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USAFOEHL REPORT

88-098EQ0159GEF

SOURCE EMISSION TESTING OF HOSPITAL AND CLASSIFIED WASTE INCINERATORS, PLATTSBURGH AFB NY

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July 1988

Final Report

USAF Occupational and Environmental Health Laboratory
Human Systems Division (AFSC)
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At the request of HQ SAC/SGPB, source emission testing for particulates and hydrogen chloride emissions was conducted on the USAF Hospital pathological incinerator at Plattsburgh AFB NY by the Air Quality Function of the USAF Occupational and Environmental Health Laboratory. This survey was requested to evaluate emissions with respect to proposed New York State Standard for medical care facility-waste incinerators. The 380 BMW/MSS classified waste incinerator was also tested because of concerns that similar emissions could be produced from this unit.

Results indicate that the hospital incinerator did not meet the present air emission standards or proposed standards with the exception of hydrogen chloride (HCl) emissions. The classified waste incinerator met both standards with respect to visible emissions but did not meet the standards for particulate emissions. Although not required by present or proposed regulations, the classified waste incinerator was evaluated for HCl emissions; results indicate that this unit met the proposed HCl emissions standards for infectious

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Item 19 Continued

waste incinerators. Since only one sample run of the three required by testing methods could be accomplished on the classified waste unit, results should only be used as an indicator of performance and not as definite evidence of either meeting or failing to meet regulations.

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I. INTRODUCTION

On 6-10 Dec 87, source emission testing for particulate and hydrogen chloride (HCl) emissions was conducted on the USAF Hospital pathological incinerator at Plattsburgh AFB by the Air Quality Function of the USAF Occupational and Environmental Health Laboratory (USAFOEHL). This survey was requested by HQ SAC/SGPB to evaluate emissions with respect to proposed New York State interim standards for medical care facility-waste incinerators. The 380 BMW/MSS classified waste incinerator was also tested because of concerns that similar emissions could be produced from this unit. Personnel involved with on-site testing are listed in Appendix A.

II. DISCUSSION

A. Background

There has been a growing concern by the New York State Department of Environmental Conservation (NYSDEC) concerning the environmental impact of hospital waste disposal including transportation, storage and disposal. Even though the primary concern with this waste material has been related to the infectious fraction, interest is now being focused on the incineration aspects of disposal. It is not the infectious material that is of primary concern during incineration, but the increasing amounts of disposable plastics found in the wastes. Many of the plastics are chlorinated and, when incinerated, produce emissions containing hydrochloric acid and possibly traces of chlorinated organic compounds.

Current state air regulations did not address toxic emissions at the time of their adoption but only dealt with particulates and opacity. At the time of this survey, an in-house test program was being considered by the state to characterize the emissions from selected medical care-waste incinerators and evaluate the risk from the emission constituents. The resulting technical data gathered by the state would be used to revise current air laws with regards to toxic emissions. Due to the time needed to develop adequate emission data and the inadequacy of the present regulations, the state deemed it necessary to promulgate interim guidance which would apply to new or modified units for which applications for permits to construct are received on or after 15 Oct 1986. The interim guidelines would not affect present units. The guidelines would be voluntary; however, the final regulations would be at least as stringent as the interim guidance.

B. Site Description

1. The hospital pathological waste incinerator is located in a separate building near the hospital. This facility is pictured in Figure 1. The incinerator is manufactured by Spronze Incinerator Corporation (Model RL-20 HDP) and has the following operational parameters:

a. Designed for Type 4 waste (human and animal solid refuse consisting of carcasses and organs from hospitals, laboratories, slaughterhouses).

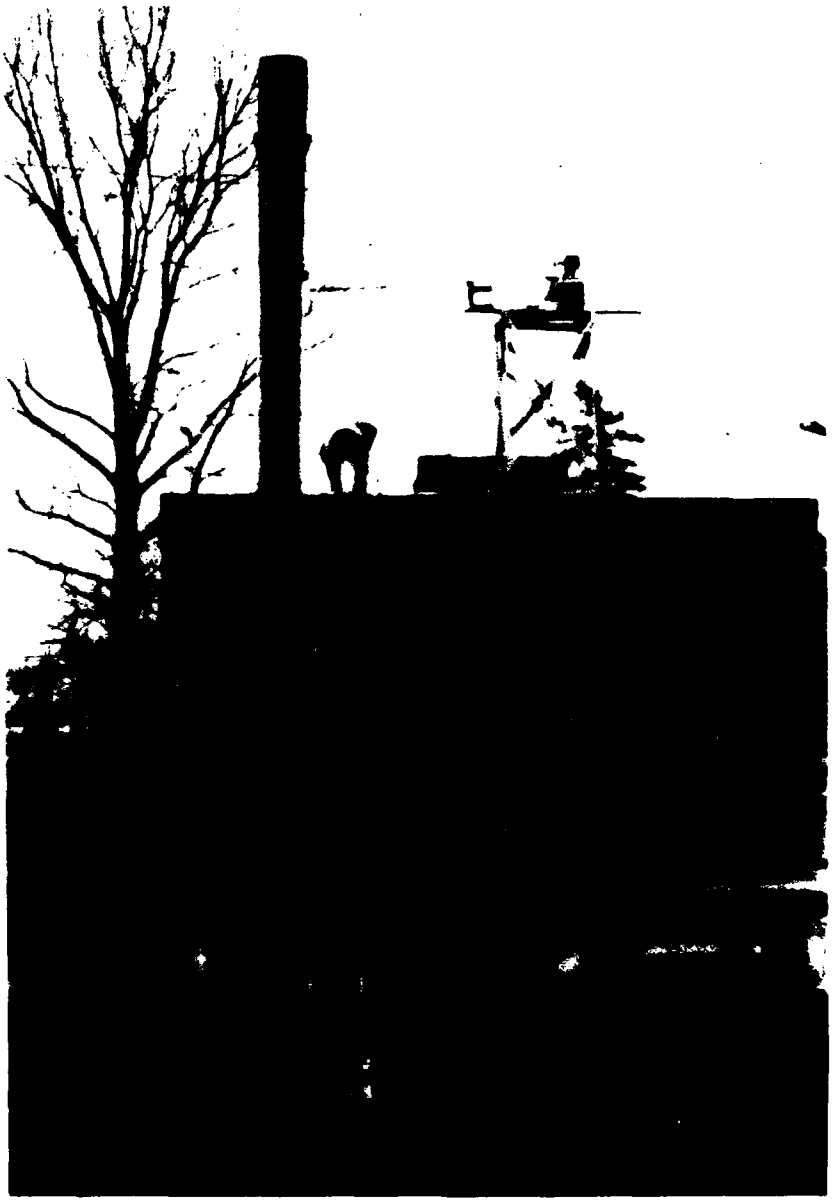

Figure 1. Hospital Incinerator Facility

b. Feed mechanism: batch

c. Load capacity: 150 pounds per hour (lbs/hr)

d. Combustions chamber design: Two-chamber design (primary/secondary)

e. Fuel: LP gas

f. Burner rating: 1,200,000 British thermal units per hour (Btu/hr)

2. The classified waste incinerator is located in a separate building (Bldg 2009) located next to Building 2008. The facility is pictured in Figure 2. The incinerator is manufactured by Spronze Incinerator Corporation (Model RL-20HD) and has the following operational parameters:

a. Designed for Type 0 waste (rubbish consisting of highly combustible materials such as paper, wood and cardboard including up to 10% treated papers, rags, plastic or rubber from commercial and industrial sources).

b. Feed mechanism: batch

c. Load capacity: 230 lbs/hr.

d. Combustion chamber design: two-chamber design (primary/secondary).

e. Fuel: fuel oil.

f. Burner rating: 1,200,000 Btu/hr.

C. Applicable Standards and Guidelines

1. The monitoring requirements, opacity and particulate regulations are defined under Codes, Rules and Regulations of the State of New York, Title 6, Chapter III - Air Resources, Subchapter A - Prevention and Control of Air Contamination and Air Pollution, Part 219 - Incinerators. The current state regulations for particulate and smoke emissions (opacity) are provided in Appendix B. The NYSDEC interim guidance pertaining to medical care-waste incinerators which prompted this project is provided in Appendix C. The proposed regulations (Subpart 219-3, Infectious Waste Incineration Facilities and Subpart 219-5, Existing Incinerators) which are now undergoing the public review process and which will affect future incinerator compliance are presented in Appendix D. Proposed Subpart 219-3 applies to all new, modified and existing infectious waste incineration facilities including those used for the incineration of all medical wastes and whose total permitted charging rate is less than 50 tons per day (present facilities must comply by 1 Jan 1992). The requirements of 219-3 are somewhat different from those outlined in the interim guidance presented in Appendix C. Proposed Subpart 219-5 applies to any incinerator installed or constructed or for which an application for a permit to construct was received prior to the effective date of the subpart (does not include incinerators falling under 219-3).

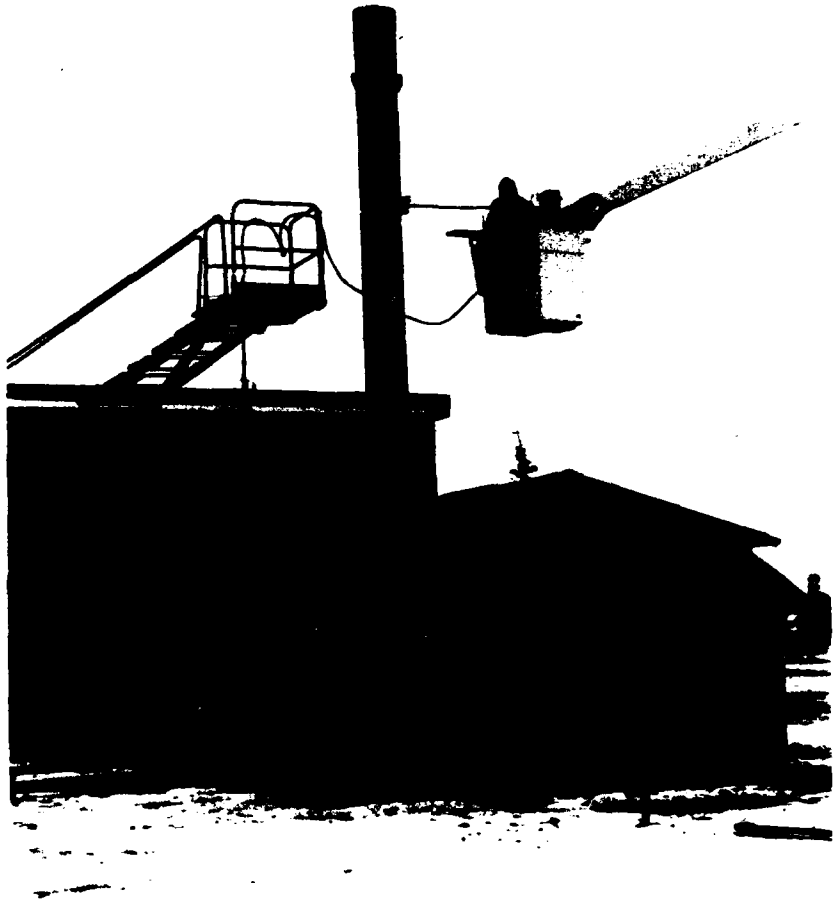

Figure 2. Classified Waste Incinerator Facility

2. The present state regulations for emissions from incinerators having a capacity of 2000 lb/hr or less and installed after 1 Jan 68 are as follows:

a. Particulate emissions: Emissions are based on the amount of refuse charged in the incinerator on a lb/hr basis. Emissions for incinerators rated at less than 100 lb/hr shall meet the standards for a unit rated at 100 lb/hr which limits particulate emissions to 0.3 lb/hr. Reference Part 219, Appendix 2, Figure 1 (Appendix B).

b. Smoke emissions: opacity not denser than 20 percent (%) or No. 1 on the Ringleman chart or equivalent during normal operation.

3. The proposed NYSDEC revision of Part 219, Subpart 219-3, for infectious waste incineration facilities provides for the following operational parameters:

a. Particulate emissions: not greater than 0.015 grains per dry standard cubic foot (gr/dscf) of flue gas corrected to 7% oxygen (O_2).

b. HCl emissions: uncontrolled emission rate less than four pounds per hour and the total charging rate is less than 500 lb/hr.

c. Design requirements:

(1) Interlocks - batch fed units: must prevent charging waste until secondary chamber exit temperature reaches 1600 degrees Fahrenheit (°F) and prevent recharging until combustion and burndown cycles are complete.

(2) Temperature and residence time:

(a) Primary chamber: temperature maintained at no less than 1400°F.

(b) Secondary chamber: residence time at least 1 sec for combustion gas and temperature not less than 1800°F.

d. Operating requirements:

(1) Carbon monoxide (CO) emissions: not greater than 100 parts per million by volume, dry basis, corrected to 7% O_2.

(2) Smoke emissions: not to exceed a six-minute average opacity equal to or greater than 10%.

e. Continuous emission monitoring: monitor and record primary and secondary chamber exit temperatures, exit temperature of particulate cleaning device (if installed), opacity and CO (units with charging rate of 500 lbs or more).

f. Stack testing: must be tested at start-up and annually thereafter for particulates, HCl, O_2 and CO.

4. The proposed NYSDEC revision of Part 219, Subpart 219-5, for existing incineration facilities (classified waste unit) provides for the following operational parameters:

a. Particulate emissions: same as present regulations - 0.3 lb/hr (for charging rate up to 100 lb/hr)

b. Visible emissions: not to exceed an average opacity of 20% during any six consecutive minutes.

5. The proposed regulations, Subparts 219-3 and 219-5, contain additional incinerator criteria not addressed by this project. These criteria should also be reviewed to determine additional future compliance requirements.

D. Sampling Methods and Procedures

The present regulations require that all emissions tests be conducted in accordance with the procedures and analysis methods specified in 40 CFR 60, Appendix A, Methods 1-5 (particulate emissions) and 9 (visible emissions). It is assumed that proposed regulations will require that Method 10 be used to evaluate CO emissions. At the present time, there is no standard method for determining HCl emissions; therefore, we coordinated with State of New York and Environmental Protection Agency personnel for an acceptable method to use for this project. For the parameters evaluated, test methods, equipment, sample train preparations, sampling and recovery, calibration requirements and quality assurance were done in accordance with the methods and procedures outlined in 40 CFR 60, Appendix A.

Inspection of the stacks indicated that sampling ports had already been installed on both the hospital incinerator and classified waste incinerator stacks. Inside stack diameters at the sampling ports for each stack were essentially the same: 13.5 inches (1.1 ft) for the hospital incinerator and 14 inches (1.2 ft) for the classified incinerator. Ports were located 5.0 stack diameters upstream from the stack exit and 12.8 stack diameters downstream from any disturbance (incinerator). Based on 1.1 to 1.2 ft inside stack diameters, port location and type of sample (particulate), a total of eight traverse points were determined for emission evaluation for each unit. The total time for each sampling run was 64 minutes; therefore, the sampling time for each point in a particular stack was 8 minutes. Illustrations showing port locations and sampling points are provided in Appendixes E and F.

Prior to every sample run on each stack, a preliminary velocity pressure traverse was accomplished and cyclonic flow was determined. For acceptable cyclonic flow conditions to exist in a stack, the average of the absolute value of the flow angle taken at each traverse point must be less than or equal to 20 degrees. The average flow angles in the hospital incinerator stack and classified waste incinerator stack were 18 degrees and 11 degrees respectively. These average flow angles indicate acceptable flow conditions in each of the stacks.

During each sample run, a flue gas sample for Orsat analysis (measures oxygen and carbon dioxide in the stack gas) was taken. Orsat sampling and analysis equipment are shown in Figures 3 and 4. Flue gas moisture content was obtained during particulate sampling.

Particulate samples were collected using the sampling train shown in Figure 5. The train consisted of a button-hook probe nozzle, heated inconel probe, heated glass filter, impingers and pumping and metering device. The nozzle was sized prior to each sample run so that the gas stream could be sampled isokinetically; in other words, the velocity at the nozzle tip was the same as the stack gas velocity at each point sampled. Flue gas velocity pressure was measured at the nozzle tip using a Type-S pitot tube connected to a ten inch inclined-verticle manometer. Type K thermocouples were used to measure flue gas as well as sampling train temperatures. The probe was heated to minimize moisture condensation. The heated filter was used to collect particulate materials. The impinger train (first, third and fourth impingers: modified Greenburg-Smith type, second impinger: standard Greenburg-Smith design) was used as a condenser to collect stack gas moisture. Also, the first two impingers contained 100 milliliters each of a dilute sodium carbonate solution (0.10N) instead of distilled water to collect HCl. The pumping and metering system was used to control and monitor the sample gas flow rate.

Both incinerators were tested using the typical waste and amounts normally burned in the units. The hospital wastes were the commonly termed "medical wastes" which included infectious waste and all other wastes derived from the care of patients. The estimated amount of wastes generated by the hospital for incineration is 44 to 88 bags per week. This equates to incineration operation 1-2 times per week with charge weights ranging from 20 to 50 lb. During emission testing, loading rates ranged from 20 to 50 pounds/hr. The classified wastes contained paper, plastic film-coated paper and film. The amount of plastics/film is usually less than 10% of the total volume. The estimated maximum amount of wastes generated for disposal in the classified incinerator is 30 bags per week. However, at the time of testing only enough material for a one-hour burn was available; this equated to a loading rate of 50.5 lb/hr.

Emission calculations were done using "Source Test Calculation and Check Programs for Hewlett-Packard 41 Calculators" (EPA-340/1-85-018) developed by the EPA's Office of Air Quality Planning and Standards, Research Triangle Park NC. All field data and resulting emissions calculations are presented in Appendixes E and F. Calibration data are presented in Appendix G.

III. CONCLUSIONS

Incinerator operating parameters and emissions results are presented in Table 1. Particulate and HCl emissions data are given in units which are consistent with both present and proposed regulations.

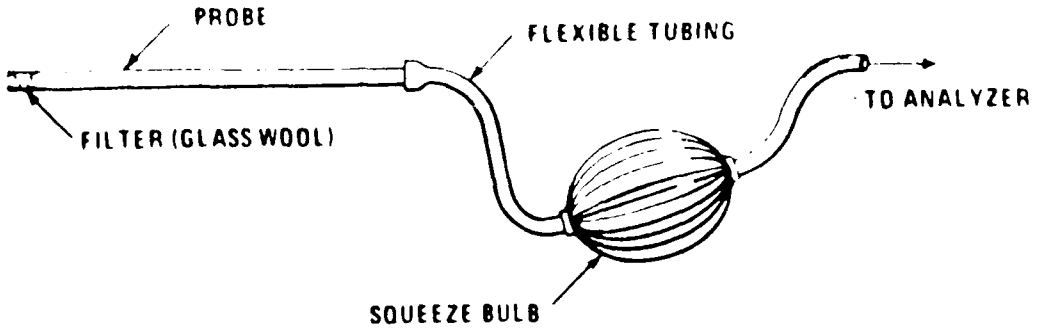

Figure 3. Orsat Sampling Train

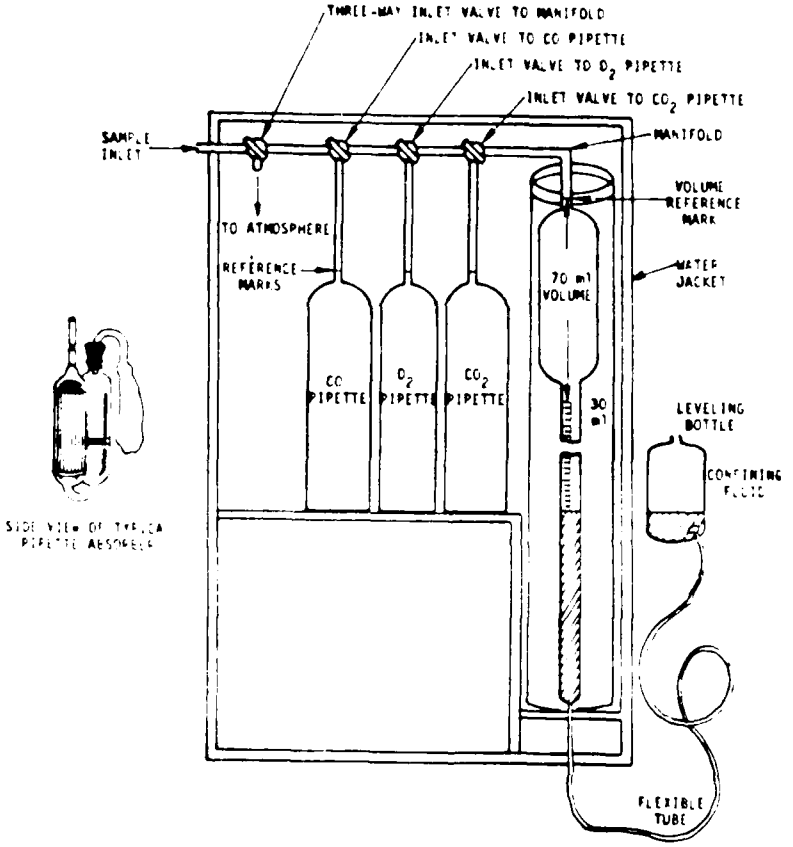

Figure 4. Orsat Apparatus

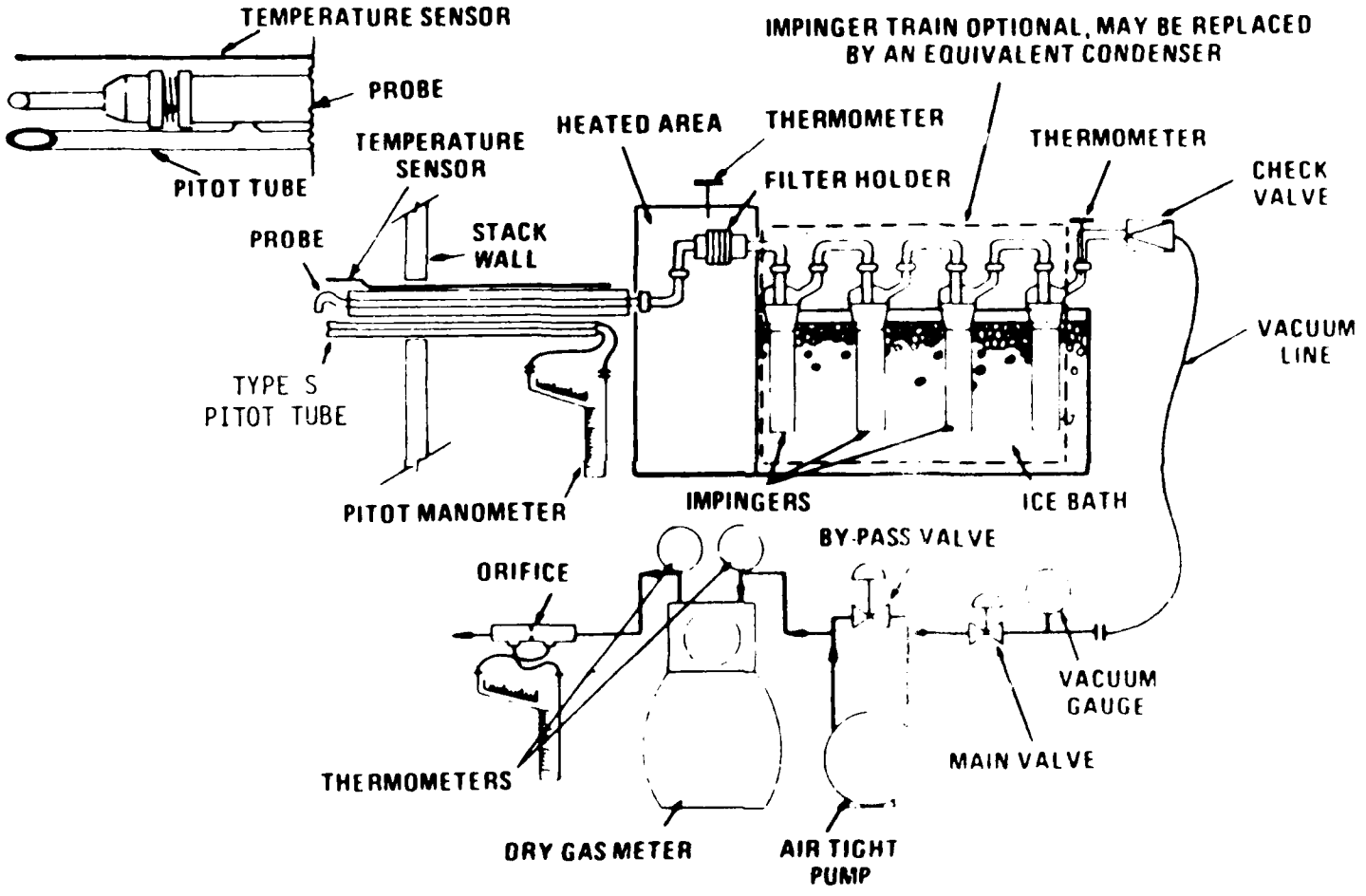

Figure 5. Particulate Sampling Train

Table 1. Stack Emission Data

DATE	INCINERATOR ID	RUN #	LOADING RATE (lb/hr)	% ISOKENETIC SAMPLING RATE	OXYGEN CONCENTRATION (%)	HCl CATCH (mg)	SAMPLE VOLUME (dscf)	STACK FLOW RATE (dscf/min)
08 Dec 88	CLASSIFIED	1	51.5	102	11.83	126	38.19	572
09 Dec 88	HOSPITAL	1	50.0	106	17.27	33	50.40	546
10 Dec 88	HOSPITAL	2	20.0	98	15.47	29	51.29	597
10 Dec 88	HOSPITAL	3	17.0	98	17.33	28	51.79	604

	EMISSIONS			
	PARTICULATES			HCl
	(lb/hr)	(gr/dscf)	(gr/dscf @ 7% O2)	(lb/hr)
	2.81	0.57	0.34	0.25
	0.37	0.08	0.03	0.05
	0.49	0.10	0.05	0.04
	0.16	0.03	0.01	0.04
AVG =	0.34	0.07	0.03	0.04

A. Hospital incinerator: Results indicate that the hospital incinerator did not meet either the present or proposed incinerator regulations.

1. Present regulations:

a. Present regulations require opacity to be not greater than 20%. A formal Method 9 (visible emissions) was not accomplished on this unit; however, it was estimated that during the first 6 to 10 minutes after charging the opacity of the visible emissions was greater than 90%. This fact is evidenced by Figure 6. Approximately 10 minutes into the run, the opacity rapidly began to decrease as shown in Figure 7 and reached essentially 0% opacity as shown in Figure 1. Opacity remained at this level for the remainder of the test (approximately 55 minutes).

b. Present regulations limit particulate emissions to 0.3 lb/hr. Our tests indicate that actual emissions averaged 0.34 lb/hr. On sample runs 1 and 2 it became necessary to change filters during the first five minutes of each test run due to the high particulate loading encountered. These filter changes prevented a certain amount of sampling during this high emission period; therefore, actual particulate emissions are greater than 0.34 lb/hr.

2. Proposed regulations: The hospital incinerator would not have passed the emissions, design, operating or continuous emission monitoring criteria which were evaluated with the exception of HCl.

a. Particulate emissions: Emissions are limited to 0.015 gr/dscf. Actual emissions were 0.03 gr/dscf. Again, note that emissions would have been higher had it not been for the filter changes required in sample runs 1 and 2.

b. HCl emissions: Emissions are limited to less than 4 lb/hr for charging rates less than 500 lb/hr. The average emission rate was 0.25 lb/hr, well below the standard.

c. Design requirements:

(1) Temperature and residence time: Primary chamber - temperature maintained at no less than 1400°F. Secondary chamber - residence time of at least one second at no less than 1800°F.

(2) Primary and secondary chamber operating temperatures for both the hospital and classified waste incinerators as well as corresponding stack temperatures are presented in Table 2. The hospital incinerator data were obtained during runs 2 and 3 and is typical of the temperature fluctuations observed during testing. As can be seen by these data, the incinerator does not meet the proposed temperature criteria. Based on secondary chamber volume (54 cubic feet) and temperature and flue gas temperatures and flow rates observed during testing, the calculated residence time ranged between 0.5 and 1.3 seconds. However, we feel the incinerator temperature sensing and/or indicating devices are suspect based on the following observations:

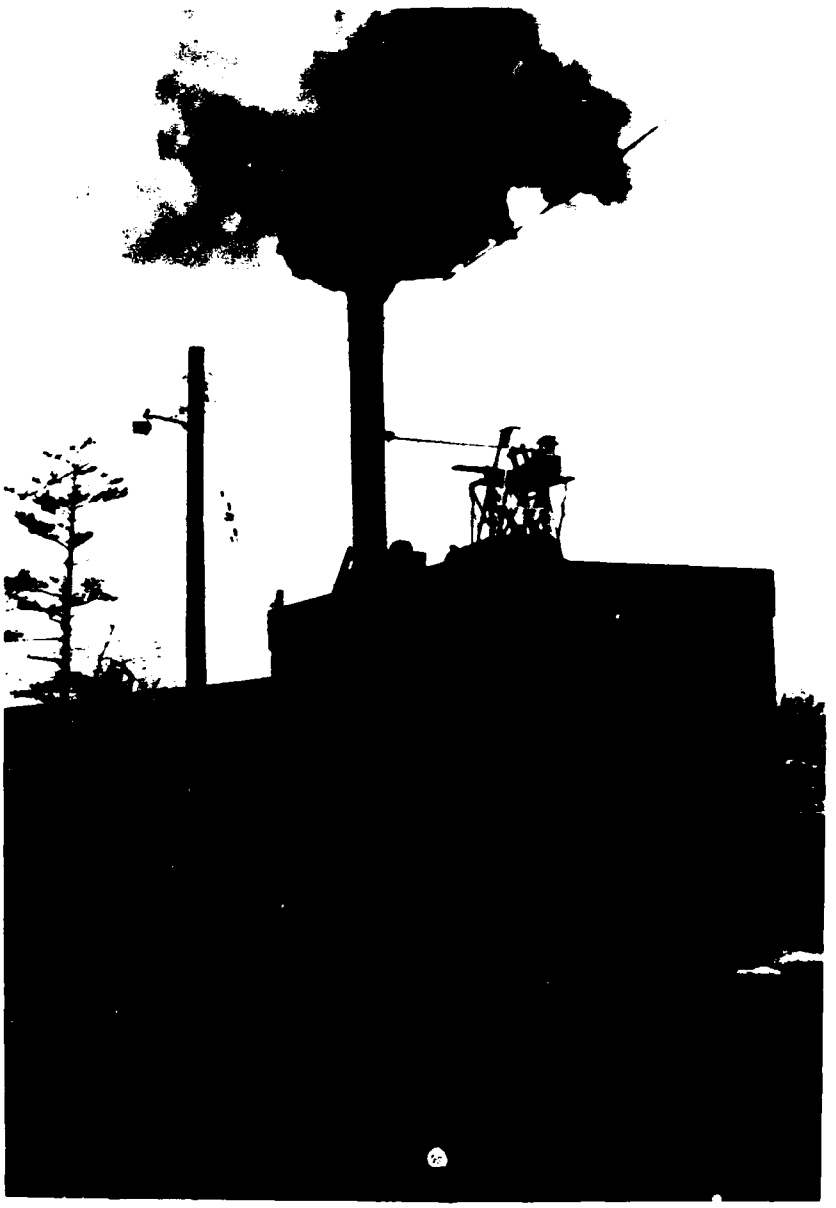

Figure 6. Hospital Incinerator During Initial 10 Minutes of Burn

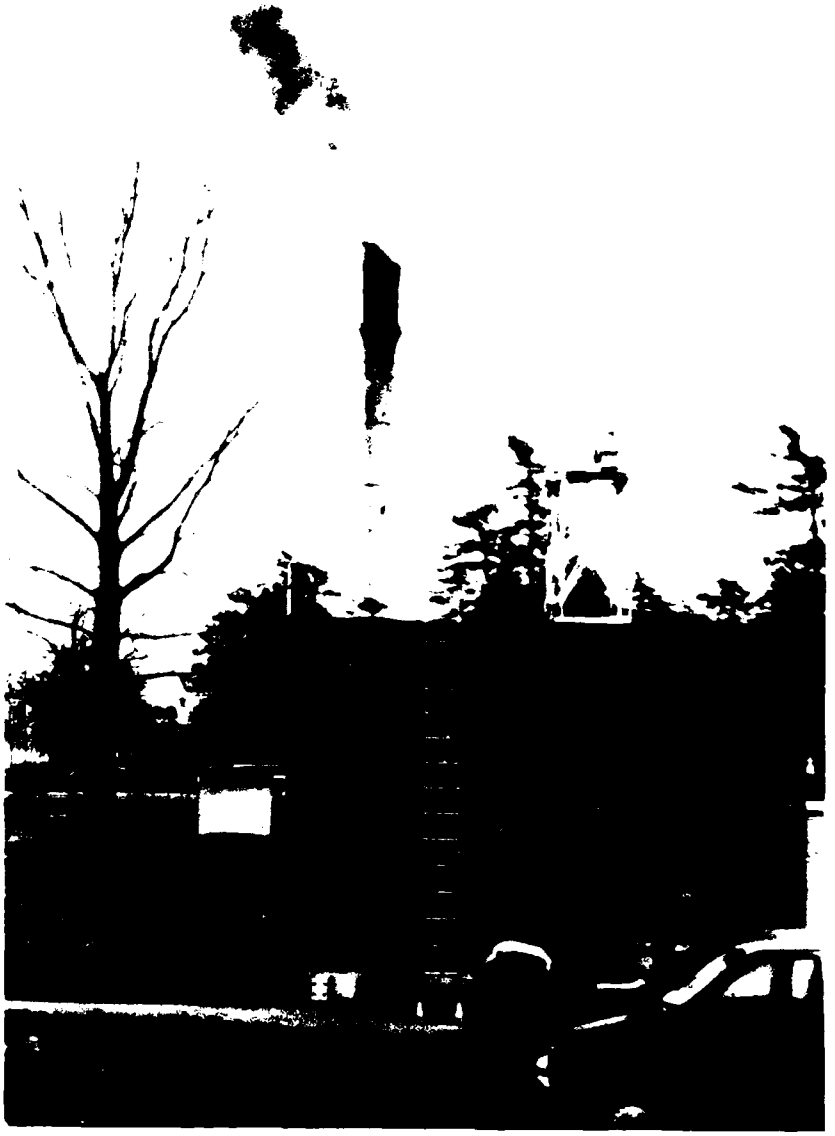

Figure 7. Hospital Incinerator 10 Minutes Into Burn

(a) The extremely high primary and secondary chamber temperatures recorded during testing (Table 2). The temperature indicating devices were actually "pegged out" when the 2700°F readings were recorded. Discussion with Spronz Incinerator Corp. personnel indicated that normal chamber temperatures should range between 1700-1800°F with the secondary chamber reaching about 2300°F during a burn.

(b) The wide fluctuation in secondary chamber temperature over very short periods of time (temperature dropping 1700°F in two minutes or 1000°F in one minute) with no corresponding fluctuations in stack temperature.

(c) Lower stack flue gas temperatures corresponding to higher secondary chamber temperatures than noted during operation of the classified waste unit.

(2) Interlocks: Incinerators must incorporate interlocks to prevent charging of wastes until chamber temperatures reach specified values, maintain specified chamber temperatures until waste has been reduced to ash and prevent recharging until the design burn cycle is complete. This unit was not equipped with such an interlock system.

c. Operating requirements:

(1) CO emissions: Not measured.

(2) Smoke emissions: Smoke emissions are limited to not more than a six-minute average opacity of 10%. Opacity was estimated to be greater than 90% for the first 6-10 minutes of each of the three sample runs.

e. Continuous emission monitoring: Requires primary and secondary chamber temperatures, opacity, and control device (if installed) exit temperature to be continuously monitored and recorded. The only parameters continuously measured are chamber temperature; but, they are not continuously recorded.

B. Classified incinerator: Due to the amount of waste material available (51.5 lbs - charged in four loads over the sample run), only one sample run was accomplished. Due to high particulate loading, the run was shutdown after 52 minutes of sampling time. Since Method 5 requires that three sample runs be accomplished and the results averaged to determine final particulate emissions and each sample run be at least 60 minutes, results of this run should only be used as a possible indicator of performance and not as definite evidence of either meeting or failing to meet present or proposed emission regulations.

1. Present regulations:

a. Present regulations require opacity to be not greater than 20%. A formal Method 9 (visible emissions) was not accomplished on this unit; however, it was estimated that opacity of the visible emissions was less than 20% during the entire run.

Table 2. Incinerator Temperature Data

INCINERATOR ID	TIME	CHARGE	TEMPERATURE(°F) PRIMARY CHAMBER	SECONDARY CHAMBER	STACK
HOSPITAL	0925		2700	2700	
	0928	X	2700	2700	
	0930		300	1000	520
	0933		800	1300	
	1005		2000	2700	
	1007	X	1450	2700	
	1008		500	2700	
	1009		600	1700	
	1011		800	1500	
	1013		900	2300	550
	1016		1300	2700	
	1024		1500	2700	590(1021 & 1025 hrs)
	1053		1450	2700	590(1054 hrs)
	1100		1500	2700	600(1100 hrs)
	1228		2000	2200	
	1229	X	2000	2000	
	1231		800	1400	
	1233		1000	2000	620(1234 hrs)
	1235	X	800	900	
	1250		800	1700	645
	1300		800	800	602(1302 hrs)
CLASSIFIED	1130	X	1200	1500	750
	1137	X			
	1140		1400	1700	745(1138 hrs)
	1141	X			
	1147		1250	1500	850(1146 hrs)
	1148	X			
	1230		1600	1500	
	1237		1900	1800	920(1233 hrs)
	1240		1900	2000	

b. Present regulations limit particulate emissions to 0.3 lb/hr. Our tests indicate that, after correcting for the 52-minute run, actual emissions for the one sample run was 2.27 lb/hr. This result is significant in that, even if two additional runs had been accomplished and their results were zero, the average emissions rate would still be 0.76 lb/hr.

2. Proposed regulations for opacity and particulate emissions remain the same as the present standards. Therefore, the classified incinerator would have met regulations for opacity but not for particulates.

Even though not required by present or proposed regulations, secondary chamber temperature and HCl emissions were also noted. HCl emissions were 0.25 lb/hr which is well below the infectious waste incinerator emission limits. Secondary chamber temperatures ranged between 1500-2000°F during testing (Table 2).

IV. RECOMMENDATIONS

It is our opinion that the hospital and the classified waste incinerators should undergo a maintenance inspection to ensure they are operating according to the manufacturer's specifications. Once proper operation is attained, the units should undergo periodic preventive maintenance to ensure they continue to operate as designed. The following items should be evaluated initially and on a periodic schedule: (1) proper operation of combustion chamber temperature sensing and indicating devices, (2) proper operation of burners (auxiliary fuel) and supply of excess air to control chamber temperature, (3) integrity of seals, refractory, grates and overall general condition of unit.

Once the unit itself has been verified as operating properly, poor performance can then usually be attributed to the waste material or the charging technique. If the waste material consists of compressed or packaged materials rather than loose materials or materials for which the unit wasn't designed to burn (plastics), the rate of volatilization and the rate at which combustion air is supplied can become unbalanced which will cause smoke. Variable amounts of moisture in the waste can also cause a combustion imbalance and cause visible emissions. Therefore, to control emissions through charging techniques, consider the following suggestions: (1) use smaller and more frequent charges, (2) only fill primary (ignition) chamber two-thirds of the distance from grate to top of chamber, (3) remove ash buildup frequently, (4) spread charge evenly over grate and (5) preheat chamber to operating temperature prior to charging.

Once final incinerator regulations have been promulgated and the hospital and classified waste incinerators have been inspected and demonstrate proper operation, the units should be formally tested to ensure compliance with state standards.

REFERENCES

1. "Standards of Performance for New Stationary Sources," Title 40, Part 60, Code of Federal Regulations, July 1, 1987.

2. Quality Assurance Handbook for Air Pollution Measurement Systems - Volume III, Stationary Source Specific Methods, U.S. Environmental Protection Agency, EPA-600/4-77-027-b, Research Triangle Park, North Carolina, December 1984.

3. Source Test Calculation and Check Programs for Hewlett-Packard 41 Calculators. U.S. Environmental Protection Agency, EPA-340/1-85-018, Research Triangle Park, North Carolina, May 1987.

APPENDIX A

Personnel Information

1. USAFOEHL Test Team

Maj James Garrison, Chief, Air Quality Function

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A1C James Jarbeau, Industrial Hygiene Technician

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APPENDIX B

State Regulations

PART 218
VEHICLES PROPELLED BY DIESEL ENGINES

(Effective May 1, 1972; May 10, 1981)

Section 218.1 Applicability. This Part shall apply to all vehicles propelled by a diesel engine, excluding marine vessels.

218.2 Prohibitions. (a) No person who owns, operates or leases a vehicle propelled by a diesel engine or who owns, leases or occupies land and has actual or apparent dominion or control over the operation of a vehicle propelled by a diesel engine which is present on said land, shall operate said vehicle or allow or permit it to be operated, in such a manner that exhaust emissions of a shade of blue, black or grey equal to or greater than Number 1 on the Ringelmann chart or equivalent standard acceptable to the Commissioner are produced for a continuous period of more than five seconds when the vehicle is in motion.

(b) No person who owns, operates or leases a bus or truck, the motive power for which is provided by a diesel engine or who owns, leases or occupies land and has the actual or apparent dominion or control over the operation of a bus or truck present on such land, the motive power for which said bus or truck is provided by a diesel engine, shall allow or permit the diesel engine of such bus or truck to idle for more than five consecutive minutes when the bus or truck is not in motion, except as otherwise permitted by section 218.3.

218.3 Exceptions. The prohibitions of subdivision (b) of Section 218.2 shall not apply when:

(a) A bus or truck is forced to remain motionless because of traffic conditions over which the operator thereof has no control.

(b) Regulations adopted by federal, state or local agencies having jurisdiction require the maintenance of a specific temperature for passenger comfort. The idling time specified in subdivision (b) of section 218.2 may be increased but only to the extent necessary to comply with such regulations.

(c) A diesel engine is being used to provide power for an auxiliary purpose, such as loading, discharging, mixing or processing cargo, controlling cargo temperature; construction; lumbering; oil or gas well servicing; farming; or when operation of the engine is required for the purpose of maintenance.

(d) Fire, police and public utility trucks or other vehicles are performing emergency services.

(e) Trucks owned or operated by persons engaged in mining and quarrying are used within the confines of such persons' property.

(f) A truck is to remain motionless for a period exceeding two hours, and during which period the ambient temperature is continuously below twenty-five degrees Fahrenheit.

PART 219
INCINERATORS

(Effective May 1, 1972)

Section 219.1 Title. *These rules shall be* known as the New York State rules to prevent air pollution from incinerators.

219.2 Applicable geographical area. This Part shall apply to the entire State of New York.

219.3 Definitions. (a) Incinerator. Any structure or furnace in which combustion takes place and type 0, 1, 2, 3, or 4 refuse is used as fuel, alone or in conjunction with fossil fuel.

(b) Refuse. All waste material, including but not limited to, garbage, rubbish, incinerator residue, street cleanings, dead animals, and offal. Refuse is classified in accordance with Table 1, Appendix 2.

(c) Smoke. An air contaminant consisting of small gas-borne particles emitted by an air contamination source in sufficient number to be observable.

219.4 Emission limits. (a) All incinerators having a capacity of 2,000 lb/hr or less and built and installed after January 1, 1968, shall be designed, built, installed and operated to meet the emission limits of figure 1*.

(b) No incinerator larger than 2,000 lb/hr capacity and built after January 1, 1970, shall be operated so as to produce particulate emissions which exceed the amount shown in figure 1*.

(c) No incinerator having a capacity of 2,000 lb/hr or less and built or installed between April 1, 1962, and January 1, 1968, shall be operated so as to produce particulate emissions which exceed 0.5 lb/hr for every 100 lb/hr of refuse charged, unless a final order by the commissioner provides otherwise.

(d) Any incinerator having a capacity of 2,000 lb/hr or less and built or installed prior to April 1, 1962, shall either meet the requirements of 219.4(c) or shall be equipped with adequate control devices or redesigned and rebuilt so as to meet the requirements of 219.4(a) by January 1, 1969.

(e) No incinerator larger than 2,000 lb/hr capacity and built between April 1, 1962, and January 1, 1970, shall be operated so as to produce particulate emissions which exceed 0.5 lb/hr for every 100 lb/hr of refuse charged, unless a final order by the commissioner provides otherwise.

(f) Any incinerator larger than 2,000 lb/hr capacity and built prior to April 1, 1962, shall either meet the requirements of 219.4(e) or shall be equipped with adequate control devices or redesigned and rebuilt so as to meet the requirements of 219.4(b) by January 1, 1970.

219.5 Smoke emissions. (a) No incinerator, built or installed after January 26, 1967, regardless of size, shall emit smoke of an opacity denser than 20 percent or No. 1 of the Ringelmann chart or equivalent, under normal operating conditions.

(b) No incinerator built or installed prior to January 26, 1967, regardless of size, shall be operated so as to emit smoke of an opacity denser than 40 percent or No. 2 of the Ringelmann chart or equivalent, under normal operating conditions.

219.6 Tests. (a) All incinerators larger than 2,000 hr/lb capacity shall be tested using isokinetic sampling techniques in accordance with test procedures acceptable to the commissioner.

(c) All incinerators built or installed after January 1, 1968, and having a capacity of 2,000 lb/hr or less shall be tested in

*See Appendix 2.

accordance with special test procedures promulgated by the commissioner. Units which are representative models may be tested instead of an actual installation, in accordance with special test procedures promulgated by the commissioner.

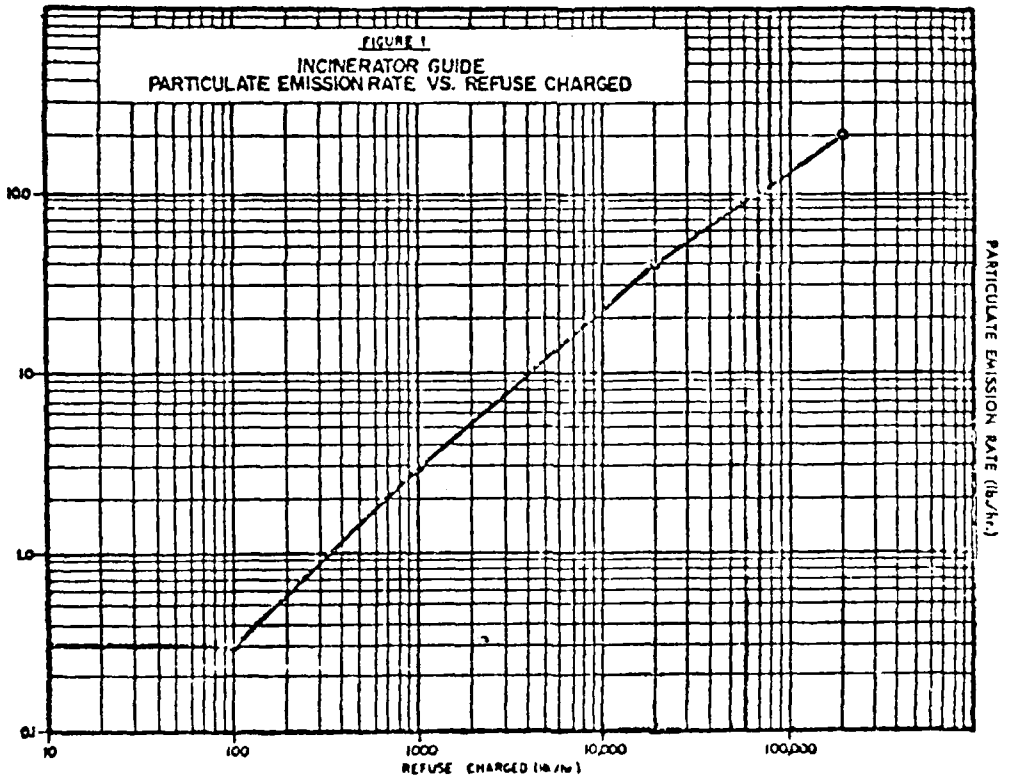
219.7 Abatement. (a) Where the commissioner has reason to believe that an incinerator installation is violating the emissions standards of section 219.4, he may have tests conducted. The owner shall provide, at his expense, sampling holes and pertinent allied facilities as needed, at the request of the commissioner.

(b) If such tests indicate a contravention of the emission limits, the commissioner may require the installation of appropriate control equipment or he may seal the incinerator if such equipment is not installed within the time limit specified by the commissioner.

(c) The commissioner may order the cleaning, repair, replacement or alteration of any equipment or control equipment which causes or is operated so as to cause a violation of this Part.

(d) The commissioner may order a change in the manner of operation of any incinerator which is operated so as to cause a violation of this Part.

APPENDIX 2



APPENDIX 2

TABLE 1

Classification of Refuse

(1) Type	(2) Principal Components	(3) Approximate Composition % by Weight	(4) Approximate Moisture Content % by Weight	(5) Approximate Incombustible Solids, % by Weight	(6) Approximate B.T.U. per Pound of Refuse
0	Rubbish consisting of highly combustible materials such as paper, wood and cardboard including up to 10% treated papers, rags, plastic or rubber from commercial and industrial sources	Rubbish 100%	10%	5%	8500
1	Some garbage but primarily rubbish consisting of combustible materials such as paper, cardboard, wood, cartons, bulk floor sweepings from residential, commercial and industrial sources	Rubbish 90% Garbage 10%	25%	10%	6500
2	Rubbish and garbage from residential sources	Rubbish 50% Garbage 50%	50%	7%	4300
3	Some rubbish, but primarily garbage consisting of animal and vegetable matter from restaurants, hotels, hospitals, institutional and commercial sources	Garbage 90% Rubbish 10%	70%	5%	2500
4	Human and animal solid refuse consisting of carcasses and organs from hospitals, laboratories, abattoirs, animal pounds and similar sources	100% animal and human tissue	85%	5%	1000
5	Gaseous, liquid or semi-liquid refuse from processes such as tar, paints, solvents and chemical sludge	Variable	Dependent on predominant components	Variable	Variable
6	Solid or semi-solid refuse from processes such as rubber, plastics, wood and sewage sludge.	Variable	Dependent on predominant components	Variable	Variable

PART 220
PORTLAND CEMENT PLANTS
(Effective March 16, 1973; May 10, 1984)

Section 220.1 Definitions. (a) For the purpose of this Part, the general definitions of Part 200 of this Title apply.

(b) For the purpose of this Part, the following definitions also apply:

(1) Dry process portland cement plant. A portland cement plant where the raw material kiln feed entering the kiln in a powder form has a moisture content of one percent or less by weight.

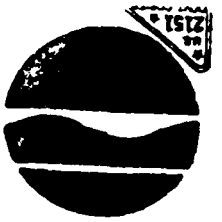
(2) Feed to the kiln. The weight of all materials, excluding fuels and uncombined water, introduced into the kiln during the time when a stack sample is being taken to determine compliance with sections 220.2 and 220.3 of this Part.

(3) Upset condition. Any unavoidable

APPENDIX C

State Interim Guidelines

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-



Henry G. Williams
Commissioner

MEMORANDUM

TO: Regional Air Pollution Control Engineer
Bureau Directors
Section Chiefs
FROM: Mr. Hovey (Originator: W. Sonntag)
SUBJECT: Regulation of Medical Care Waste-Incineration 86-AIR-21
DATE: October 14, 1986

Background

There has been a growing concern over the environmental impact of hospital waste disposal. The operators of both sanitary landfills and municipal waste incinerators have generally rejected infectious waste (red bags) as described in Department of Health Memorandum, Health Facilities Series H-12, copy attached. As a result, the red bags have piled up and their transportation, storage and disposal have at times been truly inadequate. Commercial incineration facilities have been developed to dispose of hospital wastes and their larger capacities and continuous operation should be scrutinized closely.

Although the primary concern with hospital waste relates to its infectious fraction, there is also concern with incinerator emissions from burning increasing amounts of disposable plastics. Some of these plastics are chlorinated, producing hydrochloric acid and possibly traces of chlorinated organic compounds when burned.

Existing Parts 219 and 222 were adopted in 1972 and 1973 to provide for the general regulation of refuse and pathological waste incineration. Part 222 applies in New York City, Nassau and Westchester Counties and Part 219 applies in the rest of the State. At the time of adoption, there was little concern with toxic emissions from these incinerators. Therefore, these regulations limit only emissions of particulate matter and smoke; Part 222 requires maintenance of 1400°F at the furnace outlet to destroy odors.

In order to revise Parts 219 and 222 to reflect current air toxic concerns, the Division of Air Resources plans to test a few selected medical care facility-waste incinerators to characterize emissions. Results and samples from these tests will then be given to the Department of Health for analysis with subsequent quantitative risk assessment of the emitted toxic contaminants. This program is scheduled for completion in spring, 1987.

Because the technical material needed to revise the incinerator regulations will not be available until spring 1987, the revisions will not be formally adopted until early 1988. This delay, combined with the inadequacy of existing Parts 219 and 222 dictates the need for interim guidance.

Direction

The suggestions provided here should be construed as guidance. DEC staff should strive to obtain voluntary compliance with this guidance and then incorporate its recommendations in permits.

Incinerator manufacturers have indicated that they generally consider these recommendations good engineering practice, therefore they are not opposed to them.

Source owners refusing to meet the provisions of this guidance should be informed that the forthcoming proposed revisions of Parts 219 and 222 will be at least as stringent as this guidance and if adopted, existing units will be required to comply with them within the next few years. Retrofitting is frequently more expensive and less effective than a properly designed new unit.

Rationale for Interim Requirements

Applicability

Concerns with hospital waste incineration relate to emissions and impacts from individual units burning infectious waste and high concentrations of plastics. These waste materials are not restricted to hospitals; they are generated in nearly all medical care facilities. Therefore, for the purpose of this guidance, hospital waste refers to all wastes, except unmixed garbage, that are generated by a medical care facility.

Hospital waste incineration is carried out both on-site and off-site with impacts largely independent of geography and population density. This guidance applies to all on-site incinerators located throughout New York State which burn wastes generated by a medical care facility. This does not apply to incinerators dedicated exclusively to the burning of Type 3 waste (garbage).

Commercial facilities incinerating waste generated by medical care facilities are generally of sufficient size as to present a potential risk to public health and the environment. Their emissions are similar to those from hazardous waste facilities and they should be regulated accordingly. Therefore, more sophisticated operating and emission control equipment should be sought for such facilities. This may be handled under SEQRA. The Bureau of Source Control will provide guidance as requested.

It would be inappropriate to change the standards of acceptability for existing incinerators without formal analysis and public notification and comment. This guidance then applies only to new or modified (including replacement) units for which applications for permits to construct are received on or after October 15, 1986.

Particulate matter

It has been found by test and by communication with manufacturers that well designed, controlled air incinerators can meet a particulate emission standard of 0.10 grain per dry standard cubic foot of flue gas, corrected to 12 percent

CO_2 (EPA Method 5), without gas cleaning. Since this value is achievable, it is recommended here.

Temperature and residence time

Studies used in the development of a regulation [illegible] have indicated that chlorinated plastics [illegible] for one second to assure the destruction of toxic organic compounds. This guidance recommends that those [illegible] no credit is assumed for burning [illegible]

Loading and operating [illegible]

Batch fed incinerators should [illegible]

- Prevent ignition [illegible] 1600°F.
- Prevent recharging [illegible] cycles are complete.

Nonbatch fed incinerators should [illegible] lock system to prevent opening [illegible] of the loading system must match the incinerator capacity to assure complete burning of the waste. Interlocks must prevent charging the waste until the secondary chamber exit temperature reaches 1600°F.

Auxiliary burners alone should be capable of raising the secondary chamber exit temperature to a minimum of 1500°F. The firing rate of these burners should be modulated automatically to maintain the secondary chamber exit temperature at this minimum temperature.

Acid gas control

Hydrochloric acid is produced by the burning of chlorinated plastics. It is a very reactive acid, capable of causing structural damage and irritation of the respiratory tract. For these primary reasons, the Department intends to require acid gas control for at least larger incinerators, e.g. ≥1000 lbs/hr burning rate, in its forthcoming revision of Parts 219 and 222. Because of the cost of purchasing and operating gas scrubbing equipment and its attendant impact on medical care facilities, it will not be required until regulations are promulgated following public hearing. In the interim, facility owners anticipating the installation of hospital waste incinerators should be informed of the State's intention and encouraged to apply acid gas scrubbers where feasible. Space should be allowed for scrubbers in case they are required in the future.

Type 4 Waste

Because of its high density and moisture content, pathological (Type 4) waste will normally burn more slowly than hospital waste, making it more suitable for burning alone in a crematory. However, some hospital waste incinerators are designed to provide for the acceptable burning of Type 4 waste. For your guidance then, Type 4 waste should only be burned with hospital waste if the

incinerator has been satisfactorily tested while burning that mixture. "Satisfactorily tested" means that the Type 4 waste must be completely destroyed and not be identifiable in the residue. Permits issued should restrict charging rates, by waste type, to the rates shown satisfactory by test.

Continuous monitoring and recording

The secondary chamber exit temperature should be continuously measured and recorded to assure the maintenance of at least 1600°F. Flame from the auxiliary burner must not impinge on the thermocouples. Records should be submitted annually.

Opacity

Opacity should be limited to less than 10 percent during any consecutive six minute period except that a maximum of one six minute period per hour of less than 20 percent is allowed, as determined by EPA Method 9. This is consistent with the "Revised Draft Operating Requirements for Municipal Solid Waste Incineration Facilities," dated June 20, 1986.

Calculations

Calculations and data, including references, should be provided relative to the following:

Waste - Provide for each waste or mixture to be burned at one time (if all wastes are mixed uniformly, provide only once).

- Burning rate (maximum) - pounds per hour, tons per year
- Heating value of waste (maximum, average) (how determined), BTU/per pound
- Moisture (maximum, average), percent
- Pathological waste (Type 4), percent (by weight)
- Infectious waste (DOH designation), percent (by weight)
- Plastics, percent (by weight)

Incinerator and combustion air -

Provide the following information for each waste or mixture to be burned at one time:

- Describe inlet and exit temperatures, residence times and flue gas velocities in each chamber. Residence time equals combustion chamber volume divided by volumetric flue gas flow at its average temperature.
- Describe anticipated excess air requirements in primary and secondary chambers, percent.

- Describe combustion air flow, cfm and pressure drop, inches H_2O relative to fan provided.

- Demonstrate that flame from auxiliary burners will not impinge on thermocouples.

Impact of emissions -

- Provide elementary dispersion model for particulate matter and HCl for both onsite and offsite receptors.

Testing

Because of its composition, and attendant heating value, hospital waste does not conform to Type 0 through 4 waste used in the definition of "incinerator" in Part 200. Therefore, incinerators burning hospital waste are not strictly within the purview of Parts 219 and 222 and the DEC list of "approved" incinerators no longer applies to them. The effect of this is that any incinerator, whether approved by the DEC to burn Type 0-4 waste or not, should not be excused from the need to demonstrate compliance with the 0.10 grains/dscf at 12% CO_2 particulate emission limitation of this guidance, using EPA Method 5, until it or a geometrically similar model has been demonstrated to meet those requirements while burning hospital waste and formal approval of that demonstration has been given by the DEC. The first unit of a representative series should be tested in New York State to assure the attainment of the standard while burning waste of known composition.

Owners of incinerators burning hospital waste should provide results of measurements made at startup and annually thereafter, of carbon monoxide concentration in the secondary chamber, before the introduction of cooling air (to assess combustion efficiency).

Owners of incinerators burning hospital waste should provide results of measurements made at startup, of secondary chamber: (1) inlet temperature (to evaluate average temperature and residence time) and (2) hydrogen chloride concentration (to evaluate the impact on receptors and to assess the need for future acid gas scrubbing).

The Bureau of Toxic Air Sampling will continue to evaluate and maintain records of incinerator test reports, including the compilation of an approved list for hospital waste incinerators.

All test methods must be acceptable to the Commissioner.

Inspection

Experience has shown incinerator performance to be highly variable, depending on both operators and incinerator condition. These problems could be exaggerated in burning high plastics and infectious waste. Therefore, an annual inspection report, attesting to the condition and operation of the incinerator and the calibration of instruments covered by this guidance should be prepared by a qualified engineer and submitted to the DEC by the source owner. DEC staff should inspect annually each incinerator covered by this guidance against those inspection reports, while the incinerator is operating.

Summary of Guidelines

Applicability - New or modified on-site incinerators burning waste (except Type 3, garbage) from medical care facilities Statewide. Regulate commercial units under SEQRA.

Particulate Emissions - 0.10 gr/dscf at 12% CO_2 (EPA Method 5).

Temperature & Residence Time - Secondary chamber design 1600°F and one second - Minimum 1600°F at exit.

Loading and Operating Controls - Batch fed: interlocks for charging - Nonbatch fed: mechanical loader with interlocks - Modulating, auxiliary burners to raise and maintain secondary chamber exit temperature to 1600°F.

Acid Gas Control - Not required now - Leave space for possible future need.

Type 4 Waste - Pathological waste (Type 4) may only be burned with hospital waste if tested and found acceptable. Permits to limit wastes by type.

Continuous Monitoring and Recording - Required to show secondary chamber exit temperature at least 1600°F. Submit records annually.

Auxiliary Burners - Required to raise secondary chamber temperature to 1600°F and maintain there when needed.

Opacity - Hourly average less than 10 percent. Maximum continuous 6 minute average less than 20 percent.

Calculations - Waste composition and parameters, incinerator parameters, fan, impact.

Testing - Particulates - test first unit of geometrically similar series in New York State.

- Secondary chamber inlet temperature and HCl concentration - test at startup.

- Secondary chamber CO concentration - test at startup and annually thereafter.

Inspection

- Annual report by owner.

- Annual review of report and inspection by DEC.

Attachment

cc: Regional Directors of Environmental Quality Engineering

APPENDIX D

Proposed State Regulations

New Subpart 219-1 is adopted to read as follows:

SUBPART 219-1

INCINERATION - GENERAL PROVISIONS

Section

219-1.1 Definitions
219-1.2 Summary of applicability

219-1.1 Definitions. (a) For the purpose of this Part and each of the Subparts of this Part, the general definitions of Part 200 of this Title apply.

(b) For the purpose of this Part, the following definitions also apply:

(1) Commercial waste. Solid waste generated by stores, offices, restaurants, warehouses, and other non-manufacturing activities other than household and industrial waste.

(2) Dioxin equivalent. Any combination or mix of polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans containing from four to eight chlorine atoms which are expressed as 2,3,7,8 tetrachlorinated dibenzo-para-dioxin equivalents using current New York State Department of Health toxic equivalency factors. Standard conditions upon which these data are referenced are an absolute pressure of 760 mm mercury and 20° C at 7% oxygen.

(3) Incinerator. Any structure or furnace in which combustion takes place and type 0, 1, 2, 3, or 4 refuse is used as fuel, alone or in conjunction with fossil fuel.

(4) Infectious waste. Infectious waste means and includes the following:

(i) surgical waste, which consists of materials discarded from surgical procedures involving the treatment of a patient on isolation, other than patients on reverse or protective isolation;

(ii) obstetrical waste, which consists of materials discarded from obstetrical procedures involving the treatment of a patient on isolation;

(iii) pathological waste, which consists of discarded human tissues and anatomical parts which are discarded from surgery, obstetrical procedures, autopsy and laboratory procedures;

(iv) biological waste, which consists of discarded excretions, exudates, secretions, suctionings, and disposable medical supplies which have come in contact with these substances that cannot be legally discarded directly into a sewer and that emanate from the treatment of a patient on isolation, other than patients on reverse or protective isolation;

(v) discarded materials soiled with blood emanating from the treatment of a patient on isolation, other than patients on reverse or protective isolation;

(vi) all waste being discarded from renal dialysis, including tubing and needles;

(vii) discarded serums and vaccines that have not been autoclaved or returned to the manufacturer or point of origin;

(viii) discarded laboratory waste which has come in contact with pathogenic organisms and which has not been rendered noninfectious by autoclaving or other sterilization techniques;

(ix) animal carcasses exposed to pathogens in research, their bedding, and other waste from such animals that is discarded; and

(x) other articles that are being discarded that are potentially infectious and that might cause punctures or cuts, including intravenous tubing with needles attached, that have not been autoclaved or subjected to a similar sterilization technique and rendered incapable of causing punctures or cuts.

(5) Infectious waste incineration facility. An incinerator which is operated or utilized for the disposal or treatment of infectious waste, including combustion for the recovery of heat, and which utilizes high temperature thermal destruction technologies.

Note: An infectious waste incineration facility may also burn other medical waste.

(6) Medical waste. Infectious waste and all other waste derived from the care of patients.

(7) Municipal solid waste. All materials or substances discarded from single and multiple family dwellings,

and other residential sources; similar types of materials from institutional, commercial and industrial sources; but not hazardous waste as defined in Part 371 of this Title or exclusive firing of sewage sludge.

(8) Municipal solid waste incineration facility. A facility that is owned, operated, or utilized by, or under contract with, a municipality or political subdivision and which utilizes high temperature thermal destruction technologies, including combustion for the recovery of thermal value or for the disposal of municipal solid waste.

Note: A municipal solid waste incineration facility may also be an infectious waste incineration facility.

(9) Private solid waste incineration facility. Any facility, other than a municipal solid waste facility, that burns municipal solid waste, or any fuels derived from municipal solid waste using thermal destruction technologies [illegible] without energy recovery.

(10) Refuse. All waste material, including but not limited to, garbage, rubbish, incinerator residue, street cleanings, dead animals, and offal. Refuse is classified in accordance with Table 1, Appendix 2*.

(11) Smoke. An air contaminant consisting of small gas-borne particles emitted by an air contamination source in sufficient number to be observable.

(12) Solid waste.

(i) Solid waste means all putrescible and non-putrescible materials or substances that are discarded or rejected as being spent, useless, worthless or in excess to the owners at the time of such discard or rejection, including but not limited to garbage, refuse, industrial and commercial waste, sludges from air or water treatment facilities, rubbish, tires, ashes, contained gaseous material, incinerator residue, construction and demolition debris, discarded automobiles and offal.

(ii) A material is discarded if it is abandoned by being:

(a) disposed of;

(b) burned or incinerated, including being burned as a fuel for the purpose of recovering usable energy; or

(c) accumulated, stored, or physically, chemically,

or biologically treated (other than burned or incinerated) instead of or before being disposed of.

(iii) A material is disposed of if it is discharged, deposited, injected, dumped, spilled, leaked, or placed into or on any land or water so that such material or any constituent thereof may enter the environment or be emitted into the air or discharged into groundwater or surface water.

(iv) The following materials are not solid waste for the purposes of this Part:

(a) domestic sewage;

(b) any mixture of domestic sewage and other wastes that passes through a sewer system to a publicly owned treatment works for treatment;

(c) industrial wastewater discharges that are actual point source discharges subject to permit under ECL Article 17. Industrial wastewaters while they are being collected, stored, or treated before discharge, and sludges that are generated by industrial wastewater treatment are solid wastes and are regulated by this Part;

(d) irrigation return flows;

(e) radioactive materials which are source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 USC 2011 et seq. (see subdivision 360-1.3 of this Title); and

(f) materials subject to in-situ mining techniques which are not removed from the ground as part of the extraction process.

219-1.2 Summary of applicability. (a) Subpart 219-2, "Municipal and Private Solid Waste Incineration Facilities."

(1) Subpart 219-2 applies to all new municipal or private solid waste incineration facilities, or modifications of such sources, for which a permit to construct is issued pursuant to Part 201 of this Title, 120 days or more after the effective date of this Part.

(2) Subpart 219-2 applies statewide.

(3) Any incineration facility subject to Subpart 219-2 is exempt from the requirements of Subparts 219-5 and 219-6 of this Part.

(4) Any incineration facility subject to Subpart 219-2 must also comply with Subpart 219-3 when burning infectious waste.

(b) Subpart 219-3, "Infectious Waste Incineration Facilities."

(1) Subpart 219-3 applies to all incinerators used for the incineration of infectious waste or medical waste.

(2) Subpart 219-3 only applies if the total charging rate, as limited by a permit to construct or certificate to operate issued pursuant to Part 201 of this Title, is less than 50 tons per day.

(3) Subpart 219-3 applies statewide.

(c) Subpart 219-4, "Incinerators, Crematories."

(1) Subpart 219-4 applies to all facilities constructed or installed or for which an application for a permit to construct was received by the commissioner after the effective date of this Part, used for the cremation of human and animal bodies, body parts and for the incineration of associated bedding.

(2) Subpart 219-4 applies statewide.

(d) Subpart 219-5, "Existing Incinerators."

(1) Subpart 219-5 applies to incinerators constucted or installed or which had been issued a permit to construct prior to the effective date of this Part.

(2) Subpart 219-5 applies statewide except in New York City or Westchester and Nassau Counties.

(e) Subpart 219-6, "Existing Incinerators-New York City, Nassau and Westchester Counties."

(1) Subpart 219-6 applies to incinerators constructed or installed or which had been issued a permit to construct prior to the effective date of this Part.

(2) Subpart 219-6 only applies in New York City and Westchester and Nassau Counties.

*See Appendix 2, infra.

(Appendix 2 remains unchanged.)

EXPRESS TERMS

Adopt New Subpart 219-3

Infectious Waste Incineration Facilities

(Statutory authority: Environmental Conservation Law,

Sections 3-0301, 19-0301, 19-0303, 19-0306)

Section

Section 219-3.1 Definitions. For the purpose of this Subpart, the definitions of Subpart 219-1 and Part 200 of this Title apply.

Section 219-3.2 Applicability and compliance dates. This Subpart applies to all new, modified and existing infectious waste incineration facilities including those used for the incineration of all medical waste and whose total permitted charging rate is less than 50 tons per day. Any new facility or modification for which an application for a permit to construct a source of air contamination is received by the department ninety or more days after the effective date of this Subpart must comply with the requirements of this Subpart before operation may commence. All other applicable facilities must comply with the requirements of this Subpart by January 1, 1992.

Any facility subject to this Subpart whose total permitted charging rate is 50 tons per day or more or which accepts municipal solid waste must also meet the requirements of Subpart 219-2.

Note: This Subpart alone does not require the incineration of any infectious or non-infectious waste. It only establishes the standards to be met if incineration is the chosen method of waste disposal. The requirement for incineration of infectious waste (as one treatment option) is found in PHL§ 1389-dd (for treatment at hospitals, residential health care facilities and clinical laboratories), in ECL § 15-1507 (for other treatment

facilities), in proposed solid waste regulations (6 NYCRR Subpart 360-10) and in Department of Health regulations (10 NYCRR 405.3 (b)(5) and 702.2(e)). If non-infectious waste is incinerated by choice, it must meet the requirements of Subpart 219-3 or 219-2.

Section 219-3.3 Particulate emissions No person may cause or allow emissions of particulates into the outdoor atmosphere from any emission source located in a facility subject to this Subpart in excess of 0.015 grains per dry standard cubic foot of flue gas, corrected to seven percent oxygen.

Section 219-3.4 Hydrogen chloride emissions. No person may cause or allow a running three-hour average emission of hydrogen chloride from any incinerator at a facility subject to this Subpart in excess of 10 percent by weight of the uncontrolled emissions (90 percent reduction) unless it is demonstrated that the stack concentration is less than 50 parts per million by volume, dry basis, corrected to seven percent oxygen; or the uncontrolled emission rate is less than four pounds per hour and the total charging rate is less than 500 pounds per hour.

Section 219-3.5 Design requirements. (a) Furnace design must provide for a residence time for combustion gas of at least one second at no less than 1800 degrees F. For a multichamber incinerator, these parameters must be met after the primary combustion chamber and the primary combustion chamber temperature must be maintained at no less than 1400 degrees F, or

(b) Furnace design must provide a residence time for combustion gas and a temperature which, in combination, are shown to be equivalent to subdivision (a) of this section.

(c) Auxiliary burners must be designed to provide combustion chamber temperatures as described in subdivision (a) of this section by means of automatic modulating controls.

(d) Each incinerator must incorporate an interlock system which will:

(1) Prevent the charging of waste into the incinerator until the temperatures described in subdivision (a) of this section have been reached;

(2) Prevent recharging until each design burn cycle is complete; and

(3) Maintain the temperatures described in subdivision (a) of this section until all waste has been reduced to ash and carbon.

(e) Mechanically fed incinerators must incorporate an air lock system to prevent opening the incinerator to the room environment. The volume of the loading system must be designed so as to prevent overcharging to assure complete combustion of the waste.

(f) Control equipment for reducing emissions hydrogen chloride must be designed such that the flue gas temperature at the outlet of the control device does not exc 300 degrees F unless a demonstration is made that a greater tion of condensible matter can be achieved at a higher tempe

Section 219-3.6 Operating requirements. (a) person may cause or allow emissions to the outdoor atmosphere a six-minute average opacity of 10 percent or greater from an emission source subject to these requirements.

(b) No person may cause or allow emissions of monoxide to the outdoor atmosphere having an hourly average concentration in the flue gas exceeding 100 parts per million volume, dry basis, corrected to seven percent oxygen.

(c) No person may operate a facility subject t this subpart unless the temperatures described in Section 219- are maintained.

(d) The commissioner must be notified in writi at least ten days prior to the commencement of operation of a or modified incinerator subject to this Subpart.

Section 219-3.7 Other wastes. (a) Human and body parts of up to five percent of the permitted hourly charg rate for medical waste may be burned in an incinerator subject to this Subpart only if shown by test to be unidentifiable in ash. The Certificate to Operate a source of air contamination will limit the amount of human and animal body parts that may b burned to the amount tested and found acceptable. Human and ar body parts exceeding five percent of the permitted hourly charg rate may be burned only in a crematorium permitted under Subpar 219-4, 219-5 and 219-6.

(b) Radioactive waste, whether decayed or not, may not be burned in an incinerator subject to this Subpart unl that incinerator has been issued a permit pursuant to 6 NYCRR 3

(c) Hazardous waste may not be burned in an incinerator subject to this Subpart unless that incinerator is exempt from or has been issued a permit pursuant to 6 NYCRR 373.

Section 219-3.8 Continuous emission monitoring. (a) Any person who owns or operates a facility subject to this Subpart must install, operate and maintain in accordance with manufacturer's instructions, instruments meeting specifications acceptable to the commissioner for continuously monitoring and recording the following emission and operating parameters:

(1) Primary combustion chamber exit temperature;

(2) Secondary (or last) combustion chamber exit temperature;

(3) Temperature leaving the particulate air cleaning device;

(4) Opacity; and

(5) Carbon monoxide for incinerators whose permitted charging rate is 500 pounds per hour or more.

Monitoring instruments for continuously measuring opacity will be subject to Performance Specification 1 set forth in Title 40 of the Code of Federal Regulations, Part 60, Appendix B.

Section 219-3.9 Stack testing. (a) Each facility subject to this Subpart must be tested while burning the normal waste to be incinerated in that facility, to demonstrate compliance with the standards in this Subpart. At a minimum, each incinerator must be tested at start-up and annually thereafter for particulates, hydrogen chloride, oxygen and carbon monoxide emissions. Additional testing will be at the discretion of the commissioner.

(b) A test protocol, including the configuration of breeching, stack and test port locations and test methods must be submitted for the commissioner's approval at least 30 days prior to stack testing.

(c) Witnessing of all stack tests by the commissioner's representative is required. Results of any stack test done in the absence of an approved protocol, or which is not witnessed, will not be accepted.

(d) Three copies of the stack test report must be submitted by the permittee to the commissioner within 60 days after completion of the tests, in accordance with 6 NYCRR 202.3.

Section 219-3.10 Data and calculations. Each application for a permit to construct a source of air contamination for a facility subject to this Subpart must include:

(a) Basic engineering data relative to the waste to be burned, incinerator design, combustion air, control devices and air cleaning devices; and

(b) An impact analysis using procedures acceptable to the commissioner.

Section 219-3.11 Operator training and certification.

(a) No facility subject to this Subpart will be permitted to operate until the applicant has submitted material that demonstrates to the satisfaction of the commissioner that the plant will at all times be operated under the direction of individuals who have received training necessary for proper operation of the entire facility.

(b) With the application for a certificate to operate, for a new or modified facility subject to this Subpart, the permittee must submit a description of an operator training program, including at least the following along with a time schedule for accomplishing training of all plant personnel:

(1) Proper operation and maintenance of [illegible]

(2) Knowledge of environmental pertinent [illegible] and the impact of plant operation on all emissions;

(3) Interfacing with the public on the [illegible] plant operation on environmental [illegible]

(c) The on-site operation of any facility subject to these requirements must be directed at all times by a person possessing an appropriate current New York State incinerator operator certification. This requirement is effective nine months after the date of the first qualifying examination approved by the commissioner.

(d) Operation includes, but is not limited to:

(1) Fuel preparation, storage, charging, combustion, heat extraction, combustion gas treatment; and

(2) Proper functioning of all mechanical and/or environmental control and monitoring equipment.

(e) This requirement does not eliminate the need for any person(s) involved with the facility from having to obtain any other required certificate(s) or license(s) necessary for the performance of their specific duties.

Section 219-3.12 Inspection and reporting. Each owner or operator of a permitted facility subject to these requirements must annually inspect that facility and submit a report to the commissioner, certifying that the condition and operation of that facility, including the calibration of all instrumentation, meet manufacturer's specifications. Such reports must be prepared by a qualified professional engineer, registered in New York State.

[PART 219] SUBPART 219-5

EXISTING INCINERATORS

Section

[219.1 Title]
[219.2] 219-5.1 [Applicable geographical area] Applicability
[219.3 Definitions]
[219.4] 219-5.2 Emission limits
[219.5] 219-5.3 [Smoke] Opacity of emissions
[219.6] 219-5.4 Tests
[219.7] 219-5.5 Abatement

Existing section 219.1 is repealed. Existing section 219.2 is renumbered 219-5.1 and is amended to read as follows:

[219.2] 219-5.1 [Applicable geographical area] Applicability. This [Part] Subpart [shall apply] applies to any incinerator which was installed or constructed or for which an application for a permit to construct was received prior to (effective date of this Subpart) located in the [entire] State of New York except New York City and Nassau and Westchester Counties.

Existing section 219.3 is repealed. Existing section 219.4 is amended to read as follows:

[219.4] 219-5.2 Emission limits. (a) All incinerators having a capacity of 2000 lb/hr or less and built and installed after January 1, 1968, [shall] must be designed, built, installed and operated to meet the emission limits of figure 1*.

(b) No incinerator larger than 2000 lb/hr capacity and built after January 1, 1970, [shall] will be operated so as to produce particulate emissions which exceed the amount shown in figure 1*.

(c) No incinerator having a capacity of 2000 lb/hr or less and built or installed between April 1, 1962, and January 1, 1968, [shall] will be operated so as to produce particulate emissions which exceed 0.5 lb/hr for every 100 lb/hr of refuse charged, unless a final order of the commissioner provides otherwise.

(d) Any incinerator having a capacity of 2000 lb/hr or less and built or installed prior to April 1, 1962, [shall] must either meet the requirements of [219.4(c)] 219-5.2(c) or [shall] must be equipped with adequate control devices or redesigned and rebuilt so as to meet the requirements of [219.4(a)] 219-5.2(a)

by January 1, 1969.

(e) No incinerator larger than 2000 lb/hr capacity and built between April 1, 1962, and January 1, 1970, [shall] will be operated so as to produce particulate emissions which exceed 0.5 lb/hr for every 100 lb/hr of refuse charged, unless a final order by the commissioner provides otherwise.

(f) Any incinerator larger than 2000 lb/hr capacity and built prior to April 1, 1962, [shall] must either meet the requirements of [219.4(e)] 219-5.2(e) or [shall] must be equipped with adequate control devices or redesigned and rebuilt [so as] to meet the requirements of [219.4(b)] 219-5.2(b) by January 1, 1970.

Existing section 219.5 is renumbered 219-5.3, and is amended to read as follows:

[219.5] 219-5.3 [Smoke] Opacity of emissions. (a) No incinerator, built or installed after January 26, 1967, regardless of size, [shall] will emit [smoke of an opacity denser than 20 percent or No. 1 of the Ringelmann chart or equivalent,] visible emissions having an average opacity during any six consecutive minutes of greater than 20 percent, under normal operating conditions.

(b) No incinerator built or installed prior to January 26, 1967, regardless of size, [shall] will be operated so as to emit [smoke of an opacity denser than 40 percent or No. 2 of the Ringelmann chart or equivalent] visible emissions having an average opacity during any six consecutive minutes of greater than 20 percent, under normal operating conditions.

Existing section 219.6 is renumbered 219-5.4, and is amended to read as follows:

[219.6] 219-5.4 Tests. (a) All incinerators larger than 2000 lb/hr capacity [shall] must be tested using [isokinetic sampling techniques in accordance with test procedures] emission tests acceptable to the commissioner.

(b) All incinerators built or installed after January 1, 1968 and having a capacity of 2000 lb/hr or less [shall] must be tested [in accordance with special test procedures promulgated by the commissioner] using emission tests acceptable to the commissioner. Units which are representative models may be tested instead of an actual installation, [in accordance with special test procedures promulgated by the commissioner] using emission tests acceptable to the commissioner.

Existing section 219.7 is renumbered 219-5.5,

and is amended to read as follows:

[219.7] 219-5.5 Abatement. (a) Where the commissioner has reason to believe that an incinerator installation is violating the emission standards of section [219.4] 219-5.2 of this [Part] Subpart, he may have tests conducted. The owner [shall] must provide, at his expense, sampling holes and pertinent allied facilities as needed, at the request of the commissioner.

(Renumbered subdivision 219-5.5(b) remains unchanged.)

Renumbered subdivisions 219-5.5(c) and 219-5.5(d) are amended to read as follows:

(c) The commissioner may order the cleaning, repair, replacement or alteration of any equipment or control equipment which causes or is operated so as to cause a violation of this [Part] Subpart.

(d) The commissioner may order a change in the manner of operation of an incinerator which is operated so as to cause a violation of this [Part] Subpart.

*See Appendix 2, infra.

(Appendix 2 remains unchanged.)

APPENDIX E

Hospital Incineration Field Data and Emissions Calculations

DETERMINATION OF MINIMUM NUMBER OF TRAVERSE POINTS

Stack ID: HOSPITAL INCINERATOR Stack diameter at ports: 1.1 (ft)

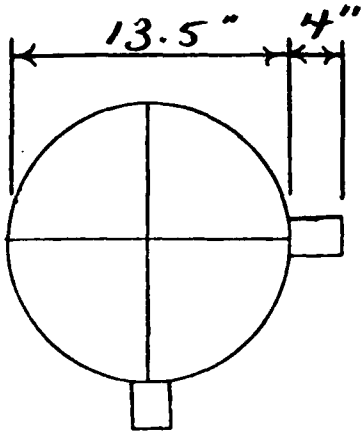
Distance A (ft) 5.6 (duct diameters) 5.0

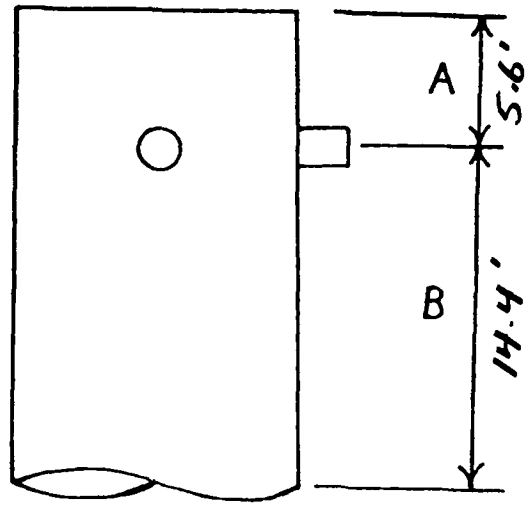
Recommended number of traverse points as determined by distance A: 8

Distance B (ft) 14.4 (duct diameters) 12.8

Recommended number of traverse points as determined by distance B: 8

Number of traverse points used: 8





PARTICULATE SAMPLING DATA SHEET

RUN NUMBER: #1
DATE: Dec 9
PLANT: Hosp Inc
BASE: Plattsburgh
SAMPLE BOX NUMBER: RAC
METER BOX NUMBER: Nutech
Qw/Qm:
Co:

SCHEMATIC OF STACK CROSS SECTION

501b loaded @ 12:33

Filter 3 + 4

leak check @ 25" Hg

total Time 10.5 min

8 min/pt

EQUATIONS

$°R = °F + 460$

$$H = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \cdot \frac{Tm}{Ts} \cdot Vp$$

t = 64 min

$\overline{PSTS} = 7.7171$
$\overline{Ts} = 582$
$\overline{Tm} = 61$
$\overline{\Delta H} = 2.00$

AMBIENT TEMP: ~~60~~ 45 °F
STATION PRESS: 29.713 in Hg
HEATER BOX TEMP: °F
PROBE HEATER SETTING:
PROBE LENGTH: in
NOZZLE AREA (A): .499, .499, .498 sq ft
Cp: .84
DRY GAS FRACTION (Fd): ~5%

TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in H2O)	STACK TEMP (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP IN (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP OUT (°F)	SAMPLE BOX TEMP (°F)	IMPINGER OUTLET TEMP (°F)
56 for 6												
1	1235	.07	6	450		0.065	2.27	600.599	61		63	268 64
4			9	450		0.055	2.28		68		63	
2 8				500		0.08	3.15		70		64	
12		10.5 min						610.062				
3 16												
20												
4 24												
28												
32						~~3.08~~ 2.43						
2	1300		7	612		0.07	~~610.268~~	61		62		
4			7	666		0.08	2.79	66		62	305	70
3 8			8	650		0.080	2.71	69		62		
12			8	667		0.080	2.68	71		62		
4 16			6	666		0.065	1.67	71		62		
20			6	662		0.065	1.68	71		62		
	1240			1400	3	450 P					opacity	30-50 %
	1245			1400	3	450 P		P =				
	1250			1400	3	350 P						

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PARTICULATE SAMPLING DATA SHEET

RUN NUMBER #1

DATE Dec 9

PLANT roop Inc

BASE Holloman

SAMPLE BOX NUMBER RAC

METER BOX NUMBER Nutech

Qw/Qm

Co

SCHEMATIC OF STACK CROSS SECTION

zero leak @ 8" Hg

cont run #1

EQUATIONS

$^{o}R = {}^{o}F + 460$

$$H = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \cdot \frac{Tm}{Ts} \cdot Vp$$

AMBIENT TEMP °F

STATION PRESS in Hg

HEATER BOX TEMP °F

PROBE HEATER SETTING

PROBE LENGTH in

NOZZLE AREA (A) sq ft

Cp

DRY GAS FRACTION (Fd)

TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in H20)	STACK TEMP (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP IN (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP OUT (°F)	SAMPLE BOX TEMP (°F)	IMPINGER OUTLET TEMP (°F)
1	1400	0.07	450		0.03	1.22	636.726	56		56	272	57
4		4	450		0.035	1.42		56		55	258	1300 P
2 8		4	550		0.035	1.42		58		56	263	1409 900 S
12		6	625		0.07	2.39		60		55	270	61
3 16		7	626		0.075	2.57		63		56		
20		8	653		0.08	2.68		65		56	262	
4 24		18	650		0.055	2.49 1.85		66		57	265	
28		7	642		0.055	1.87		67		57		
32							643.649					
	1304	.200 f	1700 s									
	1315	800 f	1400 s									
	1340	900 f	1300 s									

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AIR POLLUTION PARTICULATE ANALYTICAL DATA

BASE	DATE	RUN NUMBER
PLATTSBURGH AFB	9 DEC 87	3

BUILDING NUMBER	SOURCE NUMBER
HOSP INCINERATOR Run #1	

I. PARTICULATES

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT PARTICLES (gm)
FILTER NUMBER	0.7507	* 0.2931 + 0.2950	0.1626
ACETONE WASHINGS (Probe, Front Half Filter)	99.6460	99.5518	0.0942
BACK HALF (If needed) * 2 filters needed			
	Total Weight of Particulates Collected		0.2568 gm

II. WATER

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT WATER (gm)
IMPINGER 1 (H20)	116	100	16
IMPINGER 2 (H20)	118	100	18
IMPINGER 3 (Dry)	0.5	0	0.5
IMPINGER 4 (Silica Gel) 249.35 tare 27.7	221.65	207.18	14.47
	Total Weight of Water Collected		48.97 gm

III. GASES (Dry)

ITEM	ANALYSIS 1	ANALYSIS 2	ANALYSIS 3	ANALYSIS 4	AVERAGE
VOL % CO_2	2.3	2.5	2.4		2.4
VOL % O_2	17.3	17.3	17.4		17.33
VOL % CO					
VOL % N_2					

Vol % N_2 = (100% - % CO_2 - % O_2 - % CO)

OEHL FORM 20 MAY 78

AIR POLLUTION PARTICULATE ANALYTICAL DATA

BASE	DATE	RUN NUMBER
Plattsburgh	9 Dec 87	# 4

BUILDING NUMBER	SOURCE NUMBER
Run # 1 cont	

I. PARTICULATES

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT PARTICLES (gm)
FILTER NUMBER		~~.2937~~ ~~.2946~~ *	
ACETONE WASHINGS (*Probe, Front Half Filter*)	* See previous page		
BACK HALF (*If needed*)	2 filters used for this run		
	Total Weight of Particulates Collected		gm

II. WATER

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT WATER (gm)
IMPINGER 1 (*H20*)			
IMPINGER 2 (*H20*)			
IMPINGER 3 (*Dry*)			
IMPINGER 4 (*Silica Gel*)		~~906.44~~	
	Total Weight of Water Collected		gm

III. GASES (*Dry*)

ITEM	ANALYSIS 1	ANALYSIS 2	ANALYSIS 3	ANALYSIS 4	AVERAGE
VOL % CO_2					
VOL % O_2					
VOL % CO					
VOL % N_2					

Vol % N_2 = (100% - % CO_2 - % O_2 - % CO)

OEHL FORM MAY 78 20

PRELIMINARY SURVEY DATA SHEET NO. 2

(Velocity and Temperature Traverse)

BASE: Plattsburgh	DATE: 9 Dec 87
BOILER NUMBER: Hosp Inc	
INSIDE STACK DIAMETER: 13.5	Inches
STATION PRESSURE: 29.713	In Hg
STACK STATIC PRESSURE: 0.07	In H20
SAMPLING TEAM: ECB	

TRAVERSE POINT NUMBER	VELOCITY HEAD, V_p IN H20	cyclonic flow		STACK TEMPERATURE (°F)
1	0.045	14	16	
2	0.06	9	18	
3	0.065	4	19	750
4	0.06	4 0	18	
			(18)	
		.4816		
20 - 50/65 / burn				
~~5-22~~ / wk				
	pitot leak check			
	⊕ 6.3 ✓			
	⊖ 5.2			
	.496			
AVERAGE				

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PRELIMINARY SURVEY DATA SHEET NO. 1

(Stack Geometry)

BASE: PLATTSBURG	PLANT:
DATE: 09 DEC 88	SAMPLING TEAM: OEHL
SOURCE TYPE AND MAKE: SPIRON ZE INCINERATOR CORP MODEL RL-20 HDP, TYPE 4 WASTE	
SOURCE NUMBER: HOSP INCINERATOR	INSIDE STACK DIAMETER: 13.5 Inches
RELATED CAPACITY: 150 lb/hr	TYPE FUEL: LP GAS
DISTANCE FROM OUTSIDE OF NIPPLE TO INSIDE DIAMETER: 4 Inches	
NUMBER OF TRAVERSES: 2	NUMBER OF POINTS/TRAVERSE: 4

LOCATION OF SAMPLING POINTS ALONG TRAVERSE

POINT	PERCENT OF DIAMETER	DISTANCE FROM INSIDE WALL (Inches)	TOTAL DISTANCE FROM OUTSIDE OF NIPPLE TO SAMPLING POINT (Inches)
1			4.9
2			7.4
3			14.1
4			16.6

OEHL FORM APR 78 15

notes: ① temp gauge jump 1000-2500 (Sec upon adding cardboard Steadier than

20 lbs/hr

PARTICULATE SAMPLING DATA SHEET

RUN NUMBER: #2

DATE: 10 Dec 87

PLANT: hosp inc

BASE: Pittsburgh

SAMPLE BOX NUMBER: RAC

METER BOX NUMBER: Nutech

Qw/Qm:

Co:

SCHEMATIC OF STACK CROSS SECTION

vel ~ 18 fps

8 min/pt

	Corr	Sec
initial 0725	2700	2700
loaded 0923	2700	2700
@ 0930	300	1000
0933	800	1300

PS16 = 8.3808
Ts = 577
Tm = 57
ΔH = 2.48

4 min into run reach 20" Hg
Limit in vacuum - stop

leak check
20" Hg zero leak
10" Hg zero leak

EQUATIONS

°R = °F + 460

$$H = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \cdot \frac{Tm}{Ts} \cdot Vp$$

Pitot Check: 6.0 (+) ✓ 5.5 (−) ✓

1.8 ① temp in prim (800 sec) → (1800 sec) 47 °F

STATION PRESS: 29.518 in Hg

HEATER BOX TEMP: °F

PROBE HEATER SETTING:

PROBE LENGTH: in

NOZZLE AREA (A): .499 sq ft

Cp: .84

DRY GAS FRACTION (Fd):

start 651.854 *
stop 651.727
648.947

Start 648.947

TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in H20)	STACK TEMP (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP IN (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP OUT (°F)	SAMPLE BOX TEMP (°F)	IMPINGER OUTLET TEMP (°F)
4	0930	.07	520		0.075	2.80	648.947	56		50	260	60
4	1013		560		0.085	2.71		49		49	264	62
3 8	8		590		0.075	2.61		51		49	262	61
12		7.5	590		0.065	2.33		60		54	270	57
2 16	16	7.5	580		0.065	2.33		60		51	270	58
20		7.5	560		0.065	2.36		62		52	264	57
1 24	24	5	565		0.045	1.63		63		53	259	57
28		6	560		0.05	1.82		64		53	258	57
32						2.29	671.654					
4	1054	5	590		0.065	2.18 2.41		57		54	260	60
4		6.5	606		0.065	2.24		60		54	260	61
3 8		7	600		0.07	2.45		62		55	258	61
12		8	605		0.08	2.89		65		55	257	61
2 16		8	602		0.080	2.64 2.82		67		57	258	61
20		8	579		0.080	2.88		68		57	255	62
1 24		6	584		0.07	2.52		69		58	267	62
28		8	568		0.07	2.56		70		58	267	62
32							695.679 *					

t = 64 min

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second load 1007

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AIR POLLUTION PARTICULATE ANALYTICAL DATA

CASE	DATE	RUN NUMBER
Run # 2 ~~cont~~	10 Dec	# ~~#~~ 5

BUILDING NUMBER	SOURCE NUMBER
hosp inc	

I. PARTICULATES

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT PARTICLES (gm)
FILTER NUMBER	0.8004	~~0.2912~~ + 0.2912 ~~0.2916~~ 0.2885	0.2207
ACETONE WASHINGS (Probe, Front Half Filter)	97.7515	97.6556	0.0959
BACK HALF (If needed)	* 2 filters used for this run		
	Total Weight of Particulates Collected		0.3166 gm

II. WATER

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT WATER (gm)
IMPINGER 1 (H20)	110	100	10
IMPINGER 2 (H20)	116	100	16
IMPINGER 3 (Dry)	0.5	0	0.5
IMPINGER 4 (Silica Gel) 245.25 Tare 27.7	218.15	206.44	11.71
	Total Weight of Water Collected		38.21 gm

III. GASES (Dry)

ITEM	ANALYSIS 1	ANALYSIS 2	ANALYSIS 3	ANALYSIS 4	AVERAGE
VOL % CO_2	3.5	3.6	3.5		3.53
VOL % O_2	15.3	15.5	15.6		15.47
VOL % CO					
VOL % N_2					

Vol % N_2 = (100% - % CO_2 - % O_2 - % CO)

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AIR POLLUTION PARTICULATE ANALYTICAL DATA

CASE	DATE	RUN NUMBER
Run #2 cont	10 Dec	# 6

BUILDING NUMBER	SOURCE NUMBER
hosp Inc	

I. PARTICULATES

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT PARTICLES (gm)
FILTER NUMBER		[redacted] * 0.2912	
ACETONE WASHINGS (Probe, Front Half Filter)	* See previous page		
BACK HALF (If needed)	2 filters used for this run		
	Total Weight of Particulates Collected		gm

II. WATER

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT WATER (gm)
IMPINGER 1 (H2O)		~~100~~	
IMPINGER 2 (H2O)		~~95~~	
IMPINGER 3 (Dry)			
IMPINGER 4 (Silica Gel)		~~268.62~~ [illegible]	
	Total Weight of Water Collected		gm

III. GASES (Dry)

ITEM	ANALYSIS 1	ANALYSIS 2	ANALYSIS 3	ANALYSIS 4	AVERAGE
VOL % CO_2					
VOL % O_2					
VOL % CO					
VOL % N_2					

Vol % N_2 = (100% - % CO_2 - % O_2 - % CO)

OEHL FORM MAY 78 20

PARTICULATE SAMPLING DATA SHEET

RUN NUMBER: #3
DATE: 10 Dec 87
PLANT: hosp inc
BASE: Plattsburgh
SAMPLE BOX NUMBER: RAC
METER BOX NUMBER: Nutech
Qw/Qm:
Co:

SCHEMATIC OF STACK CROSS SECTION
load 10 lb 1239 (paper)
7 lb 1235 (plastic)
leak check @ 12" Hg zero leak

$\bar{P}_B/\bar{P}_S$ = 8.9371
$\bar{T}_S$ = 632
$\bar{T}_m$ = 60
$\bar{\Delta H}$ = 2.55

EQUATIONS (2.68)
$T_R = T_F + 460$

$$H = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \cdot \frac{Tm}{Ts} \cdot Vp$$

t = 64 min

AMBIENT TEMP: 46 °F
STATION PRESS: 29.58 in Hg
HEATER BOX TEMP: °F
PROBE HEATER SETTING:
PROBE LENGTH: in
NOZZLE AREA (A): .499 sq ft
Cp: 1.84
DRY GAS FRACTION (Fd):

TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in H20)	STACK TEMP (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP IN (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP OUT (°F)	SAMPLE BOX TEMP (°F)	IMPINGER OUTLET TEMP (°F)
4	1234	0.07 VR 5	620		0.08	2.36	695.903	53		53	251	52
	4	7	622		0.065	2.12		57		53	249	52
3	8	10	650		0.085	2.84		61		54	247	58
	12	11	643		0.09	3.04		64		55	263	62
2	16	11.5	645		0.085	2.87		66		56	266	66
	20	11.5	606		0.085	2.98		67		56	267	69
1	24	10.5	602		0.07	2.47		68		57	268	66
	28	10	602		0.07	2.47		68		57	255	66
	32	9		.07	0.065	2.45	720.135					
4		9	602		0.07	2.45		59		58	250	66
	4	9	645		0.07	2.36		63		58	250	66
3	8	11.5	643		0.085	2.87		65		59	244	67
	12	12	650		0.085	2.87		67		59	254	65
2	16	12	652		0.08	2.70		68		59	250	65
	20	12	633		0.08	2.75		69		60	242	65
1	24	8	634		0.045	1.55		67		60	260	65
	28	7	634		0.04	1.37		68		60	254	65
	32						743.313					

OEHL FORM MAY 78 18

AIR POLLUTION PARTICULATE ANALYTICAL DATA

BASE	DATE	RUN NUMBER
Plattsburgh	10 Dec 87	# 7

BUILDING NUMBER	SOURCE NUMBER
hap inc Run #3	

I. PARTICULATES

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT PARTICLES (gm)
FILTER NUMBER	0.3268	~~.2916~~ * .2926	0.0342
ACETONE WASHINGS (Probe, Front Half Filter)	99.1738	99.1074	0.0664
BACK HALF (If needed)	* one filter for this run		
	Total Weight of Particulates Collected		0.1006 gm

II. WATER

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT WATER (gm)
IMPINGER 1 (H2O) 100 - 100 10 10 0.5 - 0.55	104	100	4
IMPINGER 2 (H2O)	115	98	17
IMPINGER 3 (Dry)	3.8	0	3.8
IMPINGER 4 (Silica Gel) 254.8 tare 27.85	226.95	208.62 ~~[illegible]~~	18.33
	Total Weight of Water Collected		43.13 gm

III. GASES (Dry)

ITEM	ANALYSIS 1	ANALYSIS 2	ANALYSIS 3	ANALYSIS 4	AVERAGE
VOL % CO_2	2.7	2.6	2.4		2.57
VOL % O_2	17.1	17.3	17.4		17.27
VOL % CO					
VOL % N_2					

Vol % N_2 = (100% - % CO_2 - % O_2 - % CO)

OEHL FORM MAY 78 20

```
        XROM "METH 5"
RUN NUMBER
HOSPITAL R1
                    RUN
METER BOX Y?
          1.0020    RUN
DELTA H?
          2.0700  - RUN
BAR PRESS ?
         29.7130    RUN
METER VOL ?
         46.0500    RUN
MTR TEMP F?
         61.0000    RUN
% OTHER GAS
REMOVED BEFORE
DRY GAS METER ?
                    RUN
STATIC MOM IN ?
           .0700    RUN
STACK TEMP.
        582.0000    RUN
ML. WATER ?
         48.9700    RUN
IMP. % MOM = 4.4

% MOM=4.4


% CO2?
          2.4000    RUN
% OXYGEN?
         17.3300    RUN
% CO ?
                    RUN
MOL WT OTHER?
                    RUN

MWd =29.00
MW WET=28.59


SQRT PSTS ?
          7.7171    RUN
TIME MIN ?
         64.0000    RUN
NOZZLE DIA ?
           .4990    RUN
STK DIA INCH ?
         13.5000    RUN

* VOL MTR STD = 50.403
  STK PRES ABS = 29.72
  VOL MOM GAS = 2.31
  % MOISTURE = 4.37
  MOL DRY GAS = 0.956
  % NITROGEN = 80.27
  MOL WT DRY = 29.00
  MOL WT WET = 28.59
  VELOCITY FPS = 19.01
  STACK AREA = 0.99
  STACK ACFM = 1,134.
* STACK DSCFM = 546.
  % ISOKINETIC =  105.69
```

```
        XROM "MASSFLO"
RUN NUMBER
HOSPITAL R1
                    RUN

VOL MTR STD ?
          50.403    RUN
STACK DSCFM ?
         546.00     RUN
FRONT 1/2 MG ?
            .00     CLX
         256.80     RUN
BACK 1/2 MG ?
            0.00    RUN


F  GR/DSCF = 0.08
F  MG/MMM = 179.92
F  LB/HR = 0.37
F  KG/HR = 0.17
```

```
        XROM "METH 5"
RUN NUMBER
HOSPITAL R2
                    RUN
METER BOX Y?
          1.0020    RUN
DELTA H?
          2.4000    RUN
BAR PRESS ?
         29.5100    RUN
METER VOL ?
         46.7500    RUN
MTR TEMP F?
         57.0000    RUN
% OTHER GAS
REMOVED BEFORE
DRY GAS METER ?
                    RUN
STATIC MOM IN ?
           .0700    RUN
STACK TEMP.
        577.0000    RUN
ML. WATER ?
         38.2100    RUN
IMP. % MOM = 3.4

% MOM=3.4


% CO2?
          3.5300    RUN
% OXYGEN?
         15.4700    RUN
% CO ?
                    RUN
MOL WT OTHER?
                    RUN

MWd =29.10
MW WET=28.88


SQRT PSTS ?
          8.3868    RUN
TIME MIN ?
         64.0000    RUN
NOZZLE DIA ?
           .4990    RUN
STK DIA INCH ?
         13.5000    RUN

* VOL MTR STD = 51.280
  STK PRES ABS = 29.52
  VOL MOM GAS = 1.88
  % MOISTURE = 3.39
  MOL DRY GAS = 0.966
  % NITROGEN = 81.00
  MOL WT DRY = 29.10
  MOL WT WET = 28.88
  VELOCITY FPS = 20.64
  STACK AREA = 0.99
  STACK ACFM = 1,231.
* STACK DSCFM = 597.
  % ISOKINETIC =  98.22
```

```
        XROM "MASSFLO"
RUN NUMBER
HOSPITAL R2
                    RUN

VOL MTR STD ?
          51.28     RUN
STACK DSCFM ?
         597.00     RUN
FRONT 1/2 MG ?
         316.60     RUN
BACK 1/2 MG ?
            0.00    RUN


F  GR/DSCF = 0.10
F  MG/MMM = 218.83
F  LB/HR = 0.49
F  KG/HR = 0.22
```

```
          XROM "METH 5"
RUN NUMBER
HOSPITAL R3
                    RUN
METER BOX Y?
          1.0020    RUN
DELTA H?
          2.5500    RUN
BAR PRESS ?
         29.5100    RUN
METER VOL ?
         47.4000    RUN
MTR TEMP F?
         60.0000    RUN
% OTHER GAS
REMOVED BEFORE
                    RUN
DRY GAS METER ?
                    RUN
STATIC MOM IN ?
           .0700    RUN
STACK TEMP.
        632.0000    RUN
ML. WATER ?
         43.1300    RUN
IMP. % MOM = 3.8

% MOM=3.8
% CO2?
          2.5700    RUN
% OXYGEN?
         17.2700    RUN
% CO ?
                    RUN
MOL WT OTHER?
                    RUN

MWd =29.10
MW WET=28.68


SQRT PSTS ?
          0.9371    RUN
TIME MIN ?
         64.0000    RUN
NOZZLE DIA ?
           .4990    RUN
STK DIA INCH ?
         13.5000    RUN

* VOL MTR STD = 51.711
  STK PRES ABS = 29.52
  VOL MOM GAS = 2.03
  % MOISTURE = 3.78
  MOL DRY GAS = 0.962
  % NITROGEN = 80.16
  MOL WT DRY = 29.10
  MOL WT WET = 28.68
  VELOCITY FPS = 22.05
  STACK AREA = 0.99
  STACK ACFM = 1,315.
* STACK DSCFM = 604.
  % ISOKINETIC =  97.99
```

```
          XROM "MASSFLO"

RUN NUMBER
HOSPITAL R3
                    RUN

VOL MTR STD ?
          51.711    RUN
STACK DSCFM ?
         604.00     RUN
FRONT 1/2 MG ?
         100.60     RUN
BACK 1/2 MG ?
           0.00     RUN


F  GR/DSCF = 0.03
F  MG/MMM = 60.70
F  LB/HR = 0.15
F  KG/HR = 0.07
```

APPENDIX F

Classified Waste Incinerator Field Data and Emissions Calculations

DETERMINATION OF MINIMUM NUMBER OF TRAVERSE POINTS

Stack ID: CLASSIFIED INCINERATOR Stack diameter at ports: 1.2 (ft)

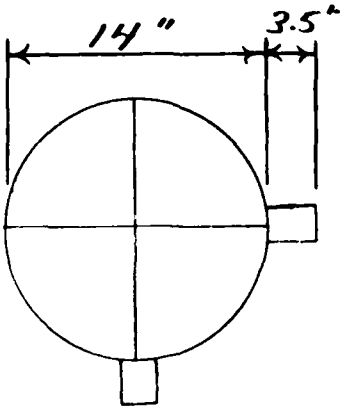
Distance A (ft) 5.6 (duct diameters) 5.0

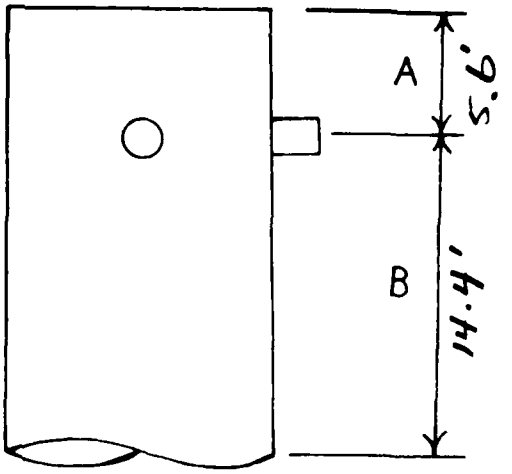
Recommended number of traverse points as determined by distance A: 8

Distance B (ft) 14.4 (duct diameters) 12.8

Recommended number of traverse points as determined by distance B: 8

Number of traverse points used: 8





AIR POLLUTION PARTICULATE ANALYTICAL DATA

BASE	DATE	RUN NUMBER
PLATTSBURGH AFB	8 DEC 87	1

BUILDING NUMBER	SOURCE NUMBER
Classified INCINERATOR	Classified

I. PARTICULATES

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT PARTICLES (gm)
FILTER NUMBER	0.5560	0.2869	0.2691
ACETONE WASHINGS (Probe, Front Half Filter)	101.4874	100.3360	1.1514
BACK HALF (If needed)			
	Total Weight of Particulates Collected		1.4205 gm

II. WATER

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT H_2O	WEIGHT WATER (gm)
IMPINGER 1 (H20)	120	100	20
IMPINGER 2 (H20)	112	100	12
IMPINGER 3 (Dry)	4.6	0	4.6
IMPINGER 4 (Silica Gel) 241.7 tare 27.4	214.3	202.92	11.38
	Total Weight of Water Collected		47.98 gm

III. GASES (Dry)

ITEM	ANALYSIS 1	ANALYSIS 2	ANALYSIS 3	ANALYSIS 4	AVERAGE
VOL % CO_2	8.2	8.0	8.0		8.07
VOL % O_2	11.8	11.9	11.8		11.83
VOL % CO					
VOL % N_2					

Vol % N_2 = (100% - % CO_2 - % O_2 - % CO)

OEHL FORM 20 MAY 78

PRELIMINARY SURVEY DATA SHEET NO. 2

(Velocity and Temperature Traverse)

BASE Pinellas	DATE
BOILER NUMBER	
INSIDE STACK DIAMETER	Inches
STATION PRESSURE	In Hg
STACK STATIC PRESSURE 0.07	In H20
SAMPLING TEAM	

TRAVERSE POINT NUMBER	VELOCITY HEAD, V_p IN H20	$\sqrt{V_p}$		STACK TEMPERATURE (°F)
1	~~0.08~~ 0.04	17	15	
2	~~0.07~~ 0.07	22	12	750
3	0.07	22	0	
4	0.05	24	15	
			AVG = 10.5	
		REV 21		
Traverse				
0.511				
~~.504~~				
.495 .496 .496				
AVERAGE				

OEHL FORM APR 78 16

PRELIMINARY SURVEY DATA SHEET NO. 1

(Stack Geometry)

BASE: PLATTSBURG	PLANT:
DATE: 08 DEC 88	SAMPLING TEAM: OEHL
SOURCE TYPE AND MAKE: SPRONZE INCINERATOR CORP, MODEL RL-20HD, TYPE 0 WASTE	
SOURCE NUMBER: CLASS. INCINERATOR	INSIDE STACK DIAMETER: 14 Inches
RELATED CAPACITY: 230 lb/hr	TYPE FUEL:
DISTANCE FROM OUTSIDE OF NIPPLE TO INSIDE DIAMETER: 3.5 Inches	
NUMBER OF TRAVERSES: 2	NUMBER OF POINTS/TRAVERSE: 4

LOCATION OF SAMPLING POINTS ALONG TRAVERSE

POINT	PERCENT OF DIAMETER	DISTANCE FROM INSIDE WALL (Inches)	TOTAL DISTANCE FROM OUTSIDE OF NIPPLE TO SAMPLING POINT (Inches)
1			4.4
2			7.0
3			14.0
4			16.6

OEHL FORM 15 APR 78

```
          XROW "METH 5"
RUN NUMBER
CLASSIFIED R1
                    RUN
METER BOX Y?
          1.0020    RUN
DELTA H?
           1.9700   RUN
BAR PRESS ?
          30.1140   RUN
METER VOL ?
          33.8320   RUN
MTR TEMP F?
          51.0000   RUN
% OTHER GAS
REMOVED BEFORE
DRY GAS METER ?
                    RUN
STATIC MON IN ?
            .0700   RUN
STACK TEMP.
         806.7000   RUN
ML. WATER ?
          47.9000   RUN
IMP. % MOH = 5.6

% MOH=5.6


% CO2?
           8.0700   RUN
% OXYGEN?
          11.8300   RUN
% CO ?
                    RUN
MOL WT OTHER?
                    RUN

MWd =29.76
MW MET=29.11


SQRT PSTS ?
           9.2837   RUN
TIME MIN ?
          52.0000   RUN
NOZZLE DIA ?
            .4960   RUN
STK DIA INCH ?
          14.0000   RUN

* VOL MTR STD = 38.192
  STK PRES ABS = 30.12
  VOL MON GAS = 2.26
  % MOISTURE = 5.58
  MOL DRY GAS = 0.944
  % NITROGEN = 80.10
  MOL WT DRY = 29.76
  MOL WT WET = 29.11
  VELOCITY FPS = 22.52
  STACK AREA = 1.07
  STACK ACFM = 1,444.
* STACK DSCFM = 572.
  % ISOKINETIC =  102.33
```

```
          XROW "MASSFLO"
RUN NUMBER
CLASSIFIED R1
                    RUN

VOL MTR STD ?
          38.192    RUN
STACK DSCFM ?
          572.00    RUN
FRONT 1/2 MG ?
        1,420.50    RUN
BACK 1/2 MG ?
            0.00    RUN


F  GR/DSCF = 0.57
F  MG/MMM = 1,313.46
F  LB/HR = 2.81
F  KG/HR = 1.28
```

APPENDIX G

Calibration Data

NOZZLE CALIBRATION DATA FORM

Date 9DEC87 Calibrated by _____

Nozzle identification number	Nozzle Diameter[a]			ΔD,[b] mm (in.)	D_{avg}[c]
	D_1, mm (in.)	D_2, mm (in.)	D_3, mm (in.)		
0.5a	0.499	0.499	0.498	0.001	0.499

where:

[a] $D_{1,2,3}$, = three different nozzles diameters, mm (in.); each diameter must be within (0.025 mm) 0.001 in.

[b] ΔD = maximum difference between any two diameters, mm (in.), $\Delta D \leq$ (0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3.

NOZZLE CALIBRATION DATA FORM

Date _____ 8 DEC 87 Calibrated by _____

Nozzle identification number	Nozzle Diameter[a]			ΔD,[b] mm (in.)	D_{avg}[c]
	D_1, mm (in.)	D_2, mm (in.)	D_3, mm (in.)		
0.56	0.496	0.496	0.495	0.001	0.496

where:

[a] $D_{1,2,3,}$ = three different nozzles diameters, mm (in.); each diameter must be within (0.025 mm) 0.001 in.

[b] ΔD = maximum difference between any two diameters, mm (in.) $\Delta D \leq$ (0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3.

METER BOX CALIBRATION DATA AND CALCULATION FORM

(English units)

Date 28Oct 87 Meter box number Inlet

Barometric pressure, P_b = 29.515 in. Hg Calibrated by Daly

Orifice manometer setting (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F/R	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Avg[a] (t_d), °R	Time (θ), min	Y_i	$\Delta H@_i$ in. H_2O
VAC 6 0.5	5	4.672	74 74 534	79 75	79 75	535.5	13 25/60	1.072	2.056
6 1.0	5	4.684	73 74 533.5	85 81	75 81	540	9 33/60	1.078	2.096
6 1.5	10	9.376	73 74 533.5	90 86	90 86	543.75	15 42/60	1.083	2.067
6 2.0	10	9.400	73 73 533	93 91	93 91	547	13 49/60	1.086	2.126
6 3.0	10	9.441	73 73 533	97 95	97 95	550.5	11 57/60	1.086	2.126
6 4.0	10	9.433	74 73 533.5	99 98	88 87	553	9 55/60	1.088	2.171
							Avg	1.082	2.11

ΔH, in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6}) (t + 460)}$	$\Delta H@_i = \frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w} \right]^2$
0.5	0.0368		
1.0	0.0737		
1.5	0.110		
2.0	0.147		
3.0	0.221		
4.0	0.294		

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d.

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number 1 Date 12/6/82 Meter box number Nutech Plant [illegible]

Barometric pressure, P_b = 29.70 in. Hg Dry gas meter number 6840583 Pretest Y 1.082

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Average[a] (t_d), °F	Time (θ), min	Vacuum setting, in. Hg	Y_i	$Y_i \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
1.1	10 9.324	83.113 / 93.784	76 536	84 / 80	78 / 76	79.5 539.5	18 4/60	13	1.076	
1.1	10 1.347	93.784 / 103.127	76 536	84 / 84	80 / 79	82.25 542.75	18 6/60	13	1.080	
1.1	10 9.370	103.127 / 112.787	76 536	87 / 87	82 / 82	84.5 544.5	18 7/60	13	1.081	
									Y = 1.079	

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d

where

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in. H_2O.

Y_i = Ratio of accuracy of wet test meter to dry gas meter for each run.

Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y $\pm$0.05Y.

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, min.

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SUPPLEMENTARY

INFORMATION

DEPARTMENT OF THE AIR FORCE
USAF OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY (AFSC)
BROOKS AIR FORCE BASE, TEXAS 78235-5501

REPLY TO ATTN OF: ECQ

SUBJECT: Addendum to USAFOEHL Report 88-098EQ0159~~MEF~~ GEF, Source Emission Testing of Hospital and Classified Waste Incinerators, Plattsburgh AFB NY

TO: See Distribution

RD-A199 662

1. An error was recently found in the calculation for correcting particulate emissions data to 7% oxygen. Corrections to Table 1 and the text are attached. These corrections do not change the outcome of the testing.

2. Any questions concerning this report can be addressed to Maj Garrison or Capt Vaughn at AUTOVON 240-2891.

SHELTON R. BIRCH, Colonel, USAF, BSC
Chief, Consultant Services Division

1 Atch
Corrections

1. Change Table 1. Stack Emission Data on page 10, 12th column entitled (gr/dscf @ 7% 02) to read:

0.87

0.31
0.26
0.12
0.23

2. Change page 11, paragraph A2a to read: Particulate emissions: Emissions are limited to 0.015 gr/dscf. Actual emissions were 0.23 gr/dscf. Again...

PROJECT CRITIQUE

This response sheet is provided to help us improve our service to you. Your confidential answers will be used by the Consultant Services Division Chief to identify the strengths and weaknesses of our products and services.

Project No: _____

Project Title: EE-098ED0159MEF

	Inadequate	Meager	Satisfactory	Excellent
1. Content (Did the report respond to your question?)				
2. Timeliness (Considering the complexity of the report and field survey requirements, was our response consistent with your needs?) Interim Response: Final Report:				
3. Recommendations (Were the recommendations appropriate and supported by the conclusions?)				
4. Charts, Figures, Graphs and Tables (Did these enhance or clutter the report?)				
5. Clarity (Could you understand the report?)				
6. Project Officer (Professional, competent, courteous)				

COMMENTS: (Please provide any additional comments you believe will help us improve our service. Use this section to expand any Inadequate or Meager blocks.)

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