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7. Author(s) Al Jenkins, Cindy Castronovo, Gloria Lindner, Peter Ouchida, and Dean C. Simeroth				6.	
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16. Abstract (Limit: 200 words) An evaluation test program was conducted to evaluate the emissions from a hospital refuse incinerator. The refuse incinerator/heat recovery system exhaust gas passed through a fabric filter baghouse before the gas was vented to the atmosphere. The evaluation tests were conducted as a part of the Air Resources Board's program to assess emissions from stationary sources. The incinerator was operated at an average burn rate of approximately 980 pounds of hospital refuse per hour during the entire test period. Daily average oxygen and carbon dioxide concentrations ranged from 13.2 percent (%) and 5.5%, respectively to 13.9 and 6.8%. The carbon monoxide concentrations were less than 50 parts per million by volume, (PPMV), during the entire test period. Analysis for selected trace metals was conducted and emission rates determined. The baghouse removal efficiency for trace metals exceeded 99 percent and the baghouse removal efficiency for total particulate matter averaged 93 percent. The baghouse did not have a significant effect on the emissions of hydrochloric acid. Mass emission rates for chlorinated organic compounds were determined. Stack gas samples were analyzed for polychlorinated dibenzodioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and polychlorinated biphenyls (PCBs). The data indicate that hospital incinerators are a potential source of PCDD and PCDF emissions to the atmosphere.					
17. Document Analysis a. Descriptors Organic Waste Destruction Products of Incomplete Combustion (PICs) Principal Organic Compounds (POCs) Destruction and Removal Efficiencies (DREs) b. Identifiers/Open-Ended Terms Tedlar Bag Sampling Resin Cartridge Sampling Gas Chromatography c. COSATI Field/Group					
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## SUMMARY

An evaluation test program was conducted from October 28 through October 31, 1986, by Air Resources Board (ARB) staff to evaluate the emissions from a hospital refuse incinerator located at the Cedars Sinai Medical Center in Los Angeles, CA. The refuse incinerator/heat recovery system exhaust gas passes through a fabric filter baghouse before the gas is vented to the atmosphere. A schematic of the system including sampling points is shown in Figure S-1.

The evaluation tests were conducted as a part of the Air Resources Board's program to assess emissions from stationary sources.

The incinerator was operated at an average burn rate of approximately 980 pounds of hospital refuse per hour during the entire test period. Daily average emissions of gaseous pollutants, particulate matter and hydrochloric acid as determined from test data are shown in Table S-1. Oxygen and carbon dioxide concentrations indicated the incinerator was operated at steady state conditions. Daily average oxygen and carbon dioxide concentrations ranged from 13.2 percent(%) and 5.5%, respectively to 13.9% and 6.8%. The carbon monoxide concentrations were less than 50 parts per million by volume, (PPMV), during the entire test period.

Analysis for selected trace metals was conducted and emission concentrations and mass rates are presented in Section V of the report. The baghouse removal efficiency for trace metals exceeded 99 percent and the baghouse removal efficiency for total particulate matter exceeded 98 percent. However, the baghouse did not have a significant effect on the emissions

TABLE 4  
 STACK CONDITIONS FOR INCINERATOR  
 AT CEDARS SINAI MEDICAL CENTER

Date	Location	Stack Gas Velocity, Ft/Sec.	Stack Gas Flow DSCFM	Moisture Content, % by Vol.	Temperature, °F
10-29-86	Baghouse Outlet	42.9	2711	9.3	332
	Baghouse Inlet	48.7	2793	12.2	389
	Boiler Outlet	44.4	2401	13.1	435
10-30-86	Baghouse Outlet	43.1	2699	10.0	332
	Baghouse Inlet	47.1	2710	11.4	393
	Boiler Outlet	46.7	2550	12.4	433
10-31-86	Baghouse Outlet	43.0	2720	8.6	332
	Baghouse Inlet	47.6	2789	9.0	397
	Boiler Outlet	44.6	2435	10.1	453

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TABLE 5

DAILY AVERAGE CONCENTRATIONS OF OXYGEN, CARBON DIOXIDE,  
 CARBON MONOXIDE, OXIDES OF NITROGEN, SULFUR DIOXIDE,  
 TOTAL HYDROCARBONS, PARTICULATE MATTER AND HYDROCHLORIC ACID  
 IN THE BAGHOUSE OUTLET STACK GAS AT CEDARS SINAI MEDICAL CENTER

Date	O <sub>2</sub> <sup>a/</sup> Percent	CO <sub>2</sub> <sup>a/</sup> Percent	CO <sup>a/</sup> PPMV	NO <sub>x</sub> <sup>b/</sup> PPMV	SO <sub>2</sub> <sup>b/</sup> PPMV	HC <sup>bc/</sup> PPMV	PM <sup>de/</sup> gr/DSCF	HCL <sup>d/</sup> PPMV
10-29-86	13.3	6.6	<50	270	50	7	0.001	<u>f/</u>
10-30-86	13.9	5.5	<50	220	25	3	0.001	521
10-31-86	13.2	6.8	<50	160	35	3	0.002	403

a/ The O<sub>2</sub>, CO<sub>2</sub> and CO values were used to determine the molecular weight of the stack gas and mass emission rates.  
 b/ NO<sub>x</sub>, SO<sub>2</sub> and HC data corrected to 3 percent O<sub>2</sub>.  
 c/ Total hydrocarbon data reported as propane.  
 d/ Reported at actual flue gas oxygen concentration.  
 e/ Includes front half of Method 5 catch only.  
 f/ Test results for 10-29-86 baghouse outlet deemed invalid.

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TABLE 6

MASS EMISSION RATES OF PARTICULATE MATTER AND HYDROCHLORIC ACID, LBS/HR  
AT CEDARS SINAI MEDICAL CENTER

DATE	Baghouse Inlet		Baghouse Outlet	
	PM	HCL	PM	HCL <sup>a/</sup>
10-29-86	1.73	12.86	0.03	0.59
10-30-86	1.27	9.18	0.02	7.98
10-31-86	0.69	6.30	0.05	6.23

a/ HCL data for 10-29-86 baghouse outlet deemed invalid.

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TABLE 12

MASS EMISSION RATES FOR 2,3,7,8-SUBSTITUTED PCDD AND PCDF  
IN GAS SAMPLES FROM INLET AND OUTLET OF BAGHOUSE  
AT CEDARS-SINAI MEDICAL CENTER INCINERATOR

Sampling date Sampling location	10-29-86		10-30-86		10-31-86 a/	
	INLET	OUTLET	INLET	OUTLET	INLET	OUTLET
	(ng/sec)		(ng/sec)		(ng/sec)	
<b>DIOXINS</b>						
2,3,7,8-TCDD	0.20	0.32	0.48	0.51	0.34	<0.02
1,2,3,7,8-PeCDD	0.67	1.64	2.49	1.93	1.43	<0.57
1,2,3,4,7,8-HxCDD	2.91	1.69	2.19	2.93	2.40	<0.96
1,2,3,6,7,8-HxCDD	2.68	2.77	3.99	3.44	4.52	<1.61
1,2,3,7,8,9-HxCDD	2.33	1.90	2.81	2.91	3.05	1.07
1,2,3,4,6,7,8-HpCDD	36.4	28.4	44.6	30.8	52.6	13.6
OCDD	70.8	50.1	90.2	33.8	131	13.5
<b>FURANS</b>						
2,3,7,8-TCDF	1.28	1.96	2.78	2.79	2.12	0.63
1,2,3,7,8-PeCDF	5.93	6.98	11.2	10.1	8.76	2.50
2,3,4,7,8-PeCDF	6.40	7.03	11.0	10.0	11.0	2.15
1,2,3,4,7,8-HxCDF	11.2	11.2	17.3	15.1	17.5	3.98
1,2,3,6,7,8-HxCDF	10.7	11.9	16.7	15.3	16.6	4.94
1,2,3,7,8,9-HxCDF	<0.55	1.32	<1.12	0.87	<1.28	<0.06
2,3,4,6,7,8-HxCDF	15.1	16.0	24.2	18.2	29.9	6.33
1,2,3,4,6,7,8-HpCDF	77.4	78.5	102	77.1	133	21.9
1,2,3,4,7,8,9-HpCDF	13.4	10.7	14.9	11.1	23.3	3.69
OCDF	76.7	62.8	102	48.4	187	11.4

The mass emission rates shown for 10/29 and 10/30 do not include the contribution of the resin PCDD/PCDF spike mix.

a/ Outlet sample train leakage. Data invalid.

See text, page 19.

<0.55 = Not detected at detection limit of 0.55 ng/sec.

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TABLE 18

MASS EMISSION RATES OF ARSENIC, CADMIUM,  
CHROMIUM, IRON, MANGANESE, NICKEL AND LEAD  
IN THE STACK GAS AT CEDARS SINAI MEDICAL CENTER

## MASS EMISSION RATES, POUNDS/HOUR

RUN NO.	As	Cd	Cr	Fe	Mn	Ni	Pb
HCL/M5-1D	1.43E-4	3.33E-3	1.78E-4	2.55E-3	2.14E-4	<5.31E-5	2.84E-2
HCL/M5-2D	9.05E-5	1.77E-3	0.50E-4	3.56E-3	2.14E-4	<5.43E-5	2.05E-2
HCL/M5-3D	7.22E-5	1.42E-3	0.63E-4	2.02E-3	1.61E-4	<5.47E-5	1.49E-2
HCL/M5-1S	<2.0E-8	<2.58E-6	1.59E-6	<1.19E-5	<2.58E-6	<1.49E-5	<4.97E-5
HCL/M5-2S	<2.0E-8	<2.60E-6	1.20E-6	<1.20E-5	<2.60E-6	<1.05E-5	<5.00E-5
HCL/M5-3S	<1.8E-8	<2.40E-6	0.37E-6	<1.11E-5	<2.40E-6	<1.38E-5	<4.61E-5

a/ The values denoted with the less than symbol (<) are presented to show lower detection limits. The values shown reflect differences in sampling volumes.

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