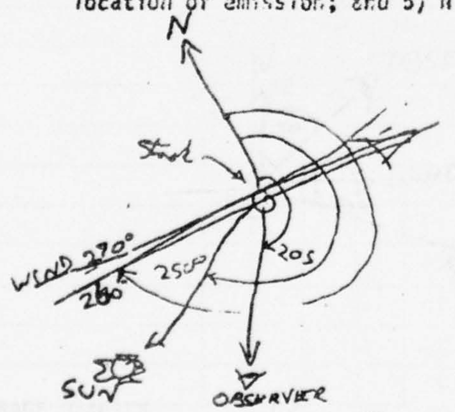
WIND: Direction W Speed 6-8 mph

SKY CONDITION 80% overcast Air Temp. 90 °F

PLUME BACKGROUND Blue Sky, Gray Cloud

PLUME COLOR clear or white

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 20 min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	3:20 I noticed slight
01	0	0	0	0	5% VE against the
02	3	5	0	0	trees, & so began these
03	5	0	0	0	readings
04	0	5	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	← Bill noticed that his
13	0	0	0	0	asbestos glove in the ~~west~~
14	0	0	0	0	unused port was burn[illegible]
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	M says breeze messing up
19	0	0	0	0	his velocities
20	0				353 - Glove smoking
21					strongly again.
22					
23					405 lower chamber blower
24					cycling on & off every few secs
25					to be expected
26					425 Ben from [illegible]
27					adjusted set point higher
28					

TABLE A-V

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER B W [illegible] LOCATION: NAME WPAFB

DATE July 15 1976 ADDRESS Bldg 294

OBSERVATION BEGAN 411 pm ENDED 421

Test 1 Run 2

SOURCE DESCRIPTION Fairchild Burner

OBSERVATION POINT SW of stack

STACK: Distance From 50 Height ~22 ft.

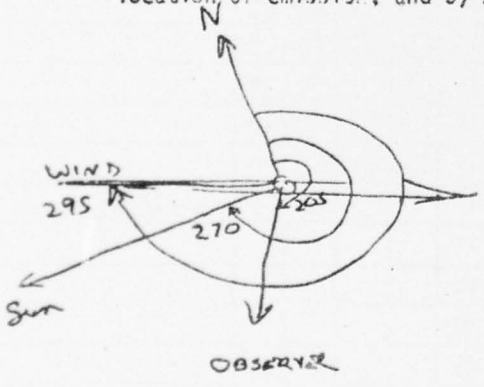
WIND: Direction 295 Speed 5-7 mph

SKY CONDITION 50% cover Air Temp. 90 °F

PLUME BACKGROUND Blue

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 10 min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	Stk. Temp was down to ~865
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0				
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					

TABLE A-VI

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER B W Dutcher

LOCATION: NAME WPAFB

DATE July 15 1976

ADDRESS Bldg 294

OBSERVATION BEGAN 446 ENDED 504

Test 1 Run 2

SOURCE DESCRIPTION Fairchild Incinerator

OBSERVATION POINT SW of stack

STACK: Distance From 50' Height ~22 ft.

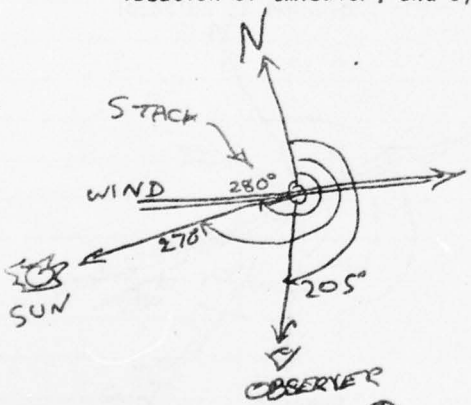
WIND: Direction W Speed 7-8 mph

SKY CONDITION 80% overcast Air Temp. 88 °F

PLUME BACKGROUND grey cloud

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 18 min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	stk temp = ~880
01	0	0	0	0	
02	0	0	0	0	looks like rain soon
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	~~plume~~
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	end of run 2
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					

TABLE A-VII

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER Jerry L Shoemaker LOCATION: NAME WPAFB

DATE July 12, 1976 ADDRESS Bldg. 294

OBSERVATION BEGAN 9:00 AM ENDED 9:54 AM w/sunglasses
TEST 2 RUN 1

SOURCE DESCRIPTION Fairchild Incinerator

OBSERVATION POINT NE of stack

STACK: Distance From 60 ft Height ~ 22 ft.

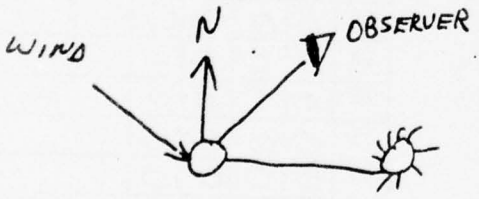
WIND: Direction NW Speed 2-4 mph

SKY CONDITION clear Air Temp. 63 °F

PLUME BACKGROUND solid blue

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY ____ %

TOTAL READING TIME 54 min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	

TABLE A-VIII

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

page 2 of 2

REPORT OF VISIBLE EMISSIONS

OBSERVER Jerry L Shoemaker LOCATION: NAME WPAFB

DATE July 12, 1976 ADDRESS Bldg 794

OBSERVATION BEGAN 9:00Am ENDED 9:54

TEST 2 RUN 1 w/ sunglasses

SOURCE DESCRIPTION

OBSERVATION POINT SEE SHEET NO. 1

STACK: Distance From Height ft.

WIND: Direction Speed mph

SKY CONDITION Air Temp. °F

PLUME BACKGROUND

PLUME COLOR

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.

AVERAGE OPACITY %

TOTAL READING TIME min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	

TABLE A-IX

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER Jerry L Shoemaker

DATE July 17, 1976

OBSERVATION BEGAN 10:45 AM ENDED 11:15 AM
TEST 2 RUN 1

LOCATION: NAME WPAFB

ADDRESS Bldg 294

w/sunglasses

SOURCE DESCRIPTION Fairchild Incinerator

OBSERVATION POINT NE of stacks

STACK: Distance From 55 ft. Height ~22 ft.

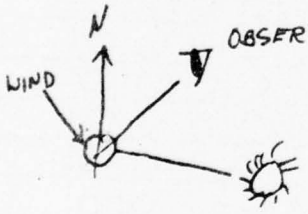
WIND: Direction NW Speed 5 mph

SKY CONDITION clear Air Temp. 70 °F

PLUME BACKGROUND solid blue

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY ____ %

TOTAL READING TIME 30 min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	

TABLE A-X

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER Datcher, Ben W. LOCATION: NAME WPAFB

DATE July 18 1976 ADDRESS Bldg 294

OBSERVATION BEGAN 933 ENDED 1003

Test 3 Run

SOURCE DESCRIPTION Fairchild Incinerator

OBSERVATION POINT SSE of Stack

STACK: Distance From 60 Height ~22 ft.

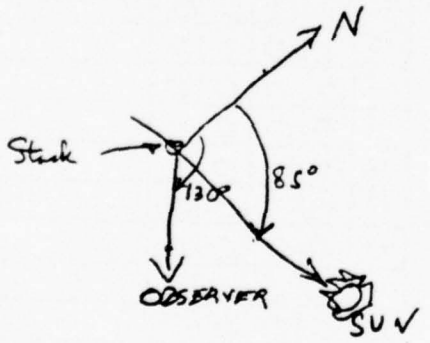
WIND: Direction 0 Speed 0 mph

SKY CONDITION clear Air Temp. 68 °F

PLUME BACKGROUND blue

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 30 min.

REMARKS 604 Hr change

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	Lower burners went off
01	0	0	0	0	about 9:04
02	0	0	0	0	
03	0	0	0	0	Test began 9:18 am
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	

TABLE A-XI

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER Datcher, Barry W. LOCATION: NAME WPAFB

DATE July 18 1976 ADDRESS 294

OBSERVATION BEGAN 1034 ENDED 1104
Test 3 Run 1

SOURCE DESCRIPTION Fairchild Silver Reclamation Incinerator

OBSERVATION POINT SE of Stack

STACK: Distance From 70 Height ~22 ft.

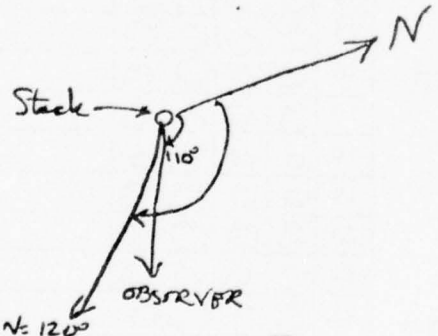
WIND: Direction 0 Speed 0 mph

SKY CONDITION clear Air Temp. 68 °F

PLUME BACKGROUND blue

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 30 min.

REMARKS

MIN.	SECONDS				COMMENTS
	00	15	30	45	
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	

TABLE A-XII

[redacted]
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

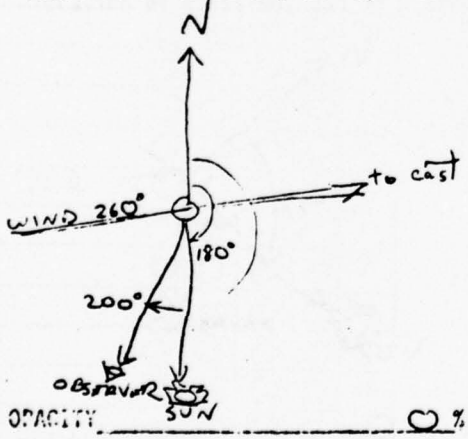
OBSERVER B. W Dutcher
DATE July 18 1976
OBSERVATION BEGAN 143 pm ENDED 213 pm
Test 3 Run 2

LOCATION: NAME WPAFB
ADDRESS Bldg. 294

SOURCE DESCRIPTION Fairchild Subm
Reclamation Incinerator
OBSERVATION POINT SW of Stack

STACK: Distance From 30 Height ~22 ft.
WIND: Direction from W Speed ~3-5 mph
SKY CONDITION 5% clouds Air Temp. 73 °F
PLUME BACKGROUND blue
PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %
TOTAL READING TIME 30 min.
REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	Test Run began 1:25
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	01

TABLE A-XIII

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER B.W. Dutcher LOCATION: NAME WPAFB

DATE July 19, 1976 ADDRESS Bldg 294

OBSERVATION BEGAN 3:04 pm ENDED 331
Test 3 Run 2

SOURCE DESCRIPTION Fairchild Silver Reclamation Incinerator

OBSERVATION POINT SW of stack

STACK: Distance From 50' Height ~22' ft.

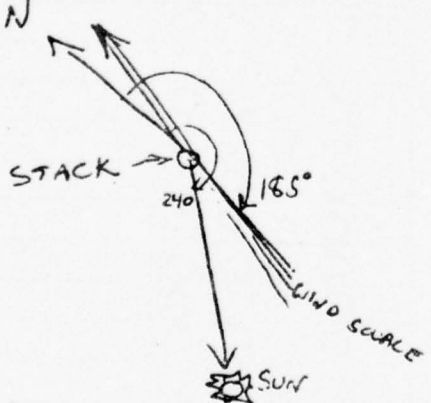
WIND: Direction South Speed ~3 mph

SKY CONDITION 30% cover Air Temp. 79 °F

PLUME BACKGROUND blue sky, white clouds

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 27 min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	End of Run
27	0				
28					

TABLE A-XIV

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45 [illegible]2
Phone: 225-4435

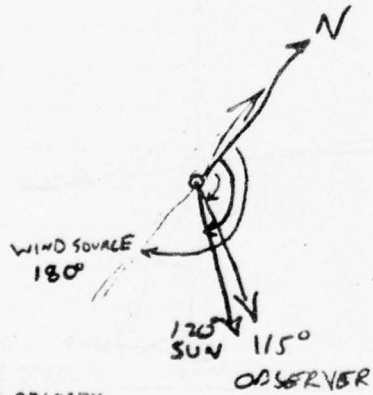
REPORT OF VISIBLE EMISSIONS

OBSERVER B.W. Pletcher
LOCATION: NAME WPAFB
DATE July 19, 1976
ADDRESS Bldg. 294
OBSERVATION BEGAN 1100 ENDED 1130 am
Test 4 Run 1

SOURCE DESCRIPTION Fairchild Silver Reclamation Incinerator
OBSERVATION POINT SE of Stack

STACK: Distance From 70 Height ~22 ft.
WIND: Direction 180° Speed 0-3 mph
SKY CONDITION blue clear Air Temp. 74 °F
PLUME BACKGROUND blue
PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0%
TOTAL READING TIME 30 min.
REMARKS 606.5 lb charge
Run began 1055 am
Burning began ignition 8:10 am

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	01

TABLE A-XV

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45[illegible]2
Phone: 225-4455

REPORT OF VISIBLE EMISSIONS

OBSERVER B.W. Dutcher

LOCATION: NAME WPAFB

DATE July 19, 1976

ADDRESS Bldg 294

OBSERVATION BEGAN 1150 am ENDED 1205
Test 4 Run 1

SOURCE DESCRIPTION Fairfield Suburban Incinerator

OBSERVATION POINT So. of stack

STACK: Distance From 40 Height ~22 ft.

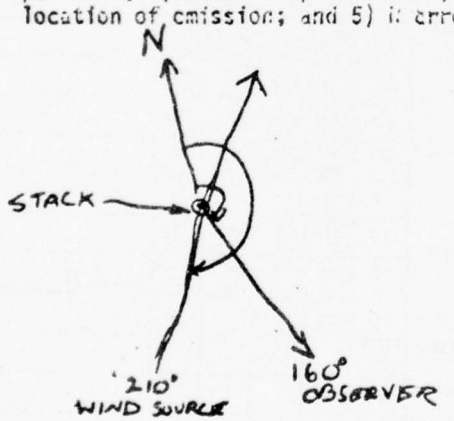
WIND: Direction _____ Speed 3-4 mph

SKY CONDITION clear Air Temp. 75 °F

PLUME BACKGROUND blue

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) ℄ arrow.



AVERAGE OPACITY 0 %

TOTAL READING TIME 15 min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	ash flakes
01	0	0	0	0	ash
02	0	0	0	0	ash
03	0	0	0	0	
04	0	0	0	0	ash
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0				
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					

TABLE A-XVI

REGIONAL AIR POLLUTION CONTROL AGENCY
451 West Third Street
Dayton, Ohio 45402
Phone: 225-4435

REPORT OF VISIBLE EMISSIONS

OBSERVER B.W Dutcher LOCATION: NAME WPAFB

DATE July 19, 1976 ADDRESS Bldg 294

OBSERVATION BEGAN 1240 pm ENDED 1259
Test 4 Run 1

SOURCE DESCRIPTION Fairchild Silver Reclamation Incinerator

OBSERVATION POINT SSE of stack

STACK: Distance From 50 Height ~22 ft.

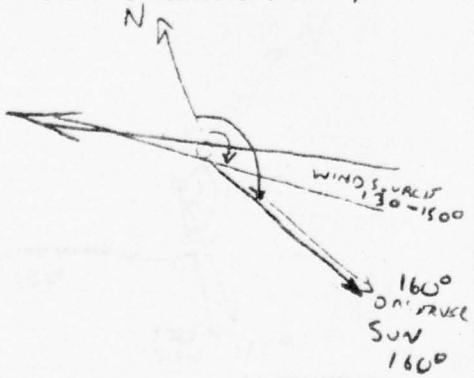
WIND: Direction from SE Speed ~0-5 mph

SKY CONDITION Light haze Air Temp. 75 °F

PLUME BACKGROUND Light blue

PLUME COLOR clear

SKETCH: Include 1) wind direction; 2) sun position; 3) observer position; 4) location of emission; and 5) N arrow.



AVERAGE OPACITY 0%

TOTAL READING TIME 19 min.

REMARKS

MIN.	SECONDS 00	15	30	45	COMMENTS
00	0	0	0	0	
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	end of run
19	0				
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					

APPENDIX B

EMISSION SAMPLING DATA

TABLE B-I

SUMMARY OF EMISSION SAMPLING DATA
FAIRCHILD-HILLER MODEL 1150-300,
INCINERATOR/SILVER RECLAMATION PROCESSOR
WRIGHT-PATTERSON OH
TESTED 15,17,18 & 19 JULY 1976

Day	Run	Particulate (lb/hr)	Temp		H_2O	CO_2		Stack Flow (ft^3/min)*	Charge Film (lbs)	Ash+ (%)	Isokinetic (%)
			Stack (^oF)	Afterburner (^oF)	Stack (%)	Stack (%)	Afterburner (%)				
1	1A	.3156	1070	2100	8.2	4.8	11.2	792	568	3.7	98.8
1	1B	.1610	895	1700	6.6	4.2	7.5	756	568	3.7	97.8
2	2A	.0899	1058	2060	8.3	4.9	11.8	808	621	4.5	99.7
2	2B	.1239	892	1650	5.6	3.1	7.2	830	621	4.5	97.2
3	3A	.1233	1101	2100	6.8	4.4	12.9	819	604	3.1	97.7
3	3B	.1093	918	1700	5.3	3.0	8.5	813	604	3.1	97.6
4	4	.1915	1017	1920	6.9	4.3	9.7	817	606	5.4	99.3

* STP, Dry

+The ash recovered after the burn divided by the initial charge times 100.

TABLE B-II

Air Pollution Source Sampling

Data Sheet 1 - Preliminary Data

Base WPAFB Bldg No. 294 Boiler No. _____

Date(s) 14-19 Jul 76 Sampling Team _____

Boiler Type & Make Fairchild-Hiller Film Incinerator/Silver Reclamation Processor

Rated Capacity _____

Type Fuel Natural Gas

Stack Geometry

Circular Stack: Wall thickness 2.0" Inside diameter 18.0"

Distance from outside of sampling port to inside diameter 6.0"

Stack area 254.5 Number Traverses _____ No Points/Traverse ____

Location of sampling points along traverse:

Point	% of Diam	Distance from Outer end of Nipple		SKETCH
1	3.3	0.6	Out	
2	10.5	1.9	7.9	
3	19.4	3.5	9.5	
4	32.3	5.8	11.8	
5	67.7	12.2	18.2	
6	80.6	14.5	20.5	
7	89.5	16.1	22.1	
8	96.7	17.4	Out	

Rectangular duct: Sketch and show dimensions:

TABLE B-III

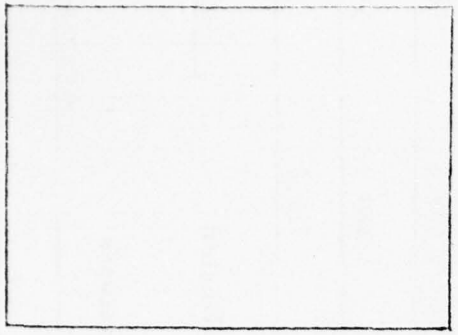
PARTICULATE SAMPLING DATA SHEET

Run No. 1
Date 15 Jul 76

Plant 294
Base WPAFB

Sample Box No. 2
Meter Box No. 4

QW/QM 0.9605
Co 0.3779



Schematic of Stack Cross Section

EQUATIONS

$H = K.VP$

$K = \left[\frac{5130.Fd.Cp.A}{Co}\right]^2 \frac{Tm}{Ts}$

$H = 137.5 \frac{Tm}{Ts} Vp$

Ambient Temp. 91°F
Barometric Press. 29.025

Heater Box Setting 315
Probe Heater Setting MAX

Probe Length Short
Nozzle Area 9.987×10^{-4} ft^2
Cp 0.93

Traverse Point Number	Sampling Time	Static Pressure	Stack Temperature	Velocity Head	Orifice Diff. Pressure	Gas Sample Volume	Gas Meter Temp Inlet	Gas Meter Temp Outlet	Sample Box Temp.	Impinger Temp.
A-6	1050	0	1150	0.060	2.78	37.879	84	80	315	115
5	1100	0	1180	0.065	2.99	42.940	95	81	315	110
4	1110	0	1190	0.065	2.98	48.200	98	82	315	110
3	1120	0	1160	0.065	3.03	53.460	98	82	315	107
2	1130	0	960	0.040	2.10	58.825	98	82	315	105
1	1140	0	900	0.035	1.95	63.620	98	82	315	105
B-6	1157	0	1120	0.050	2.40	67.930	96	84	315	100
5	1207	0	1080	0.050	2.47	72.920	100	86	315	100
4	1217	0	1090	0.055	2.70	77.860	100	86	315	95
3	1227	0	1110	0.055	2.67	83.040	100	86	315	95
2	1237	0	1000	0.040	2.08	88.220	100	86	315	95
1	1247	0	900	0.030	1.68	92.715	100	86	315	95
STOP	1257				Final	96.882				

Approved Oct 73/DAPM/jb/OPR: AF/EHL

TABLE B-IV

AIR POLLUTION ANALYTICAL DATA

Test Number 1

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No. 90)	822.7	710.0	112.7
Acetone Washings Probe-Front Half Filter Holder	7755.5	7705.7	49.8
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			162.5

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1	560.0	689.0	(-) 129.0
Impinger 2	798.3	639.6	158.7
Impinger 3	524.6	469.3	55.3
Impinger 4 (Silica Gel)	734.7	718.8	15.9
Total Weight of Water Collected			100.9

3. Gases (Sampling Port)

Component	Analysis 1	Analysis 2	Analysis 3	Average
Vol % CO_2 (dry)	4.8	4.6	5.0	4.8
Vol % CO (dry)	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	13.4	11.8	15.0	13.4
Vol % N_2 (dry)				

TABLE B-V

AIR POLLUTION ANALYTICAL DATA

Test Number 1

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No.)			
Acetone Washings Probe-Front Half Filter Holder			
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1			
Impinger 2			
Impinger 3			
Impinger 4 (Silica Gel)			
Total Weight of Water Collected			

3. Gases (Top of Afterburner Section)

Component	Analysis 1	Analysis 2	Analysis 3	Average
Vol % CO_2 (dry)	10.0	11.4	11.2	12.0	11.2
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	4.6	4.6	5.4	4.8	4.8
Vol % N_2 (dry)					

TABLE B-VI

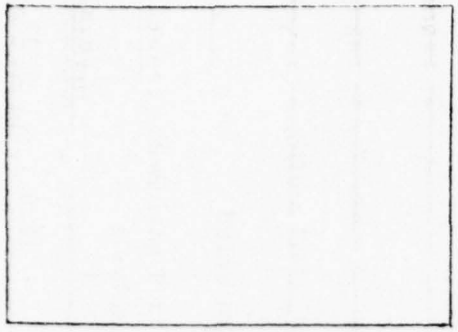
PARTICULATE SAMPLING DATA SHEET

Run No. 2
Date 15 Jul 76

Plant 294
Base WPAFB

Sample Box No. 2
Meter Box No. 4

QW/QM 0.9605
Co 0.3779



Schematic of Stack Cross Section

EQUATIONS

$H = K.VP$

$K = \left[\frac{5130.Fd.Cp.A}{Co}\right]^2 \frac{Tm}{Ts}$

$H = 134.6 \frac{\frac{Tm}{Ts}}{Vp}$

Ambient Temp. 93°F
Barometric Press. 28.950

Heater Box Setting 315
Probe Heater Setting MAX

Probe Length Short
Nozzle Area 9.987×10^{-4} ft^2
Cp 0.93

Traverse Point Number	Sampling Time	Static Pressure	Stack Temperature	Velocity Head	Orifice Diff. Pressure	Gas Sample Volume	Gas Meter Temp		Sample Box Temp.	Impinger Temp.
							Inlet	Outlet		
A-6	1457	0	920	0.045	2.41	97.047	94	86	315	100
5	1507	0	970	0.055	2.86	102.030	98	86	315	100
4	1517	0	1005	0.055	2.79	107.280	98	86	315	95
3	1527	0	960	0.040	2.10	112.540	100	86	315	95
2	1537	0	900	0.030	1.64	117.255	100	86	315	95
1	1547	0	760	0.025	1.53	121.440	100	86	315	95
B-6	1603	0	870	0.040	2.23	125.405	98	86	315	90
5	1613	0	890	0.045	2.49	130.180	100	88	315	90
4	1623	0	890	0.040	2.21	135.195	100	88	315	95
3	1633	0	890	0.040	2.21	139.950	100	88	315	90
2	1643	0	860	0.030	1.69	144.770	100	88	315	90
1	1653	0	830	0.030	1.73	148.950	100	88	315	90
STOP	1703				Final	153.206				

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TABLE B-VII

AIR POLLUTION ANALYTICAL DATA

Test Number 2

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No. 95)	753.0	713.7	40.7
Acetone Washings Probe-Front Half Filter Holder	7063.9	7023.5	40.4
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			81.1

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1	616.9	560.0	56.9
Impinger 2	802.2	798.3	3.9
Impinger 3	527.9	524.6	3.3
Impinger 4 (Silica Gel)	745.7	734.7	11.2
Total Weight of Water Collected			75.3

3. Gases (Sampling Port)

Component	Analysis 1		Analysis 2		Analysis 3	Average
Vol % CO_2 (dry)	4.2	4.2	4.2	4.0	4.2	4.2
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	14.2	14.2	14.4	14.2	14.0	14.2
Vol % N_2 (dry)						

TABLE B-VIII

AIR POLLUTION ANALYTICAL DATA

Test Number 2

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No.)			
Acetone Washings Probe-Front Half Filter Holder			
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1			
Impinger 2			
Impinger 3			
Impinger 4 (Silica Gel)			
Total Weight of Water Collected			

3. Gases (Top of Afterburner Section)

Component	Analysis 1		Analysis 2		Analysis 3	Average
Vol % CO_2 (dry)	7.4	8.8	7.2	7.2	7.0	7.5
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	8.4	8.4	8.8	8.8	8.6	8.6
Vol % N_2 (dry)						

TABLE B-IX

PARTICULATE SAMPLING DATA SHEET

Run No. 3
Date 17 Jul 76

Plant 294
Base WPAFB

Sample Box No. 2
Meter Box No. 4

QW/QM 0.9605
Co 0.3779

Schematic of Stack Cross Section

EQUATIONS

$H = K.VP$

$K = \left[\frac{5130.Fd.Cp.A}{Co}\right]^2 \frac{Tm}{Ts}$

$H = 134.6 \frac{Tm}{Ts} Vp$

Ambient Temp. 69°F
Barometric Press. 29.175

Heater Box Setting 315
Probe Heater Setting MAX

Probe Length Short
Nozzle Area 9.987×10^{-4} ft^2
Cp 0.93

Traverse Point Number	Sampling Time	Static Pressure	Stack Temperature	Velocity Head	Orifice Diff. Pressure	Gas Sample Volume	Gas Meter Temp Inlet	Gas Meter Temp Outlet	Sample Box Temp.	Impinger Temp.
A-6	0940	0	940	0.050	2.51	153.498	64	62	315	90
5	0950	0	980	0.050	2.47	158.360	74	62	315	90
4	1000	0	1050	0.055	2.59	163.330	78	64	315	90
3	1010	0	1090	0.055	2.53	168.405	78	64	315	95
2	1020	0	1080	0.045	2.08	173.395	76	64	315	95
1	1030	0	1000	0.040	1.95	178.030	76	64	315	90
B-6	1045	0	1140	0.060	2.68	182.420	76	64	315	90
5	1055	0	1120	0.060	2.72	187.440	78	66	315	90
4	1105	0	1120	0.060	2.72	192.480	78	66	315	90
3	1115	0	1110	0.055	2.52	197.550	80	68	315	90
2	1125	0	1070	0.050	2.35	202.460	80	68	315	90
1	1135	0	1000	0.040	1.97	207.295	80	68	315	90
STOP	1145				Final	211.750				

Approved Oct 73/DAPM/jb/OPR: AF/EHL

TABLE B-X

AIR POLLUTION ANALYTICAL DATA

Test Number 3

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No. 94)	728.3	694.5	33.8
Acetone Washings Probe-Front Half Filter Holder	7259.5	7247.1	12.4
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			46.2

2. Water

Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1	669.1	614.5	54.6
Impinger 2	651.8	625.6	26.2
Impinger 3	481.0	470.0	11.0
Impinger 4 (Silica Gel)	807.3	794.1	13.2
Total Weight of Water Collected			105.0

3. Gases (Sampling Port)

Component	Analysis 1		Analysis 2		Analysis 3		Average
Vol % CO_2 (dry)	5.0	5.0	5.0	4.8	4.4	5.0	4.9
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	14.6	14.4	14.0	14.0	14.2	15.0	14.4
Vol % N_2 (dry)							

TABLE B-XI

AIR POLLUTION ANALYTICAL DATA

Test Number 3

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No.)			
Acetone Washings Probe-Front Half Filter Holder			
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1			
Impinger 2			
Impinger 3			
Impinger 4 (Silica Gel)			
Total Weight of Water Collected			

3. Gases (Top of Afterburner Section)

Component	Analysis 1		Analysis 2	Analysis 3		Average
Vol % CO_2 (dry)	9.8	12.0	12.4	12.2	12.6	11.8
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	6.4	4.8	4.0	5.0	4.4	4.9
Vol % N_2 (dry)						

TABLE B-XII

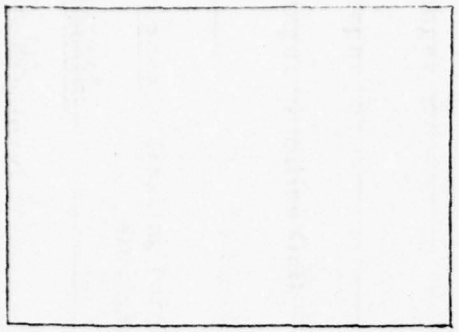
PARTICULATE SAMPLING DATA SHEET

Run No. 4
Date 17 Jul 76

Plant 294
Base WPAFB

Sample Box No. 2
Meter Box No. 4

QW/QM 0.9605
Co 0.3779



Schematic of Stack Cross Section

EQUATIONS

$H = K.VP$

$K = \left[\frac{5130.Fd.Cp.A}{Co}\right]^2 \frac{Tm}{Ts}$

$H = 137.5 \frac{Tm}{Ts} Vp$

Ambient Temp. 79°F
Barometric Press. 29.160

Heater Box Setting 315
Probe Heater Setting MAX

Probe Length Short
Nozzle Area 9.987×10^{-4} ft^2
Cp 0.93

Traverse Point Number	Sampling Time	Static Pressure	Stack Temperature	Velocity Head	Orifice Diff. Pressure	Gas Sample Volume	Gas Meter Temp		Sample Box Temp.	Impinger Temp.
							Inlet	Outlet		
A-6	1345	0	980	0.060	3.05	211.886	76	70	315	75
5	1355	0	960	0.060	3.11	217.210	80	70	315	80
4	1405	0	950	0.055	2.87	222.600	82	70	315	85
3	1415	0	930	0.040	2.10	227.850	82	70	315	85
2	1425	0	880	0.040	2.20	232.425	80	70	315	85
1	1535	0	850	0.030	1.69	237.045	82	70	315	85
B-6	1449	0	860	0.050	2.79	241.165	80	70	315	85
5	1459	0	870	0.050	2.77	246.330	82	70	315	80
4	1509	0	880	0.050	2.75	251.465	82	70	315	85
3	1519	0	880	0.045	2.48	256.630	82	70	315	90
2	1529	0	860	0.045	2.51	261.600	82	70	315	85
1	1539	0	800	0.030	1.76	266.590	82	72	315	85
STOP	1549				Final	270.824				

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TABLE B-XIII

AIR POLLUTION ANALYTICAL DATA

Test Number 4

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No. 93)	734.5	682.7	51.8
Acetone Washings Probe-Front Half Filter Holder	7691.9	7677.2	14.7
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			62.1

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1	693.4	649.1	44.3
Impinger 2	638.0	631.8	6.2
Impinger 3	475.5	471.8	3.7
Impinger 4 (Silica Gel)	822.2	807.3	14.9
Total Weight of Water Collected			69.1

3. Gases (Sampling Port)

Component	Analysis 1		Analysis 2		Analysis 3		Average
Vol % CO_2 (dry)	3.0	2.8	2.4	3.2	3.6	3.4	3.1
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	16.6	17.0	17.0	15.8	16.0	15.4	16.3
Vol % N_2 (dry)							

TABLE B-XIV

AIR POLLUTION ANALYTICAL DATA

Test Number 4

1. Particulates

Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No.)			
Acetone Washings Probe-Front Half Filter Holder			
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			

2. Water

Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1			
Impinger 2			
Impinger 3			
Impinger 4 (Silica Gel)			
Total Weight of Water Collected			

3. Gases (Top of Afterburner Section)

Component	Analysis 1		Analysis 2		Analysis 3		Average
Vol % CO_2 (dry)	7.8	7.2	7.0	7.8	6.8	6.6	7.2
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	7.2	9.2	8.6	8.4	9.0	9.4	8.6
Vol % N_2 (dry)							

TABLE B-XV

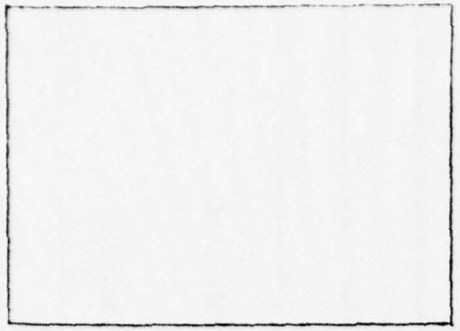
PARTICULATE SAMPLING DATA SHEET

Run No. 5
Date 18 Jul 76

Plant 294
Base WPAFB

Sample Box No. 2
Meter Box No. 4

QW/QM 0.9605
Co 0.3779



Schematic of Stack Cross Section

EQUATIONS

$H = K.VP$

$K = \left[\frac{5130.Fd.Cp.A}{Co}\right]^2 \frac{Tm}{Ts}$

$H = 134.6 \frac{Tm}{Ts} Vp$

Ambient Temp. 69°F
Barometric Press. 29.305

Heater Box Setting 315
Probe Heater Setting MAX

Probe Length Short
Nozzle Area 9.987×10^{-4} ft^2
Cp 0.93

Traverse Point Number	Sampling Time	Static Pressure	Stack Temperature	Velocity Head	Orifice Diff. Pressure	Gas Sample Volume	Gas Meter Temp		Sample Box Temp.	Impinger Temp.
							Inlet	Outlet		
A-6	0920	0	1070	0.050	2.30	270.980	66	62	315	70
5	0930	0	1080	0.060	2.76	275.690	72	62	315	70
4	0940	0	1120	0.060	2.71	280.790	78	64	315	75
3	0950	0	1180	0.065	2.84	285.835	82	64	315	75
2	1000	0	1100	0.055	2.53	291.020	82	66	315	80
1	1010	0	1050	0.050	2.39	295.990	84	68	315	80
B-6	1025	0	1130	0.050	2.26	300.775	82	68	315	75
5	1035	0	1140	0.055	2.48	305.510	84	70	315	80
4	1045	0	1130	0.060	2.74	310.400	86	70	315	80
3	1055	0	1130	0.055	2.51	315.520	88	70	315	85
2	1105	0	1080	0.045	2.12	320.510	88	70	315	85
1	1115	0	1000	0.030	1.49	325.140	86	70	315	85
STOP	1125				Final	328.995				

Approved Oct 73/DAPM/jb/OPR: AF/EHL

TABLE B-XVI

AIR POLLUTION ANALYTICAL DATA

Test Number 5

1. Particulates

Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No. 92)	719.1	690.2	28.9
Acetone Washings Probe-Front Half Filter Holder	7220.4	7187.2	33.2
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			62.1

2. Water

Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1	653.6	592.2	61.4
Impinger 2	641.1	633.3	7.8
Impinger 3	473.3	470.5	2.8
Impinger 4 (Silica Gel)	752.2	740.0	12.2
Total Weight of Water Collected			84.2

3. Gases (Sampling Port)

Component	Analysis 1		Analysis 2		Analysis 3		Average
Vol % CO_2 (dry)	4.4	4.6	4.4	5.0	4.8	4.6	4.6
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	14.8	13.6	13.6	13.6	14.0	13.8	13.9
Vol % N_2 (dry)							

TABLE B-XVII

AIR POLLUTION ANALYTICAL DATA

Test Number 5

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No.)			
Acetone Washings Probe-Front Half Filter Holder			
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1			
Impinger 2			
Impinger 3			
Impinger 4 (Silica Gel)			
Total Weight of Water Collected			

3. Gases (Top of Afterburner Section)

Component	Analysis 1		Analysis 2		Analysis 3		Average
Vol % CO_2 (dry)	12.2	12.6	13.6	14.0	13.8	11.0	12.9
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	4.2	4.8	3.2	4.4	4.2	6.4	4.5
Vol % N_2 (dry)							

TABLE B-XVIII

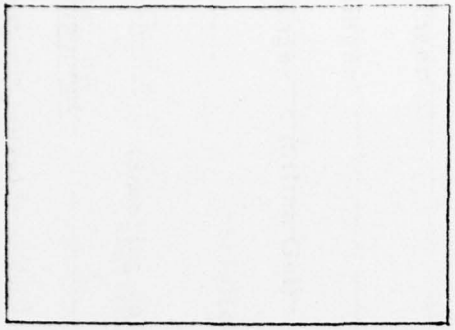
PARTICULATE SAMPLING DATA SHEET

Run No. 6
Date 18 Jul 76

Plant 294
Base WPAFB

Sample Box No. 2
Meter Box No. 4

QW/QM 0.9605
Co 0.3779



Schematic of Stack Cross Section

EQUATIONS

$H = K.VP$

$K = \left[\frac{5130.Fd.Cp.A}{Co}\right]^2 \frac{Tm}{Ts}$

$H = 137.5 \frac{Tm}{Ts} Vp$

Ambient Temp. 68°F
Barometric Press. 29.300

Heater Box Setting 315
Probe Heater Setting MAX

Probe Length Short
Nozzle Area 9.987×10^{-4} ft^2
Cp 0.93

Traverse Point Number	Sampling Time	Static Pressure	Stack Temperature	Velocity Head	Orifice Diff. Pressure	Gas Sample Volume	Gas Meter Temp		Sample Box Temp.	Impinger Temp.
							Inlet	Outlet		
A-6	1325	0	1000	0.050	2.53	329.194	80	74	315	85
5	1335	0	1000	0.050	2.54	334.180	86	74	315	95
4	1345	0	1010	0.060	3.04	339.170	88	74	315	100
3	1355	0	970	0.055	2.87	344.500	90	76	315	100
2	1405	0	930	0.040	2.14	349.720	88	76	315	100
1	1415	0	880	0.025	1.39	354.460	88	76	315	95
B-6	1430	0	900	0.045	2.46	358.263	86	76	315	90
5	1440	0	890	0.050	2.76	363.170	88	76	315	95
4	1450	0	890	0.045	2.49	368.330	90	78	315	95
3	1500	0	880	0.040	2.23	373.340	90	78	315	95
2	1510	0	870	0.040	2.25	378.150	90	78	315	100
1	1520	0	800	0.035	2.08	382.955	90	78	315	100
STOP	1530				Final	387.547				

Approved Oct 73/DAPM/jb/OPR: AF/EPL

TABLE B-XIX

AIR POLLUTION ANALYTICAL DATA

Test Number 6

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No. 91)	699.1	678.8	20.3
Acetone Washings Probe-Front Half Filter Holder	7058.5	7023.8	34.7
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			55.0

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1	697.4	653.6	43.8
Impinger 2	646.7	641.1	5.6
Impinger 3	475.9	473.3	2.6
Impinger 4 (Silica Gel)	765.0	752.2	11.8
Total Weight of Water Collected			63.8

3. Gases (Sampling Port)

Component	Analysis 1		Analysis 2		Analysis 3		Average
Vol % CO_2 (dry)	3.0	3.4	3.2	2.8	2.6	2.8	3.0
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	15.0	14.6	14.8	13.6	13.6	14.0	14.3
Vol % N_2 (dry)							

TABLE B-XX

AIR POLLUTION ANALYTICAL DATA

Test Number 6

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No.)			
Acetone Washings Probe-Front Half Filter Holder			
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1			
Impinger 2			
Impinger 3			
Impinger 4 (Silica Gel)			
Total Weight of Water Collected			

3. Gases (Top of Afterburner Section)

Component	Analysis 1		Analysis 2		Analysis 3		Average
Vol % CO_2 (dry)	10.0	10.0	9.8	7.6	6.8	6.8	8.5
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	8.2	8.6	9.2	9.8	9.8	10.0	9.3
Vol % N_2 (dry)							

TABLE B-XXI

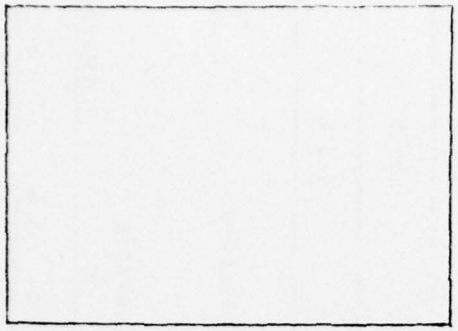
PARTICULATE SAMPLING DATA SHEET

Run No. 7
Date 19 Jul 76

Plant 294
Base WPAFB

Sample Box No. 2
Meter Box No. 4

QW/QM 0.9605
Co 0.3779



Schematic of Stack Cross Section

EQUATIONS

$H = K.VP$

$$K = \left[\frac{5130.Fd.Cp.A}{Co}\right]^2 \frac{Tm}{Ts}$$

$$H = 137.5 \frac{Tm}{Ts} Vp$$

Ambient Temp. 78°F
Barometric Press. 29.360

Heater Box Setting 315
Probe Heater Setting MAX

Probe Length Short
Nozzle Area 9.987×10^{-4} ft^2
Cp 0.93

Traverse Point Number	Sampling Time	Static Pressure	Stack Temperature	Velocity Head	Orifice Diff. Pressure	Gas Sample Volume	Gas Meter Temp		Sample Box Temp.	Impinger Temp.
							Inlet	Outlet		
A-6	1055	0	1030	0.050	2.46	387.716	76	70	315	85
5	1105	0	1030	0.055	2.72	392.660	80	70	315	90
4	1115	0	1030	0.055	2.74	397.770	86	74	315	90
3	1125	0	1020	0.050	2.51	402.930	88	74	315	95
2	1135	0	1060	0.060	2.94	407.935	88	74	315	95
1	1145	0	1020	0.050	2.52	413.120	90	74	315	100
B-6	1159	0	1020	0.050	2.52	418.122	88	76	315	95
5	1209	0	1020	0.050	2.52	423.100	88	76	315	95
4	1219	0	1020	0.050	2.52	428.080	90	76	315	100
3	1229	0	1000	0.045	2.31	433.085	92	78	315	100
2	1239	0	980	0.040	2.08	437.940	90	78	315	100
1	1249	0	970	0.040	2.09	442.550	88	78	315	100
STOP	1259				Final	447.137				

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TABLE B-XXII

AIR POLLUTION ANALYTICAL DATA

Test Number 7

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No. 96)	735.6	686.2	49.4
Acetone Washings Probe-Front Half Filter Holder	7182.7	7134.1	48.6
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			98.0

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1	641.9	587.8	54.1
Impinger 2	578.5	570.8	7.7
Impinger 3	468.3	465.9	2.4
Impinger 4 (Silica Gel)	741.9	729.5	12.4
Total Weight of Water Collected			86.6

3. Gases (Sampling Port)

Component	Analysis 1		Analysis 2		Analysis 3		Average
Vol % CO_2 (dry)	5.4	4.8	5.0	4.0	3.6	3.4	4.4
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	12.6	13.0	12.8	14.2	14.8	14.6	13.7
Vol % N_2 (dry)							

TABLE B-XXIII

AIR POLLUTION ANALYTICAL DATA

Test Number 7

1. Particulates Collection Location	Final Wt. (mg)	Initial Wt. (mg)	Wt. Particles (mg)
Filter (No.)			
Acetone Washings Probe-Front Half Filter Holder			
Glass Connections - Back Half Filter Holder			
Impinger Solution Extracts			
Impinger Solutions After Extract			
Total Weight of Particulates Collected			

2. Water Container	Final Wt. (g)	Initial Wt. (g)	Wt. Water (g)
Impinger 1			
Impinger 2			
Impinger 3			
Impinger 4 (Silica Gel)			
Total Weight of Water Collected			

3. Gases (Top of Afterburner Section)

Component	Analysis 1		Analysis 2		Analysis 3		Average
Vol % CO_2 (dry)	10.0	9.2	9.4	9.0	10.6	10.6	9.7
Vol % CO (dry)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vol % O_2 (dry)	6.6	6.8	6.4	7.0	6.4	6.8	6.7
Vol % N_2 (dry)							

APPENDIX C

ANALYSIS OF PROBE ASH

CHEMICAL ANALYSIS	USAF ENVIRONMENTAL HEALTH LABORATORY/McCLELLAN (EHL) McCLELLAN AFB, CA 95652

1. SUBMITTED BY	2. DATE REC'D	3. SAMPLE NUMBER
Capt Normington - AAF-609	13 Sep 76	76AP 10042-48

4. ANALYSIS REQUESTED	5. ANALYST
Percent Silver, Silicon, and Aluminum	T. Thomas

6. SAMPLE DESCRIPTION

Ash

7. METHODOLOGY

Emission Spectrography

8. RESULTS

Percent Element in Ash

LN	SN	Silver	Aluminum	Silicon
AP 10042	1	0.59	1.13	7.2
10043	2	1.56	1.12	6.4
10044	3	1.30	0.90	1.60
10045	4	0.96	0.30	1.60
10046	5	2.40	0.54	2.80
10047	6	0.74	0.26	0.86
10048	7	0.50	0.48	4.2

9. REMARKS

Thomas C. Thomas

10. SIGNATURE	11. DATE
THOMAS C. THOMAS, Chemist	15 Sep 76

SACRAMENTO ALC FORM APR 69 697

APPENDIX D

SILVER ANALYSIS OF FILTER ASH

CHEMICAL ANALYSIS	USAF ENVIRONMENTAL HEALTH LABORATORY/McCLELLAN (EHL) McCLELLAN AFB, CA 95652

1. SUBMITTED BY	2. DATE REC'D	3. SAMPLE NUMBER
Sgt Conway - AAF-609	23 Jul 76	76 AP 8717-8724

4. ANALYSIS REQUESTED	5. ANALYST
Ag	Mesman, Logsdon, Thomas

6. SAMPLE DESCRIPTION

Filter Papers

7. METHODOLOGY

Atomic Absorption

8. RESULTS

LN	SN	Total Milligrams of Silver
76 AP 8717	AAF 609-1F	2.08
76 AP 8918	2F	1.68
76 AP 8719	3F	1.90
76 AP 8720	4F	2.18
76 AP 8721	5F	1.10
76 AP 8722	6F	1.78
76 AP 8723	7F	2.28
76 AP 8724	8 Blank	-

9. REMARKS

Thomas C. Thomas

10. SIGNATURE	11. DATE
THOMAS C. THOMAS, Chemist	28 July 1976

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APPENDIX E

ANALYSIS OF REFRACTORY LINING

CHEMICAL ANALYSIS	USAF ENVIRONMENTAL HEALTH LABORATORY/McCLELLAN (EHL) McCLELLAN AFB, CA 95652

1. SUBMITTED BY	2. DATE REC'D	3. SAMPLE NUMBER
Capt Normington- AAF-609	17 Sep 76	27 OT 10650

4. ANALYSIS REQUESTED	5. ANALYST
Qualitative and Quantitative	T. Thomas

6. SAMPLE DESCRIPTION

Refractory Lining from Fairchild-Hiller Silver Reclamation Processor

7. METHODOLOGY

X-Ray & Emission Spectroscopy

8. RESULTS

Emission Spectrographic Analysis of the Firebrick showed:

Major (>10%)	Minor (1-10%)	Trace (0-1%)
Silicon	Iron	Magnesium
Aluminum	Titanium	Silver
Calcium		Sodium

X-Ray Analysis showed the Firebrick to be possibly a mixture of:

a. Silicon Dioxide, SiO_2 (αcristobalite)

b. Calcium Silicate, CA_2SiO_4

c. Aluminum Silicate, $Al_2O_3 \cdot SiO_2$

d. Iron Oxide, Fe_2O_3

9. REMARKS

Obviously a poured refractory cement lining.

Thomas C. Thomas

10. SIGNATURE	11. DATE
THOMAS C. THOMAS, Chemist	29 September 1976

SACRAMENTO ALC FORM APR 69 697