50272 -101

REPORT DOCUMENTATION PAGE	1. REPORT NO. ARB/ML-90-029	2.	3. PB90-259946
4. Title and Subtitle: ARB Evaluation Test Conducted on a Hospital Waste Incinerator At Los Angeles Co. - USC Medical Center Los Angeles, California			5. Report Date: Date of Approval January 1990 6.
7. Author(s): James E. McCormack 916-323-2289			8. Performing Organization Rept. No.
9. Performing Organization Name and Address: Engineering Evaluation Branch Monitoring and Laboratory Division Air Resources Board P.O. Box 2815 Sacramento, CA 95812			10. Project/Task/Work Unit No. C-87-122 11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address: Air Resources Board State of California 916-322-2990 ~~1220~~ P. O. Box 2815 Sacramento, CA 95812 323-2289			13. Type of Report & Period Covered: Test Report 3/7/88 - 3/11/88 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

A series of emission tests were conducted on a small hospital waste incinerator. The small hospital waste incinerator burns less than 100 pounds per hour of infectious hospital waste and burns a total of no more than 300 pounds per day. Hospital waste incinerators previously tested by the ARB were rated at 600 to 1000 pounds per hour. The small incinerator is manually charged and cleaned.

The objectives of the incinerator emission test were to characterize criteria and select non-criteria air pollutants released to the atmosphere. The criteria air pollutants were carbon monoxide, total hydrocarbons, sulfur dioxide, oxides of nitrogen. In addition, CO_2, PM, and O_2 were measured. Some of the select non-criteria air pollutants included dioxins, furans, PCBs, semi-volatile organics, volatile organics, hydrogen chloride, hexavalent chromium, and mercury.

17. Document Analysis a. Descriptors

Evaluation test on a small hospital refuse incinerator test report.

b. Identifiers/Open-Ended Terms:
Carbon Dioxide, Carbon Monoxide, Total Hydrocarbons, Sulfur Dioxide, Nitric Oxides, Dioxins, Furans, Polychlorinated Biphenols, Semi-volatile Organics, Hydrogen Chloride, Hexavalent Chromium and Mercury.
Incinerator
Air Pollution

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
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(See ANSI-Z39.18)

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

Table II
Charging Log

date	time	charge pounds
03/08/88	0740	30
03/08/88	0805	31
03/08/88	0835	30
03/08/88	0907	25
03/08/88	0928	28
03/08/88	0950	30
03/08/88	1010	28
03/08/88	1030	23
03/08/88	1055	28
03/08/88	1110	20
03/08/88	1130	22
03/08/88	1150	18
03/08/88	1210	20
03/08/88	1230	25
03/08/88	1250	25
03/08/88	1310	15
03/08/88	1330	12
03/08/88	1349	18
03/08/88	1410	16
03/08/88	1426	12
03/08/88	1447	18
03/08/88	1510	20
03/08/88	1553	18
03/08/88	1550	15
03/08/88	1630	12
03/08/88	1650	15
03/09/88	0708	25
03/09/88	0728	25
03/09/88	0750	25
03/09/88	0835	20
03/09/88	1015	25
03/09/88	1200	25
03/09/88	1330	25
03/10/88	0520	35
03/10/88	0550	35
03/10/88	0830	35
03/10/88	0950	57
03/10/88	1038	55
03/10/88	1230	49
03/10/88	1345	48
03/10/88	1440	35
03/10/88	1617	25
03/11/88	0540	55
03/11/88	0843	61
03/11/88	0942	52
03/11/88	1136	37
03/11/88	1215	73

Table VI
Concentrations of Gaseous Criteria Pollutants During Sampling Times

Run Number	Sampling Date	Time Start	Time End	CONCENTRATIONS NOX ppm	SO2 ppm	THC ppm	O_2 %	CO_2 %	CO ppm
RT-1	03/08/88	0849	1049	87	>463	>474	6.2	9.8	>492
RT-2	03/08/88	0900	1100	77	>463	>474	4.9	9.3	>492
M5-1	03/08/88	1145	1245	80	32	< 1	4.7	10	>492
HCL-1	03/08/88	1200	1300	69	32	>474	5.2	10	>492
RT-3	03/08/88	1352	1552	83	< 1	35	5.2	9.5	>492
VMO-1	03/08/88	1430	1450	75	28	>474	4.7	10	>492
VMO-2	03/08/88	1510	1528	102	32	27	4.3	10	>492
VMO-3	03/08/88	1550	1608	80	56	>474	5.0	10	>492
VMO-4	03/08/88	1630	1648	91	32	< 1	7.6	9.5	>492
HCL-2	03/09/88	0730	0830	58	28	>474	7.7	8	>492
DT-2	03/09/88	1126	1416	47	18	< 1	10	7.2	>492
DT-1	03/09/88	1130	1530	47	18	< 2.5	9.6	7.2	>492
M5-3	03/10/88	0715	0815	57	14	< 1	10	6.8	39
HG-1	03/10/88	0952	1150	49	< 1	9	11	6.8	>492
DT-3	03/10/88	1015	1415	44	10	< 1	11	6.3	>492
DT-4	03/10/88	1030	1430	44	10	< 1	11	6.3	>492
HG-2	03/10/88	1443	1643	30	< 1	11	12	5.0	>492
HCL-4	03/11/88	0758	0858	48	9	< 1	7.4	6.3	30
M5-4	03/11/88	0815	0915	42	8	< 1	11	6.3	30
HG-3	03/11/88	0948	1148	56	< 1	14	10	6.8	>492

> Means the values were off scale of the monitors.
< Means the values were below detection of the monitors.

Table VII

Stack Gas Flowrate and Moisture Content

Run Number	Date	Stack Flow Flow Rate dscfm	Moisture Content %
--*	03/07/88	281	--
--*	03/07/88	--	13
M5-1	03/08/88	234	17
--*	03/09/88		18
--*	03/09/88	358	
M5-3	03/10/88	334	24
M5-4	03/11/88	346	26

* - unnumbered method 2 and method 4 runs

Table X

PCDD/PCDF Stack Mass Emission Rates
(ng/sec)

RUN #	DT-1S	DT-2S+	DT-3S	DT-4S
DIOXINS				
2,3,7,8-TCDD	0.506	0.073	0.065	0.176
Total TCDD	3.083	0.364	0.923	0.968
1,2,3,7,8-PeCDD	1.872	0.342	0.300	0.794
Total PeCDD	14.092	2.782	5.540	7.195
1,2,3,4,7,8-HxCDD	2.642	0.556	0.946	1.737
1,2,3,6,7,8-HxCDD	3.303	0.920	3.232	3.474
1,2,3,7,8,9-HxCDD	2.202	0.449	1.800	2.407
Total HxCDD	26.422	5.136	25.391	27.292
1,2,3,4,6,7,8-HpCDD	30.826	4.066	46.165	39.698
Total HpCDD	57.248	8.347	87.713	76.915
Total OCDD	21.578	5.565	50.781	57.066
Total PCDD	122.4	22.2	170.3	169.436
FURANS				
2,3,7,8-TCDF	2.422	0.471	0.785	1.389
Total TCDF	35.229	7.063	9.233	19.105
1,2,3,7,8-PeCDF	5.064	1.070	1.246	2.481
2,3,4,7,8-PeCDF	8.147	1.327	1.593	3.474
Total PeCDF	74.862	17.978	32.315	42.179
1,2,3,4,7,8-HxCDF	12.771	3.424	5.078	8.932
1,2,3,6,7,8-HxCDF	17.395	4.494	9.233	15.383
1,2,3,7,8,9-HxCDF	1.387	0.385	0.808	1.141
2,3,4,6,7,8-HxCDF	12.330	3.210	13.388	20.593
Total HxCDF	112.3	32.1	76.2	106.688
1,2,3,4,6,7,8-HpCDF	46.2	17.5	53.1	66.990
1,2,3,4,7,8,9-HpCDF	13.7	5.8	13.4	18.608
Total HpCDF	107.9	44.9	120.0	156.311
Total OCDF	116.7	113.4	122.3	198.490
Total PCDF	447.0	215.5	360.1	522.773

NOTES
< - Indicates below minimum detection limit (MDL).
* - Maximum possible emission rate.
** - Total includes MDLs for homologues below the detection limit.
+ - Failed post test leak check.

Table XVI

Concentrations and Mass Emission Rates of Hydrogen Chloride

RUN NUMBER	IMPINGER CATCH	********** RESULTS **********			
	mg	gr/DSCF	PPMV	lbs/hr	mg/sec
HC1-1	3881	2.41	3620	5.60	706
HC1-2	3164	1.23	1848	3.52	443
HCL-4	1185	0.49	730	1.42	180
BLANK	< 15				

Table XVII

Concentrations and Mass Emissions of Total Particulate

RUN NUMBER	MASS CATCH mg	CONCENTRATION gr/dscf	MASS EMISSIONS lbs/hr
M5-1	650.3	0.37	0.7
M5-3	182.0	0.07	0.1
M5-4	154.1	0.06	0.1
BLANK	6.3		

Table XVIII

Concentrations and Mass Emissions of Select Trace Metals

	HCL-1(1)			HCL-2(1)			HCL-4(1)			BLANK
	TOTAL CATCH ug	MASS CONC. gr/dscf	MASS EMS. lbs/hr	TOTAL CATCH ug	MASS CONC. gr/dscf	MASS EMS. lbs/hr	TOTAL CATCH ug	MASS CONC. gr/dscf	MASS EMS. lbs/hr	TOTAL CATCH ug
ARSENIC	0.84	5.21E-07	1.21E-06	1.11	4.31E-07	1.23E-06	0.57	2.33E-07	6.84E-07	0.06
CADMIUM	154.6	9.58E-05	2.23E-04	76.8	2.98E-05	8.53E-06	32.4	1.33E-05	3.89E-06	2
CHROME	7.1	4.40E-06	1.02E-05	6.2	2.41E-06	6.88E-06	<5	2.05E-06	6.00E-06	<5
IRON	636	3.94E-04	9.17E-04	256	9.94E-05	2.84E-04	161	6.61E-06	1.94E-04	75
MAGANESE	11	6.82E-06	1.58E-05	5.7	2.21E-06	6.33E-06	4.5	1.84E-06	5.40E-06	<2.5
NICKEL	< 7.5	<4.65E-06	<1.08E-05	<7.5	<2.91E-06	<8.33E-06	<7.5	<3.07E-06	<9.01E-06	<7.5
LEAD	5035	3.12E-03	7.26E-03	2050	7.96E-04	2.28E-03	1115	4.58E-04	1.34E-03	250

(1) filters from the hydrochloric acid sampling train were analyzed for trace metals.

Particle Size Distributions
Mass Versus Aerodynamic Diameter

Aerodynamic Diameter	Percent of Total Mass		
	PS-1	PS-2	PS-3
0.5	0.08	0.05	0.06
1.0	0.39	0.20	0.80
1.5	1.21	0.51	3.26
2.0	1.84	0.57	5.57
2.5	2.12	0.65	4.68
3.0	2.23	0.83	3.16
3.5	2.20	0.72	3.06
4.0	2.43	0.87	2.23
4.5	2.38	0.67	2.50
5.0	2.50	0.98	1.68
5.5	2.54	0.89	0.75
6.0	2.75	0.53	1.73
6.5	2.30	0.50	1.85
7.0	2.60	0.69	1.86
7.5	2.29	1.01	2.17
8.0	2.47	1.31	1.94
8.5	1.58	0.64	0.92
9.0	2.10	1.48	0.78
9.5	1.79	1.03	0.41
10.0	1.99	0.15	0.00
10.5	1.34	0.62	0.89
11.0	1.98	0.62	1.38
11.5	0.87	0.97	0.37
12.0	1.54	1.12	1.53
12.5	0.81	1.10	0.00
13.0	1.24	1.61	1.14
13.5	1.07	0.50	1.69
14.0	0.81	0.15	1.07
14.5	0.64	0.20	1.36
15.0	0.96	1.16	0.74
15.5	0.90	0.91	0.00
16.0	0.68	0.26	0.00
16.5	0.72	0.62	1.03
17.0	1.04	0.46	0.00
17.5	1.07	1.24	1.68
18.0	1.72	1.75	0.00
18.5	1.48	0.81	0.00
19.0	1.05	1.79	1.07
19.5	1.29	0.00	2.41
20.0	0.32	0.00	0.00
20.5	0.48	0.00	0.00
21.0	0.14	1.25	0.00
21.5	0.99	2.02	0.00
22.0	0.69	1.19	0.00
22.5	0.00	1.34	0.00
23.0	0.37	1.22	1.57
23.5	0.45	1.55	0.00
24.0	0.36	2.16	0.00
24.5	0.39	0.71	3.50
>25.0	34.81	58.39	39.16

Table XXI

Concentrations and Mass Emission Rates of Mercury

RUN NUMBER	FILTER CATCH mg	RESULTS gr/dscf	PPMV	lbs/hr	mg/sec
HG-1	56.29	1.02E-02	2.80E+00	3.14E-02	3.96E+00
HG-3	1.52	3.01E-04	8.22E-02	8.87E-04	1.12E-01
HG-4	1.50	2.83E-04	7.74E-02	4.19E-04	5.28E-02
blank	<0.01				