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.

AP-42 MWI emission factor development by Rob Harrison 6/8/93

ALTERED BY M. V. CAMPBELL 6/11/93

==========

Test Report 28/28a

Facility: Nazareth Hospital

Control type: Wet scrubber, tower absorber, and mist eliminator

	Run 1	Run 2	Avg
Charge rate (lb/hr)	980	980	980
Charge rate (ton/hr)	0.49	0.49	0.49
Emissions (lb/hr)			
PM	0.31	0.28	0.295
CO	0.19	0.32	0.255
HCl (inlet)	29.7	17.1	23.4
HCl (outlet)	0.01	0.01	0.01

EF (lb/ton)	Rating			
PM	D	0.632653	0.571429	0.602041
CO	D	0.387755	0.653061	0.520408
HCl (inlet)	D	60.61224	34.89796	47.7551
HCl (outlet)	D	0.020408	0.020408	0.020408

	Run 5	Run 6	Avg
Charge rate (lb/hr)	980	980	980
Charge rate (ton/hr)	0.49	0.49	0.49
Emissions (lb/hr)			
PM total (front + back (PADER Method 5)	0.33	0.31	0.32

EF (lb/ton)	Rating			
PM total	D	0.673469	0.632653	0.653061

	Run 1A	Run 1B	Run 2A	Run 2B	Avg
Charge rate (lb/hr)	980	980	980	980	980
Charge rate (ton/hr)	0.49	0.49	0.49	0.49	0.49
Emissions (lb/hr)					
SO2 (inlet)	0.22	0.4	1.2	1.3	0.78
SO2 (outlet)	ND	ND	ND	ND	

EF (lb/ton)	Rating				
SO2 (inlet)	D	0.44898	0.816327	2.44898	2.653061	1.591837
SO2 (outlet)		0	0	0	0	

	Run 1	Run 2	Avg
Charge rate (lb/hr)	980	980	980
Charge rate (ton/hr)	0.49	0.49	0.49

Emissions (lb/hr)				
Antimony		0.0002	0.0002	0.0002
Arsenic	<<	0.0001	0.0001	0.0001
Beryllium	<<	0.0001	0.0001	0.0001
Cadmium		0.0022	0.0007	0.00145
Chromium		0.0001	ND	5E-05
Lead		0.012	0.0034	0.0077
Manganese		0.0003	0.0003	0.0003
Mercury		0.0197	0.0079	0.0138
Thallium	<<	0.0001	0.0001	0.0001

EF (lb/ton)	Rating			
Antimony	D	0.000408	0.000408	0.000408
Arsenic	D	0.000204	0.000204	0.000204
Beryllium	D	0.000204	0.000204	0.000204
Cadmium	D	0.00449	0.001429	0.002959
Chromium	D	0.000204	0	0.000102
Lead	D	0.02449	0.006939	0.015714
Manganese	D	0.000612	0.000612	0.000612
Mercury	D	0.040204	0.016122	0.028163
Thallium	D	0.000204	0.000204	0.000204

23a.

Project No. 1161

Ref 20

Nazareth Hospital

Emission Compliance
Test Program

Prepared for:

Mr. Ralph Manco
Vice President - Institutional Affairs
Nazareth Hospital
2601 Holme Avenue
Philadelphia, PA 19152

September 1989

Table of Contents

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Appendix A - Laboratory Analysis and Calculations

Appendix B - Field Data Sheets and Calibrations

Appendix C - Incinerator Operation Logs

1.0 Introduction

AirNova, Inc. conducted an emission compliance test program at the Nazareth Hospital located in Philadelphia, Pennsylvania on July 21 and 24, 1989 for the purpose of demonstrating compliance with applicable Pennsylvania Department of Environmental Resources (DER) and Philadelphia Air Management Services (AMS) regulations. Emission sampling was conducted in evaluation of a solid waste incinerator/waste heat boiler system and associated control device recently installed at this site. The specific parameters determined as part of this test program included the following:

Control Device Inlet	Control Device Outlet
Hydrogen Chloride	Oxygen
Sulfur Dioxide	Particulate
	Metals - Regulation 6
	Hydrogen Chloride
	Sulfur Dioxide
	Carbon Monoxide
	Visual Emissions

This report contains the complete results of the test program.

2.0 Site Description

The emission source under evaluation consists of a solid waste incinerator with associated waste heat recovery boiler. The incinerator is a Cleaver Brooks Model 1280-A/72 with a maximum charging rate of 825 lbs/hr. Both the main combustion chamber and integral afterburner are fired by natural gas. The waste heat recovery boiler is a Cleaver Brooks Model SFB-250. This unit is additionally fired by natural gas or No. 6 fuel oil. Natural gas was fired during the compliance test program.

Flue gas exiting the waste heat boiler is treated by a wet scrubber. The scrubber is an Anderson 2000 Model WAV-97 venturi throat type operating at approximately 18-inches of pressure drop. The venturi is followed by a packed tower absorber and mist eliminator. The scrubber liquid is a caustic solution.

Emission sampling at the scrubber inlet was performed in a horizontal length of exhaust ducting with an inside diameter of 19.5 inches. Two test ports situated 90° apart and located 2 diameters upstream and 8 diameters downstream from the nearest flow disturbance were utilized for all sampling. Outlet emission sampling was conducted in a horizontal section of 16-inch I.D. ducting. Two test ports situated at 90° and located 2 duct diameters upstream and 8 duct diameters downstream were utilized for all sampling. The sample traverse points for each test location were as follows:

Inlet Test Location			Outlet Test Location		
Traverse Point	Diameter (%)	Distance (in)	Traverse Point	Diameter (%)	Distance (in)
1	4.4	0.9	1	4.4	0.7
2	14.6	2.8	2	14.6	2.3
3	29.6	5.8	3	29.6	4.7

Table 3-1
Particulate Emission Summary
EPA Method 5

Run No.	1	2
Date	07/21/89	07/21/89
Test Period	1105-1213	1307-1410
Volume of Gas Sample (DSCF)	36.59	37.99
Stack Area (sq. ft.)	1.4	1.4
Stack Gas Velocity (fpm)	2,176	2,342
Stack Gas Temperature (°F)	124	138
Stack Gas Moisture (%)	12.7	15.0
Stack Gas Mol. Wt. (lb/mole)	27.96	27.70
Stack Gas Flow Rate (DSCFM)	2,406	2,461
Nozzle Diameter (inches)	0.25	0.25
Isokinetic Variation (%)	108	106
Gas Analysis		
Carbon Dioxide (%)	5.4	5.2
Oxygen (%)	13.7	14.5
Nitrogen (%)	80.9	80.3
Patriculate - Front Half		
gr/DSCF	0.015	0.013
gr/DSCF @ 7% O_2	0.029	0.029
lb/hr	0.31	0.28
gram/second	0.04	0.04

Standard Conditions: 68°F, 29.92 in. Hg.

Table 3-2

Particulate Emission Summary

PADER Method 5

Run No.	5	6
Date	07/21/89	07/21/89
Test Period	1450-1614	1650-1806
Volume of Gas Sample (DSCF)	54.54	47.71
Stack Area (sq. ft.)	1.4	1.4
Stack Gas Velocity (fpm)	2,924	2,482
Stack Gas Temperature (°F)	141	143
Stack Gas Moisture (%)	17.6	18.2
Stack Gas Mol. Wt. (lb/mole)	27.43	27.51
Stack Gas Flow Rate (DSCFM)	2,964	2,488
Nozzle Diameter (inches)	0.25	0.25
Isokinetic Variation (%)	105	109
Gas Analysis		
Carbon Dioxide (%)	5.4	6.8
Oxygen (%)	14.3	13.3
Nitrogen (%)	80.3	79.9
Patriculate - Front Half		
gr/DSCF	0.013	0.015
gr/DSCF @ 7% O_2	0.028	0.028
.3 gr/DSCF @ 12% CO_2	0.029	0.026
lb/hr	0.32	0.31
gram/second	0.04	0.04
Particulates - Total*		
gr/DSCF	0.013	0.015
gr/DSCF @ 7% O_2	0.028	0.028
gr/DSCF @ 12% CO_2	0.029	0.029
lb/hr	0.33	0.31
gram/second	0.04	0.04

* Includes back-half insoluble

Standard Conditions: 68°F, 29.92 in. Hg.

Outlet

Table 3-3
Carbon Monoxide Emission Summary

Run No.	1	2
Date	07/21/89	07/21/89
Test Period	1105-1213	1307-1410
Stack Gas Flow Rate (DSCFM)	2,406	2,461
Concentration (ppmV-dry)	18.0	30.0
Emission Rate		
lb/hr	0.19	0.32
gram/second	0.02	0.04

Standard Conditions: 68°F, 29.92 in. Hg.

These CO runs were done during runs 1 and 2 [times and flow rates are the same]

Table 3-4
Sulfur Dioxide Emission Summary

Run No.	Date	Location	Test Period	Stack Gas Flow Rate (DSCFM)	Concentration (ppmV)	Emission Rate lb/hr	Emission Rate gr/sec.	Removal Efficiency (%)
1A	07/24/89	Inlet	1255-1315	2,950	14.8	0.22	0.03	-
1A	07/24/89	Outlet	1255-1315	2,382	<0.04	<0.001	<1.2E-4	>99.9
1B	07/24/89	Inlet	1347-1407	2,950	27.2	0.40	0.05	-
1B	07/24/89	Outlet	1347-1407	2,382	<0.04	<0.001	<1.2E-4	>99.9
2A	07/24/89	Inlet	1436-1456	2,945	82.4	1.2	0.15	-
2A	07/24/89	Outlet	1436-1456	2,750	<0.04	<0.001	<1.2E-4	>99.9
2B	07/24/89	Inlet	1514-1534	2,945	90.3	1.3	0.16	-
2B	07/24/89	Outlet	1514-1534	2,750	<0.04	<0.001	<1.2E-4	>99.9

Standard Conditions: 68°F, 29.92 in. Hg.

Table 3-5
Hydrogen Chloride Emission Summary

Run No.	1		2	
Date	07/21/89		07/21/89	
Location	Inlet	Outlet	Inlet	Outlet
Test Period	1104-1206	1104-1206	1305-1410	1305-1410
Stack Gas Flow Rate (DSCFM)	3,059	2,406	3,049	2,461
Concentration ppmV	1,719	0.7	993	0.7
Emission Rate lb/hr	29.7	0.01	17.1	0.01
gm/sec.	3.7	1.3E-3	2.2	1.3E-3
Removal Efficiency	99.97		99.94	

Standard Conditions: 68°F, 29.92 in. Hg

at the

These HC ← Rob mote

same fi (Same as PM 1&2 and CO 1&2)

but in

from outlet

some out leakage

somewhere - Andersen 2000

scrubbers usually have

induced-draft fan

outleakage seems strange

- something may be wrong w/ data.

Table 3-6
Metals Emission Summary

Run No. 1
Test Date: 07/24/89
Test Period: 1015-1130

A

A x 0.000437

		Volume (DSCF)	Volume (DSCF)	Concentration (mg/DSCM)	Stack Gas Flow Rate (DSCFM)	Emission Rate (lb/hr)	Emission Rate (gm/sec)	gr/dscf
Sb	Antimony	44.82	1.269	0.0198	2,389	0.0002	0.00002	0.0000086
As	Arsenic			0.0020		<0.0001	<0.00001	0.0000009
Be	Beryllium			0.0009		<0.0001	<0.00001	0.0000003
Cd	Cadmium			0.2434		0.0022	0.00027	0.0001063
Cr	Chromium			0.0158		0.0001	0.00002	0.0000069
Pb	Lead			1.3393		0.0120	0.00151	0.0005852
Mn	Manganese			0.0280		0.0003	0.00003	0.0000122
Hg	Mercury			2.1987		0.0197	0.00248	0.0009608
Ni	Nickel			ND		ND	ND	
Se	Selenium			ND		ND	ND	
Tl	Thallium			0.0023		<0.0001	<0.0001	0.0000010

Run No. 2
Test Date: 07/24/89
Test Period: 1200-1315

Antimony	50.64	1.434	0.0209	2,750	0.0002	0.00003	0.0000091
Arsenic			0.0025		<0.0001	<0.00001	0.0000010
Beryllium			0.0008		<0.0001	<0.00001	0.0000003
Cadmium			0.0700		0.0007	0.00009	0.0000305
Chromium			ND		ND	ND	—
Lead			0.3277		0.0034	0.00043	0.0001432
Manganese			0.0323		0.0003	0.00004	0.0000141
Mercury			0.7669		0.0079	0.00100	0.0003351
Nickel			ND		ND	ND	
Selenium			ND		ND	ND	
Thallium			0.0035		<0.0001	0.00001	0.0000015

Standard Conditions: 68°F, 29.92 in. Hg.

4.0 Test Methodologies

The emission test program was conducted for the following parameters utilizing the methodologies as specified below.

Emission Parameter	Test Location	No. Test Run	Sampling and Analytical Methodology
Carbon Dioxide, Oxygen	Inlet	3*	EPA Method 3
Particulate	Outlet	2	EPA Method 5
	Outlet	2	EPA method 5 with DER Modifications
Hydrogen Chloride	Inlet/Outlet	2	EPA Modified Method 5 - Mercuric Nitrate Titration
Metals - Regulation 6	Outlet	2	EPA Modified Method 5 - Mixed Metals Sampling Train
Sulfur Dioxide	Inlet/Outlet	2	EPA Method 6
Carbon Monoxide	Outlet	2	EPA Method 10
Visual Emissions	Outlet	2	EPA Method 9

* Performed during all emission determinations.

A full description of each of the above referenced test methodologies is provided below.

Particulates, Hydrogen Chloride, and Moisture Content

Outlet determinations of hydrogen chloride, EPA Method 5 particulate, and moisture content were sampled isokinetically using a single Modified EPA Method 5 sampling system. The combined sampling system allowed for discrete determination of these parameters without presenting interferences to the prescribed analytical methodologies.

The sample train consisted of a heated glass-lined probe with a

CITY OF PHILADELPHIA

DEPARTMENT OF PUBLIC HEALTH
500 S. Broad Street
Philadelphia, Pa. 19146

MAURICE C. CLIFFORD, M.D.
Health Commissioner

PLANT Nazareth Hospital
ADDRESS 2601 Holme Avenue - 19152
STACK Infectious Waste Incinerator
DATE 7/21-24/89 Tests, 9/89 Rpt, 10/2/89 Rev

Page 1
PARTICULATE CALCULATIONS
EPA RM 5

			RUN 1	RUN 2	Avg	RUN 1	RUN 2	Avg
1. Vm	Actual Meter Volume	ft3	37.71	39.337		56.751	49.444	
2. Vmcorr	Corrected Meter Vol.,VmxPm=		37.710	39.337		56.751	49.444	
	Meter Conditions. Pm = _____		1	1		1	1	
3. dHavg	Average Orifice Pressure Drop	in H20	1.634	1.442		2.183	1.583	
4. Pbar	Barometric Pressure	in Hg	29.9	29.9		29.9	29.91	
5. Pm	Absolute Meter Pressure							
	Pm = Pbar +(dHavg/13.6) =	in Hg	30.02	30.01		30.06	30.03	
6. Tmr	Absolute Avg. Meter Temperature	deg. F	86	88.4		92.1	89.2	
	TmR = TmF + 460	deg. R	546	548.4		552.1	549.2	
7. Vmstd	Dry Standard Volume Metered	scfd	36.574	37.967		54.507	47.685	
	Vmstd = (VmcorrxPmx17.64)/TmR							
8. Vwci	Std. Vol. H20 Vapor - Impingers	scf	3.95	5.55		10.45	9.18	
	Vwci = Vlc(mls)x 0.04707 Ft3/ml enter mls		84	118		222	195	
9. Vwcgel	Std. Vol. H20 Vapor - Silica Gel - scf		1.367	1.160		1.179	1.414	
	Vwcgel = Vlc(gms)x 0.04715 Ft3/grm enter gms		29	24.6		25	30	
10. Vwc	Total H20 Vapor = Vwci + Vwcgel	scf	5.321	6.714		11.628	10.593	
11. Bwo	% Water = 100 x Vwc/(Vmstd+Vwc)	%	12.70	15.03	13.86	17.58	18.18	17.880
12. %CO2	Carbon Dioxide (dry)	%	5.4	5.2	5.30	5.4	6.8	6.100
13. %02	Oxygen (dry)	%	13.7	14.5	14.10	14.3	13.3	13.800
14. %CO	Carbon Monoxide (dry)	%	0	0	0.00	0	0	0.000
15. %N2	Nitrogen = 100-%CO2-%O2-%CO	%	80.9	80.3	80.60	80.3	79.9	80.100
16. Md	Dry MW=.44*CO2+.32*O2+.28*(N2+CO)	g/gmol	29.41	29.41	29.41	29.44	29.62	29.528
17. Ms	Wet Molecular Weight Stack Gas	g/gmol	27.96	27.70	27.83	27.43	27.51	27.467
	Ms= Mdx(1-Bwo/100) + 18(Bwo/100)							
18. Cp	Pitot Tube Coefficient	no units	0.85	0.85		0.85	0.85	
19. TsR	Avg. Stack Temp	deg. F	124	138	131	141	143	142.000
	Deg. R = Deg. F + 460 Absolute	deg. R	584	598	591	601	603	602.000
20. Psg	Static Guage Pressure of Stack	in H20	0.15	0.22	0.19	0.17	0.25	0.210

Mr. Ralph Manco, VP, Institutional Affairs
Inlet - HCl, SO2 Outlet - O2, Particulate, Metals, HCl, SO2, CO, VE
C.B. Model 1280-A/72 825 #/Hr - Gas/#6 oil. Gas during tests.
Anderson 2000 Model WAV -97 venturi - 18" dp then packed tower and demister.
Caustic solution in the scrubber.
ID at inlet sampling duct (not stack outlet) - 19.5 inches. 2 dia up and 8 down
ID at outlet duct (not the stack) - 16" - also 2 and 8 dias. 12 points per site were used.

Charge 195 #/12 min
980 lb/hour mixed

Category - New Regulation XI, Non BAT	
Allowable	Actual
Particulate 0.03 gr/dscf @ 7% O2 and 0.1 gr/dscf @ 12% CO2 PA	0.026-0.029 gr/dscf at 7%O2
Sulfur Dioxide100PPMV or 70% control.	0.04 PPMV and >99.6%
Hydrogen Chloride - 50 PPMV or 90% control.	0.7 PPMV and >99.9%
Carbon Monoxide - 100 PPMV,4 day and 400 PPMV 8 hour.	18-60 PPMV
Comb Eff - 99.9% 4 day running average = 100*CO2/(CO2+CO)	99.93-99.97

CO	RUN 1	RUN 2	Avg
Date	07/21/89	07/21/89	
Time	'1105-1213	'1307-1410	
DSCFM	2406	2461	2433.500
PPMV-dry	18	30	24.000
Lb/Hr	0.19	0.32	0.255
G/sec	0.02	0.04	0.030

Combustion Efficiency Based On EPA 1&2/CO tests

RUN 1	RUN 2	Avg	
0.0018	0.003		CO - %
5.4	5.2		CO2 -%
99.97	99.94		C. E.

Inlet Sulfur Dioxide

	RUN 1A	RUN 1B	Avg	RUN 2A	RUN 2B	Avg
Date	07/24/89	07/24/89		07/24/89	07/24/89	
Time	'1255-1315	'1347-1407		'1436-1456	'1514-1534	
DSCFM	2950	2950	2950.000	2945	2945	2945.000
PPMV-dry	14.8	27.2	21.000	82.4	90.3	LD
Lb/Hr	0.22	0.4	0.310	1.2	1.3	1.250
G/sec	0.03	0.05	0.040	0.15	0.16	0.155

Outlet Sulfur Dioxide EPA - RM 6. 15ml 80% isopropanol, glass plug outlet arm, 1LPM

	RUN 1A	RUN 1B	Avg	RUN 2A	RUN 2B	Avg
Date	07/24/89	07/24/89		07/24/89	07/24/89	
Time	'1255-1315	'1347-1407		'1436-1456	'1514-1534	
DSCFM	2382	2382	2382.000	2750	2750	2750.000
PPMV-dry	0.04	0.04	0.040	0.04	0.04	LD
Lb/Hr	0.001	0.001	0.001	0.001	0.001	LD
G/sec	0.00012	0.00012	1.20E-04	0.00012	0.00012	LD
Efficiency	99.6	99.76	99.680	99.92	99.925	99.923 Minimum

	Hydrogen Chloride Inlet			Hydrogen Chloride Outlet		
CO	RUN 1	RUN 2	Avg	RUN 1	RUN 2	Avg
Date	07/21/89	07/21/89		07/21/89	07/21/89	
Time	'1104-1206	'1305-1410		'1104-1206	'1305-1410	
DSCFM	3059	3049	3054.000	2406	2461	2433.500
PPMV	1719	993	1356.000	0.7	0.7	0.700
Lb/Hr	29.7	17.1	23.400	0.01	0.01	0.010
G/sec	3.7	2.2	2.950	0.0013	0.0013	1.30E-03
			Efficienc	99.959278	99.929506	99.944

H20 - Inlet
H20 - Outlet

Nazareth Hospital
2601 Holme Avenue - 19152
Infectious Waste Incinerator
7/21-24/89 Tests, 9/89 Rpt, 10/2/89 Rev

Charge

Primary T F Range	'1095-1450
Secondary T F Range	'1894-2324
AB T F Range	'1733-2113
Stack Draft Range -	'0-0.13
Bypass T F Range	'145-373
Scrubber GPM	7.0-9.5
Scrubber dP In. H2O	'19-27
Scrubber pH	'6-9.8
Scrubber H2O Inlet P	'21-31"
Scrubber Bed dP "H2O	'2-4
Makeup H2O	'48-53.9
Venturi GPM	'40
Tower GPM	'50

INCINERATOR

Daily Operational Data Report

[redacted] [redacted] [redacted] [redacted] DATE: July 20, 1989

Operator's Name: REN. ROGERS

FRIDAY

ed #	Time	Main Chamber Temp	Thermal Reactor Temp	Retention Chamber Temp	Stack Draft	Emergency Bypass	Materials Burned
1	0858	500	2000°	1850°	.11"	212°	Cardboard
2	09:20	1256°	1967°	1927°	.13"	170°	BR, CB, RE
3	09:22	1289°	1978°	1951°	.10"	178°	BR, Cardbo
4	09:26	1418°	1936°	1959°	.11"	207°	BR, CB, RE
5	09:49	1497°	1927°	1957°	.12"	253°	BR, CB, RE
6	10:00	1305°	1858°	1950°	.11"	226°	BR, CB, RE
7	10:10	1257°	1919°	1963°	.10"	212°	BR, CB, RE
8	10:21	1280°	2005°	1999°	.06"	193°	BR, CB, RE
9	10:33	1300°	2025°	2032°	.06"	213°	BR, CB, RED
10	10:45	1264°	2094°	2062°	.05"	372°	BR, CB, RED
11	11:08	1254°	2096°	2057°	.04"	201°	BR, CB, RED
12	11:12	1251°	2081°	2068°	.05"	173°	BR, CB, RED
13	11:24	1233°	2063°	2079°	.06"	177°	BR, CB, RED
14	11:34	1276°	2083°	2074°	.05"	173°	BR, CB, RED
15	11:45	1279°	2059°	2068°	.05"	170°	BR, CB, RE
16	12:00	1266°	2073°	2079°	.05"	197°	BR, CB, RED
17	12:12	1304°	2017	2045°	.03"	231°	BR, CB, RED
18	12:35	1317°	2020°	2068°	.06"	213°	BR, CB, RED
19	12:49	1295°	1994°	2061°	.05	197°	BR, CB, RED
20	13:02	1335°	1999°	2055°	.05"	177°	BR, CB
21	13:14	1325°	2019°	2069°	.05"	175°	BR, RED, CB
22	1324	1329°	2069°	2069°	.05"	172°	BR, CB, RED
23	1338	1308°	2058°	2058°	.05"	170°	BR, CB, RED
24	13:50	1298°	2026°	2059°	.05"	162°	BR, CB, RED
25	[illegible]	1314°	2051°	2068°	.05"	165°	BR, CB, RE

INCINERATOR

Daily Operational Data Report

DATE: July 20, 1989

Operator's Name: JN ROGERS

PAGE 3 OF 3

sed #	Time	Main Chamber Temp	Thermal Reactor Temp	Retention Chamber Temp	Stack Draft	Emergency Bypass	Materials Burne
THR	0950	975.0					
0 HR	10 50	975.0					
0 HR	11:50	975.0					
0 HR	12:50	975.0					
0 HR	13:50	975.0					
0 HR	14:50	975.0					
0 HR	15:50	975.0					
0 HR	16:50	975.0					
0 HR	17:50	975.0					
0 HR	18:50	975.0					

INCINERATOR

Daily Operational Data Report

DATE: July 24, 1989

Operator's Name: P.N. ROGERS

Monkey

PAGE 1 OF 3

d	Time	Main Chamber Temp	Thermal Reactor Temp	Retention Chamber Temp	Stack Draft	Emergency Bypass	Materials Burned
	08:25	1122°	2005°	1884°	.07"	152°	Cardboard
–	08:37	1146°	2000°	1881°	.06"	152°	BR, cardboard
2	08:48	1193°	1980°	1888°	.07"	157°	BR, CB, RE
4	08:57	1338°	2002°	1896°	.07"	145°	BR, CB, RED
5	09:09	1189°	1979°	1902°	.07"	163°	BR, CB, RED
6	09:21	1343°	1967°	1899°	.07"	165°	BR, CB, RED
7	09:33	1206°	1982°	1915°	.07"	179°	BR, CB, RED
8	09:45	1348°	1971°	1942°	.07"	217°	BR, CB, RED
9	09:59	1327°	1951°	1926°	.07"	178°	BR, CB, RED
0	10:09	1305°	1946°	1926°	.07"	165°	BR, CB, RED
1	10:21	1273°	1936°	1938°	.07"	179°	BR, CB, RED
2	10:33	1295°	1993°	1957°	.07"	206°	BR, CB, RED
3	10:45	1281°	1978°	1968°	.07"	199°	BR, CB, RED
4	10:57	1200°	2000°	1985°	.07"	217°	BR, CB, RED
5	11:09	1234°	1993°	2002°	.07"	227°	BR, CB, RED
6	STOKE 11:21	1341°	1997°	2014°	.07"	237°	BR, CB, RED
7	11:33	1242°	2012°	2059°	.00"	278°	BR, CB, RED
8	11:45	1258°	2093°	2082°	.00"	280°	BR, CB, RED
9	11:57	1210°	2090°	2082°	.03"	288°	BR, CB, RED
0	12:09	1211°	2070°	2075°	.03"	282°	BR, CB, RED
1	12:21	1303°	2017°	2044°	.07"	231°	BR, CB, RED
2	12:33	1265°	2024°	2053°	.07"	217°	BR, CB, RED
3	12:45	1270°	2001°	2039°	.07"	223°	BR, CB, RED
4	12:57	1281	2013	2039	.06"	213	BR, CB, RED
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

DATE: 7-21-89

Elapsed Time

ge #	1700	1708	1720	1734	1744	1804	:00	:10	:20	:30	:40	:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00
Incinerator Main Chamber Temperature °F	11 17	11 04	11 92	11 87	11 98	11 9[illegible]													
Thermal Reactor Temperature °F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]													

TATEST

Test #
Start:
Type:

Nazareth Hospital
2601 Holme Avenue
Philadelphia, PA

Readings by: _____

| Page # | | |

ATE: 7-21-89

Elapsed Time

e #	0820	0910	0920	0937	0947	0958	1010	1032	1035	1048	1100	1118	1124	1136	1149	1202	1214
	:00	:10	:20	:30	:40	:50	1:00		1:10	1:20	1:30	1:40	1:50	2:00			
Incinerator - Main Chamber	500°	1111°	1157°	1266°	12	12	12	12	12	12	13	12	12	12	13	12	11
Temperature °F					79	71	76	76	78	75	76	78	70	70	76	72	82
Thermal Reactor	[illegible]	[illegible]	[illegible]	[illegible]	21	21	21	21	22	22	22	22	22	22	22	22	22
Temperature °F		[illegible]			71	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	70	[illegible]	[illegible]	71
[illegible]																	
[illegible]																	

DATATEST

Test #
Start: 11:05

Nazareth Hospital
2601 Holme Avenue
Philadelphia, PA

Readings by: _____

TE: 7-21-07

Elapsed Time

uge #		17:32	17:49	17:54											
		:00	:10	:20	:30	:40	:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	
1	Incinerator - Main Chamber Temperature °F	[illegible]	[illegible]	[illegible]											
2	Thermal Reactor Temperature °F	[illegible]	[illegible]	[illegible]											
3	Retention Chamber Outlet Temperature °F	[illegible]	[illegible]	[illegible]											
4	Draft Gauge Inches H_2O	[illegible]	[illegible]	[illegible]											
5	Scrubber Water Supply [illegible]	[illegible]	[illegible]	[illegible]											
6	[illegible]	[illegible]	[illegible]	[illegible]											
7	Scrubber Water [illegible]	[illegible]	[illegible]	[illegible]											
8	Scrubber Inlet Pressure Inches H_2O	[illegible]	[illegible]	[illegible]											
	[illegible]	[illegible]	[illegible]	[illegible]											
	Auxiliary Fuel Gauge SCF of Natural Gas														
	[illegible]	[illegible]	[illegible]	[illegible]											
	[illegible]	90	40	40											
2	[illegible]	50	50	50											

eaver Brooks

Test #
Start:
Type: 1908 TEST OVER 073711

Nazareth Hospital
2601 Holme Avenue
Philadelphia, PA

Readings by: [illegible]

TE: 7-21-89

Elapsed Time

| Gauge # | | |

Elapsed Time

| Gauge # | | |

Elapsed Time

Gauge #	
1	Incinerator - Main Chamber Temperature °F
2	Thermal Reactor Temperature °F
3	Retention Chamber Outlet Temperature °F
4	Draft Gauge Inches H_2O
5	Scrubber Water Supply GPM
6	Scrubber Pressure Drop Inches H_2O
7	Scrubber Water PH
8	Scrubber Inlet Pressure Inches H_2O
9	Scrubber Packed Bed Differential Pressure Inches H_2O
10	Auxiliary Fuel Gauge SCF of Natural Gas

Cleaver Brooks

Test #
Start: 1100
Type:

Nazareth Hospital
2601 Holme Avenue
Philadelphia, PA

Readings by: P W ROGERS

1 OF 4

DATE: 7-24-89

Elapsed Time

1:10 1:20 1:30 1:40 1:50 2:00

Cleaver Brooks

Test #
Start:
Type: Test our 105674

Nazareth Hospital
2601 Holme Avenue

TE: 7-24-89

Elapsed Time

Gauge #		11:21	11:33	11:45	11:57	12:09	12:21	12:33	12:45	12:57	13:09	13:21	13:33	13:45	13:57
		:00	:10	:20	:30	:40	:50	1:00		1:10	1:20	1:30	1:40	1:50	2:00
1	Incinerator - Main Chamber Temperature °F	1268	1290	1253	1260	1222	1305	1305	1292	1278	1378	1453	1338	1271	1325
2	Thermal Reactor Temperature °F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	Retention Chamber Outlet Temperature °F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	Draft Gauge Inches H_2O	07	07	07	00	03	07	07	07	00	07	06	09	07	07
5	Scrubber Water Supply GPM	[illegible]	[illegible]	75	75	[illegible]	75	75	75	70	70	70	70	70	70
6	Scrubber Pressure Drop Inches H_2O	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	Scrubber Water PH	75	75	70	70	75	75	75	70	70	70	70	80	75	
8	Scrubber Inlet Pressure Inches H_2O	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	Scrubber [illegible] Inches H_2O	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	Auxiliary Fuel Gauge SCF of Natural Gas														
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	40	40	40	40	40	40	40	40	40	40	40	40	40	40
13	[illegible]	40	50	50	50	50	50	50	50	50	50	50	50	50	50

11:30 - Test # ODER - 105470

Start:

Type: → 105510 End 105547

leaver Brooks

Nazareth Hospital
2601 Holme Avenue
Philadelphia, PA

Readings by: P.N. ROGERS

Operator's Name: P.N. ROGERS

DATE: 7-24-89

Elapsed Time

Gauge #		1251	1259	1310	1324	1337	1347	1359	1412	1424	1436	1447	1501	1514	1527					
						:00	:10	:20	:30	:40	:50	1:00		1:10	1:20	1:30	1:40	1:50	2:00	
A	Incinerator - Main Chamber Temperature °F	12 06	12 11	12 22	12 [illegible]	11 25	12 04	11 14	11 29	11 03	11 14	11 04	11 01	11 26	1172					
B	Thermal Reactor Temperature °F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					
C	Retention Chamber Temperature °F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					

Operator's Name: P.N. ROGERS [redacted]

TE: 7-24-89

Elapsed Time

Page #		08:25 +00	08:45 +10	08:57 +20	09:09 +30	09:21 +40	09:33 +50	09:45 +60	09:57 +70	10:09 1:10	10:21 1:20	10:33 1:30	10:45 1:40	10:57 1:50	11:09 2:00
1	Incinerator - Main Chamber Temperature °F	1486	1457	1562	1535	1553	1581	1587	1498	1533	1587	1587	1540	1581	1523
2	Thermal Reactor Temperature °F	1070	1021	1019	1069	1066	1019	1019	1026	1068	1025	1052	1017	1083	1074
3	Retention Chamber Outlet Temperature °F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	Draft Gauge Inches H_2O	10	07	07	05	07	07	10	07	07	05	07	07	07	07
5	Scrubber Water Supply GPM	70	70	70	70	70	70	70	70	70	70	70	70	70	75
6	Scrubber Pressure Drop Inches H_2O	24"	24"	24"	24"	25"	25"	25"	25"	24"	24"	24"	24"	24"	25"
7	Scrubber Water PH	75	75	75	70	75	75	75	75	75	75	70	70	70	75
8	Scrubber Inlet Pressure Inches H_2O	25"	24"	24"	24"	24"	25"	25"	25"	26"	26"	24"	24"	24"	24"
9	Scrubber Packed Bed Differential Pressure Inches H_2O	35	35	35	35	35	35	25	25	30	30	30	30	30	25
10	Auxiliary Fuel Gauge SCF of Natural Gas														
11	[illegible]	495	497	496	500	509	510	514	499	511	519	519	499	501	506
12	[illegible]	40	40	40	40	40	40	40	40	40	40	40	40	40	40
13	[illegible]	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Test #

TEST Started 10:15 → 104597

Nazareth Hospital
2601 Holme Avenue

Readings by: P.N. ROGERS

Operator's Name: [illegible]

DATE: 7-24-89

Elapsed Time

Gauge #		1251	1259	1310	1324	1337	1347	1359	1412	1424	1436	1447	1501	1514	1527						
						:00	:10	:20	:30	:40	:50	1:00		1:10	1:20	1:30	1:40	1:50	2:00		
A	Incinerator - Main Chamber Temperature °F	12 06	12 11	12 22	12 [illegible]	11 95	12 04	11 14	11 29	11 03	11 14	11 04	11 01	11 [illegible]	1172						
B	Thermal Reactor Temperature °F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						
C	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						

DATATEST

Test #

Start:

Nazareth Hospital