

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.

Ref 15

REPORT OF EMISSION TESTS
THE NEW JERSEY AIR POLLUTION CONTROL CODE

#34

Burlington County Memorial Hospital
175 Madison Avenue
Mount Holly, New Jersey 08060
A.P.C. Plant I.D. No. 045043



NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY

November 28, 1989

Amended Report

Source Emission Test Summary
Burlington County Memorial Hospital

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SECTION I

PROJECT PURPOSE

Burlington County Memorial Hospital
175 Madison Avenue
Mount Holly, New Jersey, 08060
A.P.C. Plant I.D. No. 045043
NJ Stack No. 001

PROJECT PURPOSE:

The Bureau of Technical Services, conducted a pathological incinerator test program in order to determine various air contaminants and emission levels being emitted from this source category.

Several pathological incinerator sources were inspected and evaluated by personnel of the Bureau of Technical Services for the purpose of this testing project. The pathological incinerator selection for testing was based on a wide profile of units with special attention focused on the following:

1. Amount and type of material charged per hour.
2. Unit operating times.
3. Operating Temperatures.
4. Manner of material charge.
5. Type and percentage of plastics charged.

Stack emission tests were conducted on the Pathological Incinerator (N.J. Stack No. 001) for the following contaminants.

- A) Particulates
- B) Carbon Monoxide
- C) Total Hydrocarbons
- D) Nitrogen Oxides
- E) Hydrochloric Acid

The stack emissions tests were conducted to determine compliance with the standards stated on Permit/Certificate Number 66822 as filed under New Jersey Administrative Code 7:21-8 "Permits" and the standards prescribed by New Jersey Administrative Code 7:27-11 "Incinerators".

SECTION II

EMISSION TEST PROJECT PERSONNEL

PERSONNEL:

The emission tests were conducted by personnel of the New Jersey Department of Environmental Protection, Air Quality Engineering and Technology Element, Bureau of Technical Services.

Those participating in the emission test program were as follows:

Frank Papp - Environmental Compliance Investigator I
Stafford Stewart - Environmental Engineer
Gary Andrew - Environmental Specialist
Robert Tembrevilla - Environmental Specialist
Debra Berman - Environmental Engineer Trainee
Andrew Coleman - Summer Intern
Susan McLaughlin - Summer Intern

The Pathological Incinerator (N.J. Stack No. 001) was being operated at the conditions listed in incinerator operating conditions (Section VI). These process conditions were monitored by Mr. Bryan Cranston of the NJDEP's Central Regional Enforcement Office.

The emission test samples were analyzed at the Bureau of Organic Analytical Service laboratories located in West Trenton, New Jersey by:

Henry Smith, Principal Chemist

Randolph Barbiero, Principal Chemist

Gloria Griffith, Principal Laboratory Technician

SECTION III

SOURCE DESCRIPTION

SOURCE DESCRIPTION:

The Burlington County Memorial Hospital operates an American Energy Corporation Pathological A E C Model 700 Incinerator with a York-Shipley HRH-750 heat recovery boiler. Natural gas is utilized as an auxiliary fuel for the primary and secondary combustion chambers.

Pathological Incinerator

Major Components:

AEC Model 700 Incinerator
AEC Model L-10 RAM Loader
York-Shipley HRH-750 Boiler
Power-Pac Breeching
Parker Hydraulics
Midco Incinerator Burners
York Shipley Boiler Burners
New York Blower I.D. Fan

Primary Chamber Information:

- 1) Gross heat input - 800,000 BTU/hour.
- 2) Fuel fired - natural gas.
- 3) Chamber temperature - 1,000 °F.
- 4) Residence Time of Primary Chamber - 1.84 seconds.

Secondary Chamber Information:

- 1) Gross heat input - 2,500,000 BTU hour.
- 2) Fuel Fired - natrual gas.
- 3) Chamber Temperature - 1600 °F.
- 4) Residence time of Secondary Chamber - 0.65 seconds.

The Pathological Incinerator is permitted to charge up to 700 pounds per hour of Type 0, 1, 2, 3, and 4 waste.

"Type 0 Waste" means trash, a mixture of highly combustible waste such as paper, cardboard, cartons, wood boxes and combustible floor sweepings, containing approximately ten percent moisture and five percent incombustible solids, and having a heating value of approximately 8500 British Thermal Units per pound as fired, and deriving from commercial and industrial activities. The mixtures containing up to ten percent by weight of plastic bags, coated paper, laminated paper, treated corrugated cardboard, oily rags, and plastic or rubber scraps.

"Type 1 Waste" means rubbish, a mixture of combustible waste such as paper, cardboard cartons, wood scraps, foliage and combustible floor sweepings, containing approximately 25 percent moisture and ten percent incombustible solids and having a heating value of approximately 6500 British Thermal Units per pound as fired, and deriving from domestic, commercial and industrial activities. The mixture contains up to 20 percent by weight of restaurant or cafeteria waste, but contains little or no treated paper, plastic or rubber wastes.

"Type 2 Waste" Means refuse, consisting of an approximately even mixture of rubbish and garbage by weight, containing up to 50 percent moisture and approximately 4300 British Thermal Units per pound as fired, and commonly deriving from apartment and residential occupancy.

"Type 3 Waste" means garbage, consisting of animal and vegetable wastes containing up to 70 percent moisture and up to five percent incombustible solids and having a heating value of approximately 2500 British Thermal Units per pound as fired and deriving from restaurants, cafeterias, hotels, hospitals, markets, and like installations.

"Type 4 Waste" means human and animal remains, consisting of carcasses, organs, and solid organic wastes from hospitals, laboratories, abattoirs, animal pounds, and similar sources, consisting of up to 85 percent moisture and approximately five percent incombustible solids and having a heating value of approximately 1000 British Thermal Units per pound as fired.

SECTION IV

SAMPLING DATES AND TESTING SCHEDULE

SAMPLING DATES AND TESTING SCHEDULE:

The pathological incinerator was tested on August 2, 3, 4, and 7, 1989.

August 2, 1989

Time 2:17 PM - 4:12 PM

Run No. 1 Hydrochloric Acid
Run No. 1 Carbon Monoxide
Run No. 1 Total Hydrocarbons

August 3, 1989

Time 11:27 AM - 12:58 PM

Run No. 2 Hydrochloric Acid
Run No. 2 Carbon Monoxide
Run No. 2 Total Hydrocarbons

Time 2:48 PM - 4:16 PM

Run No. 3 Hydrochloric Acid
Run No. 3 Carbon Monoxide
Run No. 3 Total Hydrocarbons

August 4, 1989

Time 11:12 AM - 12:39 PM

Run No. 1 Particulate
Run No. 1 Nitrogen Oxides

Time 2:21 - 3:45 PM

Run No. 2 Particulate
Run No. 2 Nitrogen Oxides

August 7, 1989

Time 12:02 PM - 1:35 PM

Run No. 3 Particulate
Run No. 3 Nitrogen Oxides

SECTION V
SAMPLING PROCEDURES

SAMPLING PROCEDURES:

The Particulate emission tests were conducted in accordance with the sampling and analytical procedures outlined in draft New Jersey Administrative Code 7:27B-5 Air Test Method Five, "Sampling and Analytical Procedures for Determining Emission of Particulates from the Combustion of Waste".

The Total Hydrocarbon emission tests were conducted in accordance with sampling and analytical procedures outlined in New Jersey Administrative Code 7:27B-3 Air Test Method 3 - "Sampling and Analytical Procedures for the Determination of Volatile Organic Substances from Source Operations".

The Nitrogen Oxide emission tests were conducted in accordance with the sampling and analytical procedures outlined in the Code of Federal Regulations - Part 60 - Appendix A, Reference Method 7D - "Determination of Nitrogen Oxide Emission from Stationary Sources - Alkaline - Permanganate/Colorimetric Method".

The Carbon Monoxide emission tests were conducted in accordance with the sampling and analytical procedures outlined in the Code of Federal Regulations - Part 60 - Appendix A - Reference Method 10 "Determination of Carbon Monoxide Emissions from Stationary Sources".

The Hydrochloric Acid emission tests were conducted in accordance with the procedures outlined in the Draft Method entitled "Method for the Determination of HCl Emissions from Municipal and Hazardous Waste Incinerators" (July 1989).

A complete description of the sampling trains, analytical procedures, original field notes and quality assurance procedures are on file with the Bureau of Technical Services.

SECTION VI
SAMPLING LOCATION

SAMPLING LOCATION:

Two 3-inch half couplings with removable seals were installed 90° to each other and located approximately six feet above floor level. The stack diameter, upstream and downstream distances can be seen in the following drawings.

The exact stack measurements, sampling location, breeching size, and preliminary set-up data were obtained by Bureau of Technical Services Personnel.

EXISTING BOILER
HOUSE ROOF

EXISTING BOILER
HOUSE

EXISTING BOILER

10' PAN

HEAT RECOVERY
BOILER
150 H.P. AUX-FIRED

150 H.P.
AUX. BURNER

FL 03

12' 0"

6' 0"

3' 7"

RECOVERING
INSULATION

OIL TANK
FILLING PIER

SECTION VII

INCINERATOR OPERATING CONDITIONS

INCINERATOR OPERATING CONDITIONS:

The Pathological Incinerator (N.J. Stack No. 001) is permitted by the Department of Environmental Protection, Air Pollution Control Program. Permit/Certificate Number 66822 allows the facility to incinerate waste types 0, 1, 2, 3, and 4 at a rate not to exceed 700 pounds per hour.

The following is a compilation of process data monitored by Regional Enforcement Personnel present on each of the test dates.

August 2, 1989

Load No.	Time	Type Waste/No.	Charge Wt. (lbs)	Total Wt. (lbs)
Test Start 1	14:15	3	47	47
14:19 2	14:19	2	52	99
3	14:25	3	68	167
4	14:29	2	56	223
Run No. 1 5	14:33	3	42	265
6	14:38	1	43	308
HCl. CO 7	14:43	1	44	352
8	14:50	2	30	382
and THC 9	14:56	1	44	426
10	14:59	3	40	466
11	15:03	3	39	505
12	15:07	1	41	546
13	15:11	1	24	570
14	15:15	2	45	615
15	15:20	3	60	675
16	15:36	3	58	733
17	15:39	2	41	774
18	15:45	3	76	850
19	15:49	3	54	904
Test Stop 20	15:56	3	50	954
16:12 21	16:05	3	60	1014

The average charge rate during the tests on this date was 553 pounds per hour of all waste.

August 2, 1989

GAS METER READINGS

Start Reading: 3136828 CF Stop Reading: 3137131.5 CF
 Start Time: 14:19 Stop Time: 16:12
 Avg. Natural Gas Burned: 153 Ft³/hr

PATHOLOGICAL INCINERATION TEMPERATURE LOG		
Time	Primary Chamber (°F)	Secondary Chamber (°F)
14:15	1400	1550
14:35	1720	1800
14:46	1800	1850
15:01	1875	1800
15:12	2000	1750
15:23	2100	1800
15:38	2100	1825
15:50	1950	1775
16:03	2150	1900
16:12	2100	1790

Average Primary Chamber Temperature 1919.5 °F.
 Average Secondary Chamber Temperature 1784 °F.

August 3, 1989

Load No.	Time	Type Waste/No.	Charge Wt. (lbs)	Total Wt. (lbs)
Test Start 1	11:24	3	59	59
11:27 2	11:28	2	56	115
3	11:33	2	50	165
Run No. 2 4	11:38	2	63	228
5	11:42	1	36	264
HCL, CO, 6	11:46	3	73	337
7	11:50	1	20	357
and THC 8	11:55	2	66	423
9	12:00	2	86	509
10	12:17	3	59	568
11	12:23	1	26	594
Test Stop 12	12:44	3	62	656
12:58 13	12:52	3	49	705

Average charge rate during these tests was 481 per hour, of all waste.

August 3, 1989

Load No.	Time	Type Waste/No.	Charge Wt. (lbs)	Total Wt. (lbs)
Test Start 14	14:45	2	77	77
14:48 15	14:49	3	72	149
16	14:53	3	61	210
17	14:57	2	47	257
18	15:01	2	80	337
19	15:07	2	72	409
20	15:11	3	66	475
Run No. 3 21	15:18	2	60	535
22	15:23	2	82	617
HCl, CO, 23	15:30	2	54	671
24	15:35	1	24	695
and THC 25	15:41	3	60	755
26	15:46	1	47	802
27	15:50	3	34	836
28	15:53	2	60	896
29	15:56	3	59	935
30	16:03	2	60	1015
Test Stop 31	16:13	2	48	1063
16:16 32	16:16	3	75	1138

The average charge rate during these tests was 750 Pounds per hour of all waste types.

August 3, 1989

GAS METER READINGS

AM Tests

Start Reading: 3139189 CF	Stop Reading: 3139402 CF
Start Time: 11:24	Stop Time: 12:55
Avg. Natural Gas Burned: 140 Ft ³ /Hr	

August 3, 1989

GAS METER READINGS

PM Tests

Start Reading: 3140444 CF	Stop Reading: 3140660 CF
Start Time: 14:45	Stop Time: 16:22
Avg. Natural Gas Burned: 133 Ft ³ /Hr	

PATHOLOGICAL INCINERATION
TEMPERATURE LOG

Time	Primary Chamber (°F)	Secondary Chamber (°F)
11:25	2100	1800
11:36	2050	1840
11:45	2030	1800
11:56	2060	1880
12:05	2100	1820
12:19	2040	1760
12:29	2160	1770
12:45	2080	1730
12:55	2090	1800
14:50	1700	1700
15:02	1800	1770
15:18	2020	1800
15:29	2050	1750
15:42	2050	1820
15:50	2040	1800
16:00	2080	1760
16:11	2050	1860
16:21	2050	1800

Average Primary Chamber Temperature - 2031 °F.
Average Secondary Chamber Temperature - 1792 °F.

August 4, 1989

Load No.		Time	Type Waste/No.	Charge Wt. (lbs)	Total Wt. (lbs)
Test Start	1	11:00	3	88	88
11:12	2	11:03	2	75	163
	3	11:08	2	65	228
Run No. 1	4	11:11	3	76	304
	5	11:19	2	50	354
Particulate	6	11:23	1	98	452
	7	11:32	2	62	514
and NO _x	8	12:00	2	47	561
	9	12:10	2	73	634
	10	12:12	2	62	696
Test Stop	11	12:18	2	72	768
12:39	12	12:35	1	31	799
	13		2	71	870
	14		2	55	925
The average charge rate during these tests was 638 pounds per hour of all waste.					
	15	14:12	2	64	84
	16	14:15	3	68	152
Test Start	17	14:20	3	69	241
14:21	18	14:25	2	69	310
Run No. 2	19	14:30	3	74	404
	20	14:38	2	64	468
Particulate	21	14:43	2	74	562
	22	14:50	2	55	617
and NO _x	23	14:56	1	20	637
	24	15:04	3	46	683
Test Stop	25	15:25	2	73	756
15:45	26	15:37	2	68	824

The average charge rate during these tests was 575 pounds per hour of all waste.

August 4, 1989

GAS METER READINGS

AM Tests

Avg. Natural Gas Burned: 123 Ft³/Hr

GAS METER READINGS

PM Tests

Start Test: 3143752
Start Time: 14:10

Stop Test: 3143937
Stop Time: 15:48

Avg. Natural Gas Burned: 113.3 Ft³/Hr

PATHOLOGICAL INCINERATION
TEMPERATURE LOG

Time	Primary Chamber (°F)	Secondary Chamber (°F)
10:53	1680	1680
11:07	1700	1750
11:19	1950	1800
11:30	2000	1800
12:14	2050	1700
12:29	2050	1800
12:45	2050	1550
14:10	1860	1750
14:20	2020	1750
14:32	1950	1800
14:42	2080	2000
14:52	2050	1830
15:05	2100	1760
15:26	2100	1760
15:39	2050	1750
15:47	2050	1800

Average Primary Chamber Temperature: 1984 °F

Average Secondary Chamber Temperature: 1768 °F

August 7, 1989

Load No.	Time	Type Waste/No.	Charge Wt. (lbs)	Total Wt.
1	11:40	2	83	83
2	11:42	2	73	156
3	11:45	2	84	240
4	11:49	3	35	275
5	11:55	3	65	340
Test Start 6	12:01	2	67	407
12:02 7	12:13	1	16	423
8	12:16	3	80	503
Run No. 3 9	12:19	3	69	572
10	12:28	3	71	643
Partic. 11	12:30	2	62	705
12	12:37	2	106	811
and NO _x 13	12:52	3	54	865
14	13:00	2	71	936
Test Stop 15	13:07	1	21	957
1335 16	13:30	2	40	997

Average charge rate during these tests was 643 pounds per hour of all waste.

August 7, 1989

GAS METER READINGS

Start Test: 3150521 CF
Start Time: 11:41

Stop Test: 3150988 CF
Stop Time: 13:50

Avg. Natural Gas Burned: 217 Ft³/Hr

PATHOLOGICAL INCINERATION
TEMPERATURE LOG

Time	Primary Chamber (°F)	Secondary Chamber (°F)
11:41	1250	1550
12:00	1650	1800
12:15	1850	1800
12:30	1800	1800
12:50	1750	1720
13:01	1900	1760
13:28	1650	1700
13:50	1550	1620

Average Primary Chamber Temperature: 1675 °F

Average Secondary Chamber Temperature: 1719 °F

SECTION VIII
EMISSION TEST RESULTS

TEST RESULTS:

PARTICULATE

RUN	DATE	ACTUAL EMISSIONS			ALLOWABLE EMISSIONS
		GR/DSCF * @ 12% CO ₂	GR/DSCF ** @ 7% O ₂	LBS/HR	GR/DSCF @ 12% CO ₂
1	08-04-89	0.17	0.16	0.95	0.10
2	08-04-89	0.19	0.17	0.97	0.10
3	08-07-89	0.19	0.17	0.76	0.10

The above allowable GR/DSCF @ 12% CO₂ is based upon the standards stated on Permit/Certificate Number 66822, as filed under New Jersey Administrative Code 7:27-8 "Permits". The allowable standards are also prescribed by New Jersey Administrative Code 7:27-11 "Incinerators".

* GR/DSCF at 12% CO₂ minus the CO₂ from the auxillary fuel (front half collect and back half collect).

** GR/DSCF at 7% O₂ (front half collect only).

HYDROCHLORIC ACID

RUN	DATE	ACTUAL EMISSIONS		
		PPMVD	PPMVD @ 7% O ₂	LBS/HR
1	08-02-89	461	1898	3.45
2	08-03-89	489	856	3.67
3	08-03-89	409	842	2.45

Note: Hydrochloric Acid is not listed as an air contaminant on Permit/Certificate Number 66822, as filed under New Jersey Administrative Code 7:27-8.

NITROGEN OXIDE

RUN	DATE	ACTUAL EMISSIONS		
		PPMVD	PPMVD @ 7% O ₂	LBS/HR
1	08-04-89	90.3	180.6	0.88
2	08-04-89	72.5	158.6	0.73
3	08-05-89	58.5	146.3	0.56

Note: Nitrogen Oxides are not listed as an air contaminant on Permit/Certificate Number 66822, as filed under New Jersey Administrative Code 7:27-8.

CARBON MONOXIDE

RUN	DATE	ACTUAL EMISSIONS		
		PPMVD	PPMVD @ 7% O ₂	LBS/HR
1	08-02-89	13.3	54.8	0.08
2	08-03-89	41.0	71.8	0.24
3	08-03-89	28.0	57.7	0.13

Note: Carbon Monoxide is not listed as an air contaminant on Permit/Certificate Number 66822, as filed under New Jersey Administrative Code 7:27-8.

TOTAL HYDROCARBONS

RUN	DATE	ACTUAL EMISSIONS		
		PPMVD	PPMVD @ 7% O ₂	LBS/HR
1	08-02-89	14.6	60.1	0.05
2	08-03-89	16.3	28.5	0.05
3	08-03-89	15.3	31.5	0.04

Note : Total Hydrocarbons are not listed as an air contaminant on Permit/Certificate Number 66822, as filed under New Jersey Administrative Code 7:27-8.

SECTION IX
CONCLUSIONS

CONCLUSION:

The test results indicated that the Particulate emission rates from the Pathological Incinerator exceeded the standards stated on Permit/Certificate No. 66822, as filed under New Jersey Administrative Code 7:27-8 "Permits" and the standards prescribed by New Jersey Administrative Code 7:27-11 "Incinerators", during all test runs.

The tests results also indicated that Hydrochloric Acid, Nitrogen Oxide and Hydrocarbons are being emitted into the atmosphere and are not listed as air contaminants on Permit/Certificate Number 66822, as filed under New Jersey Administrative Code 7:27-8 "Permits".

Stack Emissions Test Report
Prepared by:


Leonard S. Sobolewski
Supervising Environmental
Compliance Investigator
November 28, 1989

SECTION X

EMISSION TEST DATA SHEETS:

BURLINGTON COUNTY MEMORIAL HOSPITAL
 APC PLANT ID NO.:045043
 PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

HCL	RUN NO:1		TEST DATE: 08-02-89	
POINT	DELTA P (IN H2O)	DELTA H (IN H2O)	STACK TEMP (DEGREES F)	METER TEMP (DEGREES F)
A- 1	0.052	0.06	1330	97.0
A- 2	0.050	0.06	1329	97.5
A- 3	0.061	0.07	1344	97.5
A- 4	0.061	0.07	1362	97.5
A- 5	0.052	0.06	1334	97.5
A- 6	0.046	0.05	1390	98.0
A- 7	0.041	0.05	1366	98.0
A- 8	0.039	0.05	1320	98.0
A- 9	0.044	0.05	1200	98.5
A-10	0.035	0.04	630	98.5
A-11	0.028	0.03	545	98.5
A-12	0.019	0.02	545	99.0
B- 1	0.028	0.03	1380	99.0
B- 2	0.028	0.03	1375	98.0
B- 3	0.028	0.03	1340	98.0
B- 4	0.030	0.03	1352	98.5
B- 5	0.033	0.04	1384	98.5
B- 6	0.039	0.04	1391	99.0
B- 7	0.052	0.06	1371	99.0
B- 8	0.058	0.07	1362	99.5
B- 9	0.049	0.06	1078	100.0
B-10	0.036	0.04	573	100.5
B-11	0.025	0.02	573	100.5
B-12	0.026	0.03	573	100.5
AVGS.=	0.039	0.05	1144	98.6

BURLINGTON COUNTY MEMORIAL HOSPITAL
APC PLANT ID NO.:045043
PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

HCL

RUN NO:1

TEST DATE: 08-02-89

METER VOL= 9.339 (DACF)
Y-FACTOR= 1.01
NOZZLE DIAM.= .500 (INCHES)
H2O(COLLECTED)= 29.0 (mls)

Pb= 30.14 (IN. Hg)
Pst= -0.55 (IN. H2O)
Cp= .8230
TEST TIME= 72 (MIN.)

ORSAT-CO2= 2.80 %
O2= 17.60 %
CO= 0.00 %
N2= 79.60 %

STACK DIAM= 27.0 (INCHES)

STACK AREA= 3.98 (SQ. FT.)

Ps= 30.10 (IN. Hg)
METER VOL= 8.927 (DSCF)
Gd= 0.96

Pm= 30.14 (IN. Hg)
Ms= 27.68
ISOKINETICS= 27.30 %

MOISTURE= 13.32 %
Us= 19.26 (FT/SEC)

ACFM= 4,595.6
WSCFM= 1,528.0
DSCFM= 1,324.5

CONCENTRATION- HCL= 461 (PPM-DRY)
EMISSION RATE- HCL= 3.45 (LB/HR)

ADDITIONAL TESTS USING FLOW DATA FROM HCL RUN:1

CONCENTRATION-HYDROCARBONS AS METHANE= 14.6 (PPM-DRY)
EMISSION RATE-HYDROCARBONS AS METHANE= 0.0481 (LB/HR)

CONCENTRATION- CO= 13.3 (PPM-DRY)
EMISSION RATE- CO= 0.08 (LB/HR)

BURLINGTON COUNTY MEMORIAL HOSPITAL
 APC PLANT ID NO.:045043
 PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

HCL	RUN NO:2		TEST DATE: 08-03-89	
POINT	DELTA P (IN H2O)	DELTA H (IN H2O)	STACK TEMP (DEGREES F)	METER TEMP (DEGREES F)
A- 1	0.034	0.52	1280	93.0
A- 2	0.034	0.52	1304	94.0
A- 3	0.035	0.53	1313	94.0
A- 4	0.035	0.53	1297	94.0
A- 5	0.040	0.61	1337	94.0
A- 6	0.042	0.64	1332	95.0
A- 7	0.060	0.91	1259	96.0
A- 8	0.064	0.97	1306	96.0
A- 9	0.055	0.83	1050	96.0
A-10	0.035	0.53	650	96.0
A-11	0.022	0.33	600	97.0
A-12	0.027	0.41	600	97.0
B- 1	0.031	0.47	1327	96.5
B- 2	0.040	0.61	1361	97.0
B- 3	0.049	0.74	1344	96.0
B- 4	0.052	0.79	1365	96.0
B- 5	0.045	0.68	1357	96.0
B- 6	0.037	0.56	1350	96.0
B- 7	0.030	0.46	1289	96.0
B- 8	0.030	0.46	1275	96.0
B- 9	0.039	0.59	1037	96.0
B-10	0.042	0.64	1040	96.0
B-11	0.033	0.45	1040	96.0
B-12	0.020	0.30	1040	96.0
AVGS. =	0.038	0.59	1173	95.6

BURLINGTON COUNTY MEMORIAL HOSPITAL
APC PLANT ID NO.:045043
PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

HCL

RUN NO:2

TEST DATE: 08-03-89

METER VOL= 31.223 (DACF)	Pb= 30.00 (IN. Hg)	ORSAT-CO2= 6.80 %
Y-FACTOR= 1.01	Pst= -0.55 (IN. H2O)	O2= 13.00 %
NOZZLE DIAM.= .500 (INCHES)	Cp= .8230	CO= 0.00 %
H2O(COLLECTED)= 67.3 (mls)	TEST TIME= 72 (MIN.)	N2= 80.20 %

STACK DIAM= 27.0 (INCHES) STACK AREA= 3.98 (SQ. FT.)

Ps= 29.96 (IN. Hg)	Pm= 30.04 (IN. Hg)	MOISTURE= 9.62 %
METER VOL= 29.904 (DSCF)	Ms= 28.50	Us= 18.95 (FT/SEC)
Gd= 0.98	ISOKINETICS= 91.21 %	

ACFM= 4,520.9
WSCFM= 1,469.2
DSCFM= 1,327.9

CONCENTRATION- HCL= 489 (PPM-DRY)
EMISSION RATE- HCL= 3.67 (LB/HR)

ADDITIONAL TESTS USING FLOW DATA FROM HCL RUN:2

CONCENTRATION-HYDROCARBONS AS METHANE= 16.3 (PPM-DRY)
EMISSION RATE-HYDROCARBONS AS METHANE= 0.0539 (LB/HR)

CONCENTRATION- CO= 41 (PPM-DRY)
EMISSION RATE- CO= 0.24 (LB/HR)

BURLINGTON COUNTY MEMORIAL HOSPITAL
 APC PLANT ID NO.:045043
 PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

HCL	RUN NO:3		TEST DATE: 08-03-89	
POINT	DELTA P (IN H2O)	DELTA H (IN H2O)	STACK TEMP (DEGREES F)	METER TEMP (DEGREES F)
A- 1	0.017	0.26	1340	99.5
A- 2	0.038	0.55	1369	101.5
A- 3	0.043	0.65	1376	103.0
A- 4	0.042	0.64	1383	103.5
A- 5	0.038	0.58	1382	104.0
A- 6	0.034	0.52	1386	104.5
A- 7	0.028	0.42	1390	105.0
A- 8	0.034	0.52	1369	105.0
A- 9	0.030	0.45	1153	105.0
A-10	0.027	0.41	730	105.0
A-11	0.014	0.21	730	105.0
A-12	0.008	0.12	730	105.0
B- 1	0.014	0.21	1385	101.5
B- 2	0.018	0.27	1383	102.0
B- 3	0.019	0.29	1377	102.0
B- 4	0.019	0.29	1400	103.0
B- 5	0.018	0.27	1381	103.0
B- 6	0.023	0.35	1378	104.5
B- 7	0.035	0.53	1390	105.0
B- 8	0.040	0.61	1324	105.5
B- 9	0.031	0.47	815	105.5
B-10	0.012	0.18	543	106.0
B-11	0.016	0.24	543	106.0
B-12	0.013	0.20	543	106.0
AVGS. =	0.024	0.39	1158	104.0

BURLINGTON COUNTY MEMORIAL HOSPITAL
APC PLANT ID NO.:045043
PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

HCL

RUN NO:3

TEST DATE: 08-03-89

METER VOL= 26.563 (DA CF)
Y-FACTOR= 1.01
NOZZLE DIAM.= .500 (INCHES)
H2O(COLLECTED)= 63.3 (mls)

Pb= 30.00 (IN. Hg)
Pst= -0.55 (IN. H2O)
Cp= .8230
TEST TIME= 72 (MIN.)

ORSAT-CO2= 5.60 %
O2= 14.20 %
CO= 0.00 %
N2= 80.20 %

STACK DIAM= 27.0 (INCHES)

STACK AREA= 3.98 (SQ. FT.)

Ps= 29.96 (IN. Hg)
METER VOL= 25.052 (DSCF)
Gd= 0.98

Pm= 30.03 (IN. Hg)
Ms= 28.25
ISOKINETICS= 95.89 %

MOISTURE= 10.67 %
Us= 15.14 (FT/SEC)

ACFM= 3,612.1
WSCFM= 1,184.5
DSCFM= 1,058.1

CONCENTRATION- HCL= 409 (PPM-DRY)
EMISSION RATE- HCL= 2.45 (LB/HR)

ADDITIONAL TESTS USING FLOW DATA FROM HCL RUN:3

CONCENTRATION-HYDROCARBONS AS METHANE= 15.3 (PPM-DRY)
EMISSION RATE-HYDROCARBONS AS METHANE= 0.0403 (LB/HR)

CONCENTRATION- CO= 28 (PPM-DRY)
EMISSION RATE- CO= 0.13 (LB/HR)

BURLINGTON COUNTY MEMORIAL HOSPITAL
APC PLANT ID NO.:045043
PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

PARTICULATE		RUN NO:1	TEST DATE: 08-04-89	
POINT	DELTA P (IN H2O)	DELTA H (IN H2O)	STACK TEMP (DEGREES F)	METER TEMP (DEGREES F)
A- 1	0.038	0.62	1292	100.0
A- 2	0.040	0.65	1265	101.0
A- 3	0.040	0.65	1288	101.5
A- 4	0.039	0.64	1299	103.0
A- 5	0.039	0.64	1290	104.0
A- 6	0.043	0.70	1275	104.5
A- 7	0.053	0.86	1309	106.0
A- 8	0.060	0.98	1225	106.5
A- 9	0.046	0.75	1050	107.0
A-10	0.032	0.52	1000	107.5
A-11	0.021	0.34	1000	108.0
A-12	0.023	0.37	1000	108.0
B- 1	0.034	0.55	1360	106.0
B- 2	0.062	1.01	1356	106.5
B- 3	0.069	1.12	1362	107.5
B- 4	0.068	1.11	1340	108.0
B- 5	0.062	1.01	1355	109.0
B- 6	0.054	0.88	1372	109.5
B- 7	0.049	0.80	1350	110.0
B- 8	0.050	0.82	1363	111.0
B- 9	0.051	0.83	1256	111.5
B-10	0.043	0.70	1270	111.5
B-11	0.033	0.54	1270	112.0
B-12	0.020	0.33	1270	112.0
AVGS. =	0.043	0.73	1259	107.1

BURLINGTON COUNTY MEMORIAL HOSPITAL
APC PLANT ID NO.:045043
PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

PARTICULATE

RUN NO:1

TEST DATE: 08-04-89

METER VOL= 36.354 (DACF)
Y-FACTOR= 1.01
NOZZLE DIAM.= .500 (INCHES)
H2O(COLLECTED)= 88.9 (mls)

Pb= 29.92 (IN. Hg)
Pst= -0.55 (IN. H2O)
Cp= .8230
TEST TIME= 72 (MIN.)

ORSAT-CO2= 6.00 %
O2= 14.00 %
CO= 0.00 %
N2= 80.00 %

STACK DIAM= 27.0 (INCHES)

STACK AREA= 3.98 (SQ. FT.)

Ps= 29.88 (IN. Hg)
METER VOL= 34.033 (DSCF)
Gd= 0.98

Pm= 29.97 (IN. Hg)
Ms= 28.26
ISOKINETICS= 100.94 %

MOISTURE= 11.00 %
Us= 20.89 (FT/SEC)

ACFM= 4,982.9
WSCFM= 1,534.2
DSCFM= 1,365.5

SAMPLE WT= .1797 (GRAMS)
GRAINS/DSCF= 0.0815 (Total) .0812 (feet half)
GRAINS/WSCF= 0.0725
GRAINS/DSCF @ 12% CO2(MINUS AUX FUEL)= 0.1677
GRAMS/DSCM @ 12% CO2(MINUS AUX FUEL)= 0.3837

GRAMS/DSCM= 0.1864
GRAMS/WSCM= 0.1659

PARTICULATE EMISSION RATE= 0.9536 (LB/HR)
0.7504 (feet half)

ADDITIONAL TESTS USING FLOW DATA FROM PARTICULATE RUN:1

CONCENTRATION- NOx 90.3 (PPM-DRY)
EMISSION RATE- NOx 0.88 (LB/HR)

BURLINGTON COUNTY MEMORIAL HOSIPTAL
 APC PLANT ID NO.:045043
 PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

PARTICULATE		RUN NO:2	TEST DATE: 08-04-89	
POINT	DELTA P (IN H2O)	DELTA H (IN H2O)	STACK TEMP (DEGREES F)	METER TEMP (DEGREES F)
A- 1	0.042	0.68	1240	107.0
A- 2	0.044	0.72	1242	108.0
A- 3	0.045	0.73	1257	109.5
A- 4	0.043	0.70	1237	110.5
A- 5	0.044	0.72	1279	111.0
A- 6	0.047	0.77	1265	111.5
A- 7	0.063	1.03	1299	112.9
A- 8	0.061	0.99	1084	113.5
A- 9	0.048	0.78	822	114.0
A-10	0.040	0.65	882	114.5
A-11	0.024	0.39	882	114.5
A-12	0.013	0.21	882	114.5
B- 1	0.032	0.51	1302	111.0
B- 2	0.052	0.83	1303	111.5
B- 3	0.061	0.98	1323	112.0
B- 4	0.059	0.95	1326	112.5
B- 5	0.055	0.88	1371	113.5
B- 6	0.047	0.75	1330	114.0
B- 7	0.043	0.69	1271	114.0
B- 8	0.044	0.71	1251	114.0
B- 9	0.040	0.64	1282	114.5
B-10	0.042	0.67	917	114.5
B-11	0.030	0.48	917	114.5
B-12	0.013	0.21	917	114.5
AVGS. =	0.042	0.69	1162	112.6

BURLINGTON COUNTY MEMORIAL HOSIPTAL
APC PLANT ID NO.:045043
PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

PARTICULATE

RUN NO:2

TEST DATE: 08-04-89

METER VOL= 36.297 (DACF)
Y-FACTOR= 1.01
NOZZLE DIAM.= .498 (INCHES)
H2O(COLLECTED)= 70.9 (mls)

Pb= 29.92 (IN. Hg)
Pst= -0.55 (IN. H2O)
Cp= .8270
TEST TIME= 72 (MIN.)

ORSAT-CO2= 5.20 %
O2= 14.60 %
CO= 0.00 %
N2= 80.20 %

STACK DIAM= 27.0 (INCHES)

STACK AREA= 3.98 (SQ. FT.)

Ps= 29.88 (IN. Hg)
METER VOL= 33.653 (DSCF)
Gd= 0.98

Pm= 29.97 (IN. Hg)
Ms= 28.39
ISOKINETICS= 97.03 %

MOISTURE= 9.06 %
Us= 20.00 (FT/SEC)

ACFM= 4,771.9
WSCFM= 1,557.2
DSCFM= 1,416.1

SAMPLE WT= .1743 (GRAMS)

GRAINS/DSCF= 0.0799 (Total) .0782 (femt half)

GRAINS/WSCF= 0.0727

GRAINS/DSCF @ 12% CO2(MINUS AUX FUEL)= 0.1899

GRAMS/DSCM @ 12% CO2(MINUS AUX FUEL)= 0.4346

GRAMS/DSCM= 0.1828
GRAMS/WSCM= 0.1663

PARTICULATE EMISSION RATE= ~~0.9700~~ (LB/HR)
0.9492

ADDITIONAL TESTS USING FLOW DATA FROM PARTICULATE RUN:2

CONCENTRATION- NOx 72.5 (PPM-DRY)
EMISSION RATE- NOx 0.73 (LB/HR)

BURLINGTON COUNTY MEMORIAL HOSPITAL
 APC PLANT ID NO.:045043
 PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

PARTICULATE		RUN NO:3	TEST DATE: 08-07-89	
POINT	DELTA P (IN H2O)	DELTA H (IN H2O)	STACK TEMP (DEGREES F)	METER TEMP (DEGREES F)
A- 1	0.032	0.52	1225	94.0
A- 2	0.031	0.50	1194	94.5
A- 3	0.031	0.50	1224	94.5
A- 4	0.030	0.49	1221	96.0
A- 5	0.032	0.52	1240	96.5
A- 6	0.036	0.59	1262	97.0
A- 7	0.036	0.59	1237	98.5
A- 8	0.041	0.67	1080	99.0
A- 9	0.034	0.55	859	99.5
A-10	0.023	0.37	859	99.5
A-11	0.024	0.39	859	99.5
A-12	0.037	0.60	859	100.5
B- 1	0.047	0.77	1260	96.5
B- 2	0.056	0.91	1288	97.5
B- 3	0.062	1.01	1289	98.0
B- 4	0.062	1.01	1285	99.0
B- 5	0.059	0.96	1295	100.0
B- 6	0.050	0.81	1308	100.0
B- 7	0.047	0.77	1278	100.5
B- 8	0.045	0.73	1238	100.5
B- 9	0.046	0.75	1100	100.5
B-10	0.037	0.60	1100	101.5
B-11	0.028	0.46	1100	101.5
B-12	0.019	0.31	1100	101.5
AVGS.=	0.038	0.64	1157	98.6

BURLINGTON COUNTY MEMORIAL HOSPITAL
APC PLANT ID NO.:045043
PATHOLOGICAL INCINERATOR N.J. STACK NO: 001

PARTICULATE

RUN NO:3

TEST DATE: 08-07-89

METER VOL= 34.097 (DACF)
Y-FACTOR= 1.01
NOZZLE DIAM.= .500 (INCHES)
H2O(COLLECTED)= 80.3 (mls)

Pb= 29.80 (IN. Hg)
Pst= -0.55 (IN. H2O)
Cp= .8230
TEST TIME= 72 (MIN.)

ORSAT-CO2= 4.60 %
O2= 15.40 %
CO= 0.00 %
N2= 80.00 %

STACK DIAM= 27.0 (INCHES)

STACK AREA= 3.98 (SQ. FT.)

Ps= 29.76 (IN. Hg)
METER VOL= 32.273 (DSCF)
Gd= 0.97

Pm= 29.85 (IN. Hg)
Ms= 28.17
ISOKINETICS= 98.15 %

MOISTURE= 10.53 %
Us= 19.13 (FT/SEC)

ACFM= 4,564.6
WSCFM= 1,488.4
DSCFM= 1,331.7

SAMPLE WT= .1395 (GRAMS)
GRAINS/DSCF= 0.0667 (total) .0661 (front half)
GRAINS/WSCF= 0.0597
GRAINS/DSCF @ 12% CO2(MINUS AUX FUEL)= 0.1865
GRAMS/DSCM @ 12% CO2(MINUS AUX FUEL)= 0.4267

GRAMS/DSCM= 0.1526
GRAMS/WSCM= 0.1365

PARTICULATE EMISSION RATE= 0.7613 (LB/HR)
.7545 (front half)

ADDITIONAL TESTS USING FLOW DATA FROM PARTICULATE RUN:3

CONCENTRATION- NOx= 58.5 (PPM-DRY)
EMISSION RATE- NOx= 0.56 (LB/HR)

SECTION XI
LABORATORY RESULTS



Anthony J. McMahon
Acting Director

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
380 Scotch Road
CN 411
Trenton, N.J. 08625-0411
(609) 530-4100

Eric Rau, Ph.D., Assistant Director
Laboratories and Quality Assurance

MEMORANDUM

TO: Edward Choromanski, Chief
Bureau of Technical Services

FROM: Henry Smith, Supervisor,
Source Compliance Laboratory

SUBJECT: Burlington County Memorial Hospital Incinerator
Tests.

DATE: September 26, 1989

I have enclosed laboratory results on particulate matter, Nitrogen Dioxide, Hydrogen Chloride and Carbon Monoxide runs.

Please see Bob Reinowski, Bureau of Organic Analytical Services (BOAS), Quality Assurance Officer, for Compliance sample results.

HS:kaz

c: Jay Quimby
Leonard Sobolewski

Source Test

NJ Department of Environmental Protection

HCL, Orsat Analyses

Summary

Company: Burlington County Memorial Hospital ID Number: 045043
Location: Mt. Holly Date Received: 8-7-89
N.J. Stack Number: 001 Report Date: 8-27-89
Stack Designation: Incinerator Number of Test Runs: 3
Applicable Subchapter: 11 results on dry
basis

Hydrochloric Acid

<u>Field Date</u>	<u>Run 1</u>	<u>Run 2</u>	<u>Run 3</u>
Barometric Pressure (Hg")	30.140	30.000	30.500
Avg. Meter Pressure (H ₂ O")	0.050	0.586	0.376
Meter Volume (ft ³)	9.340	31.220	26.560
Avg. Meter Temp. (°F)	98.600	95.600	104.00

<u>Analytical Date</u>	<u>Run 1</u>	<u>Run 2</u>	<u>Run 3</u>
Total volume of sample (ml)	1000	1000	1000
Aliquot of sample (ml)	10	10	10
Volume of prepared sample (ml)	250	250	250
Sample response (Pk. Hgt.)	16078	58837	42275

Slope. = 0.0004

Y-Intercept = 0.4138

Correlation Coeff. = 0.9953

Results

	<u>Run 1</u>	<u>Run 2</u>	<u>Run 3</u>
Sample Conc., HCL (ppm)	461	489	409
<u>Orsat</u>			
CO ₂	2.8	6.8	5.6
O ₂ %	17.6	13.0	14.2
CO%	0.0	0.0	0.0
N ₂ %	79.6	80.2	80.2
Drierite, Water (gm)	5.0	9.3	6.3

HS:kaz

c: Jay Quimby

Leonard Sobolewski

Source Test

NJ Department of Environmental Protection

NO₂, CO Analyses

Summary

Company: Burlington County Memorial Hospital	I.D. Number: 045043
Location: Mt. Holly	Date Received: 8-17-89
N.J. Stack Number: 001	Report Date: 8-27-89
Stack Designation: Incinerator	Number of Test Runs: 3
Applicable Subchapter: 11	NO ₂ results on dry basis

Nitrogen Dioxide

<u>Field Data</u>	<u>Run 1</u>	<u>Run 2</u>	<u>Run 3</u>
Barometric Pressure (Hg")	29.920	29.920	29.800
Avg. Meter Pressure (H ₂ O)	1.200	1.200	1.200
Meter Volume (Liters)	24.490	25.100	25.261
Avg. Meter Temp. (°F)	107.800	113.600	98.700

<u>Analytical Data</u>	<u>Run 1</u>	<u>Run 2</u>	<u>Run 3</u>
Total Volume of KMNO ₄ /NAOH solution (ml)	1000	1000	1000
Aliquot of KMNO ₄ /NAOH solution (ml)	50	50	50
Volume of prepared sample (ml)	250	250	250

Sample Response (Pk. Hgt.) 439 353 289

Slope = 0.0017

Y-Intercept = 0.0430

Correlation Coeff. = 0.9992

Results

	<u>EPA Conc.</u>	<u>Measured conc.</u>
NO ₂ Audit Sample, Difference	620 mg	613.53 mg
from EPA Value = 1.04%	DSCM	DSCM

	<u>Run 1</u>	<u>Run 2</u>	<u>Run 3</u>
Sample Conc., NO ₂ (ppm)	90.3	72.5	58.5

Carbon Monoxide

Instrumentation: Beckman
NDIR analyzer

Calibration: 0-100 ppm
range spanned with
81 ppm CO

	<u>Run 1</u>	<u>Run 2</u>	<u>Run 3</u>
Sample Conc., CO (ppm)	13.3	41.0	28.0

HS:kaz

c: Jay Quimby

Leonard Sobolewski

SOURCE TEST
N.J. DEPT ENV PROT
PARTICULATE ANALYSIS
SUMMARY

COMPANY: BURLINGTON COUNTY MEMORIAL HOSPITAL ID # 45043
LOCATION MT. HOLLY
NJ#: 2001
STACK DES: INCINERATOR
APPLIABLE SUBCHAPTER: 11
DATE REC: 8/7/89
REP DATE: 10/6/89
TEST RUNS: 3
RESULTS ON DRY BASIS

DATA

		RUN 1	RUN 2	RUN 3
part filter	gm	0.0992	0.0779	0.0754
part acetone	gm	0.0799	0.0926	0.0629
water desc	gm	10.9000	7.9000	11.3000
acetone blk	gm	0.0000	0.0000	0.0000
init. imp vol	ml	0.0000	0.0000	0.0000
final imp vol	ml	0.0000	0.0000	0.0000
acetone vol	ml	250.0000	340.0000	295.0000
blank vol	ml	100.0000	100.0000	100.0000
imp part	gm	0.0001	0.0004	0.0000
org part	gm	0.0004	0.0031	0.0008
inorg resd	gm	0.0001	0.0003	0.0004

RESULTS

acetone resd	gm	0.0000	0.0000	0.0000
adj part acet	gm	0.0799	0.0926	0.0629
total part	gm	0.1797	0.1743	0.1393
total water	gm	10.9000	7.9000	11.3000

ORSAT RESULTS

%CO2	6.0000	5.2000	4.6000
%O2	14.0000	14.6000	15.4000
%CO	0.0000	0.0000	0.0000
%N2	80.0000	80.2000	80.0000

SIGNATURE

Henry Smith

Let's protect ourselves



Anthony J. McMahon
Acting Director

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
380 Scotch Road
CN 411
Trenton, N.J. 08625-0411
(609) 530-4100

Eric Rau, Ph.D., Assistant Director
Laboratories and Quality Assurance

MEMORANDUM

TO: Bob Reinowski, Quality Assurance Officer
Bureau of Organic Analytical Services

FROM: Henry Smith, Supervisor
Source Compliance Laboratory

SUBJECT: Burlington County Memorial Hospital, NO_x
Compliance Sample.

Results: B03618

Total ug of NO₂ = 1987.5

Mg/DSCM = 993.7

HS:kaz