

Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources*. AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.



COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY

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CHARLES W. CARRY
Chief Engineer and General Manager

December 6, 1996
File: 31R-109.10

Ms. Kirsten Brust
Pechan and Associates
3500 Westgate Drive, Suite 103
Durham, NC 27707

Dear Ms. Brust:

**Source Test Data Request-EPA AP-42 Emission Factor Documentation
for Municipal Solid Waste Landfills**

Please find enclosed the above referenced data as requested by you on October 10, 1996 by fax to Ray Huitric. There are two binders containing source test data for Sanitation District operated landfill gas fired flares, boilers, and turbines, spanning from 1990 to 1996. We hope you find this data useful in the development of more reliable emission factors for municipal solid waste landfills.

If you have any questions concerning this data, please contact the undersigned at the telephone number listed above.

Very truly yours,

Charles W. Carry

Charlotte Nesbit - 2432
Project Engineer
Solid Waste Management Department

CN:eo

EMISSIONS

SUMMARY OF EMISSIONS DATA RESULTS

CALABASAS LANDFILL			
Equipment	Report Date	Test Date	Conducted
Flares	mm/dd/yy	mm/dd/yy	by
4, 5, 6	Jun-90	Mar-90	CARNOT
3, 7	Apr-91	Feb-91	CARNOT
3, 4	Feb-92	Feb-92	HORIZON
1, 2, 5	Mar-93	Mar-93	HORIZON
6	Feb-94	Feb-94	CARNOT
1,3	Jun-95	Jun-95	HORIZON
1, 3, 4	Mar-95	Mar-95	HORIZON
7	Aug-95	Jul-95	CARNOT
6, 8, 9	Mar-96	Mar-96	CARNOT

MISSION CANYON			
Equipment	Report Date	Test Date	Conducted
Flares	mm/dd/yy	mm/dd/yy	by
3	Nov-95	Nov-95	S.C.E.C.
UNSPECIFIED	Nov-90	Mar-90	S.C.A.Q.M.D

PUENTE HILLS			
Equipment	Report Date	Test Date	Conducted
Flares	mm/dd/yy	mm/dd/yy	by
9, 10, 11, 12	Jun-90	May-90	CARNOT
13, 14, 15, 16	Aug-90	Jul-90	CARNOT
2, 3, 4, 24	Jan-90	Oct-90	CARNOT
5, 7, 17, 19	Jul-91	May-91	CARNOT
6, 8, 18, 20,22	Jan-92	Dec-91	CARNOT
11, 13, 17, 19	Jul-92	May-92	CARNOT
18, 20, 22, 24	Jan-93	Oct./Nov./92	CARNOT
2, 4, 6, 8	Mar-93	Feb-93	CARNOT
10, 12, 14, 16	Feb-94	Dec-93	CARNOT
3, 5, 7, 9	Jul-94	May-94	HORIZON
6, 8, 10, 12	Apr-95	Mar-95	CARNOT
2, 4, 18, 24	Oct-95	Aug-95	S.C.E.C.
RESEARCH	Nov-95	Oct-95	CARNOT
11, 13, 14, 15	Apr-96	Feb-96	CARNOT
3, 5, 7, 9	Jul-94	May-94	HORIZON

EMISSIONS

PERG			
Equipment	Report Date	Test Date	Conducted
BOILER	mm/dd/yy	mm/dd/yy	by
300,400	Jan-90	Jan-90	E.S.A
300	Oct-90	Sep-90	CARNOT
300,400	Apr-91	Apr-91	CARNOT
400	Sep-91	Aug-91	CARNOT
300	Jul-92	Jun-92	CARNOT
300	Aug-92	Jul-92	CARNOT
300	Aug-92	Aug-92	CARNOT
400	Nov-93	Sep-93	CARNOT
300	Dec-94	Nov-94	CARNOT
300	Jan-96	Nov-95	CARNOT

PUENTE HILLS TURBINE			
Equipment	Report Date	Test Date	Conducted
TURBINE	mm/dd/yy	mm/dd/yy	by
SOLAR	Jun-90	May-90	CARNOT
NATCO	Sep-90	Jul-90	CARNOT
SOLAR	Feb-91	Dec-90	CARNOT
SOLAR	Nov-91	Aug-91	CARNOT
GAS No.1	Oct-91	Aug-91	Steiner Environmental, Inc.
NATCO	Dec-91	Nov-91	CARNOT
SOLAR	Jan-93	Oct-92	CARNOT
GAS No. 1	Nov-92	Oct-92	Steiner Environmental, Inc.
GAS No. 2	Nov-92	Oct-92	Steiner Environmental, Inc.
NATCO	Nov-93	Sep-93	CARNOT
SOLAR	Nov-93	Sep-93	CARNOT
SOLAR No.1	Nov-94	Nov-94	HORIZON
SOLAR No.2	Nov-94	Nov-94	HORIZON
NATCO	Dec-94	Nov-94	CARNOT
SOLAR	Apr-95	Mar-95	CARNOT
SOLAR	Jan-96	Nov-95	CARNOT
SOLAR	Apr-95	Mar-95	CARNOT

EMISSIONS

SUMMARY OF EMISSIONS DATA RESULTS

COMMERCE			
Annual Testing	Report Date	Test Date	Conducted
Compliance	mm/dd/yy	mm/dd/yy	by
TEST RESULTS	Jan-94	Sep-93	CARNOT
TEST RESULTS	Sep-94	Sep-94	HORIZON
TEST RESULTS	Feb-96	Nov./Dec.-95	CARNOT

PALOS VERDES			
Equipment	Report Date	Test Date	Conducted
Flares	mm/dd/yy	mm/dd/yy	by
5, 6	Oct-90	Sep-90	CARNOT
3	May-90	Feb-91	CARNOT
4	Nov-91	Oct-91	CARNOT
1	Apr-92	Mar-92	CARNOT
6	Jan-94	Nov-93	CARNOT
5	Jan-95	Dec-94	CARNOT
4	Jul-96	May-96	CARNOT

EMISSIONS

PVERG			
Equipment	Report Date	Test Date	Conducted
Flares	mm/dd/yy	mm/dd/yy	by
UNIT No. 1	Jan-93	Dec-92	CARNOT
UNIT No. 1	Aug-93	JUC93	CARNOT
UNIT No. 2	Jan-94	Nov-93	CARNOT
UNIT No. 1	Jan-95	Dec-94	CARNOT
BOILER No. 2	Apr-95	Apr-95	HORIZON
BOILER No. 1	Dec-95	Dec-95	HORIZON
BOILER No. 2	Dec-95	Dec-95	HORIZON
UNIT 2	Jan-96	Dec-95	CARNOT

SCHOLL CANYON			
Equipment	Report Date	Test Date	Conducted
Flares	mm/dd/yy	mm/dd/yy	by
2, 5, 8	Jul-90	Jul-90	CARNOT
2	Jul-91	Jun-91	CARNOT
9, 10, 11, 12	Nov-91	Sep-91	CARNOT
11	Jan-92	Sep-91	CARNOT
1, 3, 4, 6	Sep-92	Aug-92	CARNOT
2, 5, 7, 12	Aug-93	Jul-93	CARNOT
1, 9, 10, 11	Nov-94	Sep-94	CARNOT
3, 4, 5, 6	Jul-95	Jun-95	CARNOT
1, 2, 7, 12	May-96	May-96	HORIZON

SPADRA			
Equipment	Report Date	Test Date	Conducted
Flares	mm/dd/yy	mm/dd/yy	by
5	Jul-90	Jun-90	CARNOT
2, 6	Nov-91	Aug-91	CARNOT
2, 3	Apr-92	Feb-92	CARNOT
6	Mar-93	Mar-93	Calscience Evironmental Labs.
1, 5	Feb-94	Jan-94	CARNOT
2, 3	Jun-94	May-94	CARNOT
2, 3	May-95	May-95	HORIZON
4	Jun-96	Apr-96	CARNOT

SPERG			
Equipment	Report Date	Test Date	Conducted
Flares	mm/dd/yy	mm/dd/yy	by
BOILER	Sep-91	Aug-91	CARNOT
BOILER	Apr-91	Oct-91	CARNOT
BOILER	Sep-92	Aug-92	CARNOT
BOILER	Apr-92	Mar-93	CARNOT
BOILER	Nov-93	Sep-93	CARNOT
BOILER	Jan-95	Dec-94	CARNOT
BOILER	Jan-96	Dec-95	S.C.E.C.

**EMISSION TEST ON
THREE FLARES AT CALABASAS LANDFILL**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICT
Whittier, California**

Prepared By:

**Robert A. Finken
Craig H. Fry**

CARNOT

formerly the California Division of
ENERGY SYSTEMS ASSOCIATES

Tustin, California

JUNE 1990

ESR 70900-2074R2

TABLE 4-1
GENERAL RESULTS
FLARE NO. 4

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	9.5	6.9	8.2	11.0	10.5	10.8
CO ₂ , (% Dry)	23.2	23.7	23.5	10.1	9.3	9.7
H ₂ O, (%)	5.1	4.9	5.0	11.5	10.5	11.0
Flow Rate (dscfm)	710	711	711	4,344	4,898	4,621
Temperature (°F)	97	97	97	1,603	1,615	1,609
NO _x :						
ppm	—	—	—	13.0	12.0	12.5
ppm @ 3% O ₂	—	—	—	23.5	20.7	22.1
lb/hr	—	—	—	0.41	0.43	0.42
CO:						
ppm	4.5	4.9	4.7	27	12.5	19.8
ppm @ 3% dry	—	—	—	48.8	21.5	35.2
lb/hr	—	—	—	0.52	0.27	0.40
HC:						
CH ₄ ppm	245,000	254,000	249,500	<0.5	1.42	<0.96
Total NMHC ppm as CH ₄	6,228	5,592	5,910	<1	<1	<1
Total NMHC as CH ₄ ppm @ 3% O ₂	—	—	—	<1	<1	<1
NMHC lb/hr as CH ₄	11.2	10.1	10.6	0.011	0.012	0.012
Destruction Eff. %	—	—	—			>99.9
Sulfur Compounds:						
H ₂ S (ppm)	29.8	42.5	36.2	—	—	—
Methyl Mercaptan (ppm)	0.6	0.9	0.8	—	—	—
Ethyl Mercaptan (ppm)	0.1	0.7	0.4	—	—	—
Dimethyl Sulfide (ppm)	5.4	3.6	4.5	—	—	—
Carbonyl Sulfide (ppm)	0.10	0.09	0.10	—	—	—
Carbon Disulfide (ppm)	0.6	0.2	0.4	—	—	—
Particulate:						
grains/DSCF	—	—	—	0.0111	0.0089	0.010
lb/hr	—	—	—	0.41	0.0115	0.0113
					1.26	0.84
					0.37	0.39
Carbon Balance						
lbs carbon/min			11.03			14.17
ratio (out/in)						1.29
Heat Balance						
Heat input MMBtu/hr			11.0			10.93
Heat output MMBtu/hr						

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 4

Species	Fuel Gas (ppb)	Flare Exhaust (ppb)	Destruction Efficiency %
Acetonitrile	ND (<5000)	ND (<250)	NA
Benzene	6000	ND (<10)	>99.83
Benzyl Chloride	ND (<1000)	ND (<50)	NA
Chlorobenzene	2600	ND (<50)	>98.08
Chloroethene (vinyl chloride)	9700	ND (<10)	>99.90
1,2-Dichlorobenzene	ND (<1000)	ND (<50)	NA
1,3 + 1,4-Dichlorobenzene	ND (<400)	ND (<20)	NA
1,1-Dichloroethane	9400	ND (<10)	>99.89
1,2-Dichloroethane	4100	ND (<10)	>99.76
1,1-Dichloroethene	700	ND (<10)	>98.57
Dichloromethane	41000	ND (<10)	>99.98
Tetrachloroethylene	7200	ND (<10)	>99.86
Tetrachloromethane	ND (<200)	ND (<10)	NA
Toluene	72000	ND (<50)	>99.93
1,1,1-Trichloroethane	1800	ND (<10)	>99.44
Trichloroethylene	5100	20	99.6
Trichloromethane	ND (<200)	ND (<10)	NA
Xylenes	48000	ND (<100)	>99.79

ND indicates that the species was not detected. Values in parenthesis indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
GENERAL RESULTS
FLARE NO. 5

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	9.4	8.1	8.8	12.5	12.8	12.7
CO ₂ , (% Dry)	22.2	23.3	22.8	9.5	9.5	9.5
H ₂ O, (%)	4.2	2.6	3.4	10.1	9.1	9.6
Flow Rate (dscfm)	903	915	909 <i>941 scfm</i>	7,018	5,679	6,349 <i>7025 scfm</i>
Temperature (°F)	85	85	85 <i>986 °F</i>	1,616	1,597	1,607
NO _x :						
ppm	—	—	—	12.3	10.1	11.2
ppm @ 3% O ₂	—	—	—	26.2	22.3	24.3
lb/hr	—	—	—	0.63	0.42	0.53
CO:						
ppm	5.2	5.9	5.6	14.0	8.2	11.1
ppm @ 3% dry	—	—	—	29.8	18.1	24.0
lb/hr	—	—	—	0.43	0.21	0.32
HC:						
CH ₄ ppm	243,000	248,000	245,500	1.42	<0.5	1.0
Total NMHC ppm as CH ₄	6,218	6,636	6,427	10.1	2.08	6.1
Total NMHC as CH ₄ ppm @ 3% O ₂	—	—	—	21.5	4.6	13.0
NMHC lb/hr as CH ₄	14.2	15.4	14.8	0.18	0.066	0.012
Destruction Eff. %	—	—	—	—	—	99.2
Sulfur Compounds:						
H ₂ S (ppm)	44.6	40.4	42.5	—	—	—
Methyl Mercaptan (ppm)	0.6	0.9	0.8	—	—	—
Ethyl Mercaptan (ppm)	0.1	0.7	0.4	—	—	—
Dimethyl Sulfide (ppm)	5.4	3.6	4.5	—	—	—
Carbonyl Sulfide (ppm)	0.10	0.09	0.10	—	—	—
Carbon Disulfide (ppm)	0.6	0.2	0.4	—	—	—
Particulate:						
grains/DSCF	—	—	—	0.0097	0.0081	0.0089
lb/hr	—	—	—	0.58	0.39	0.49
Carbon Balance						
lbs carbon/min			13.81			19.07
ratio (out/in)						1.38
Heat Balance						
Heat input MMBtu/hr			13.86			
Heat output MMBtu/hr						14.44

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 5

Species	Fuel Gas (ppb)	Flare Exhaust (ppb)	Destruction Efficiency %
Acetonitrile	ND (<5000)	ND (<5.0)	NA
Benzene	6000	ND (<0.2)	100.00
Benzyl Chloride	ND (<1000)	ND (<1.0)	NA
Chlorobenzene	2800	ND (<1.0)	>99.96
Chloroethene (vinyl chloride)	22000	ND (<0.2)	100.00
1,2-Dichlorobenzene	ND (<1000)	ND (<1.0)	NA
1,3+1,4-Dichlorobenzene	ND (<400)	ND (<0.4)	NA
1,1-Dichloroethane	7000	ND (<0.2)	100.00
1,2-Dichloroethane	3900	ND (<0.2)	>99.99
1,1-Dichloroethene	600	ND (<0.2)	>99.97
Dichloromethane	37000	ND (<0.2)	100.00
Tetrachloroethylene	10000	ND (<0.2)	100.00
Tetrachloromethane	ND (<200)	ND (<0.2)	NA
Toluene	75000	6.9	99.99
1,1,1-Trichloroethane	1600	ND (<0.2)	>99.99
Trichloroethylene	4700	ND (<0.2)	100.00
Trichloromethane	ND (<200)	ND (<0.2)	NA
Xylenes	49000	ND (<2.0)	100.00

ND indicates that the species was not detected. Values in parenthesis indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-5
GENERAL RESULTS
FLARE NO. 6

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	9.0	14.8*	9.0	11.3	11.2	11.3
CO ₂ , (% Dry)	23.8	17.4*	23.8	8.9	9.3	9.1
H ₂ O, (%)	3.6	4.0	3.8	9.7	9.4	9.6
Flow Rate (dscfm)	792	789	791 <i>822 dscfm</i>	5,566	5,222	5,394 <i>5967 scfm</i>
Temperature (°F)	95	95	95 <i>871 dscfm</i>	1,549	1,560	1,555
NO _x :						
ppm	--	--	--	14.0	16.3	15.2
ppm @ 3% O ₂	--	--	--	26.1	30.1	28.1
lb/hr	--	--	--	0.57	0.62	0.59
CO:						
ppm	5.0	N/A	5.0	11.0	12.0	11.5
ppm @ 3% dry	--	--	--	20.5	22.1	21.3
lb/hr	--	--	--	0.27	0.28	0.27
HC:						
CH ₄ ppm	254,000	185,000*	254,000	<0.5	<0.5	<0.5
Total NMHC ppm	6,172	3,470*	6,172	<1	4.6	<2.8
as CH ₄						
Total NMHC as	--	--	--	<1.9	8.5	<5.2
CH ₄ ppm @ 3% O ₂						
NMHC lb/hr as CH ₄	12.4	--	12.4	<0.03	0.06	<0.04
Destruction Eff. %	--	--	--			>99.7
Sulfur Compounds:						
H ₂ S (ppm)	36.5	40.5	38.5	--	--	--
Methyl Mercaptan (ppm)	0.6	0.9	0.8	--	--	--
Ethyl Mercaptan (ppm)	0.1	0.7	0.4	--	--	--
Dimethyl Sulfide (ppm)	5.4	3.6	4.5	--	--	--
Carbonyl Sulfide (ppm)	0.10	0.09	0.10	--	--	--
Carbon Disulfide (ppm)	0.6	0.2	0.4	--	--	--
Particulate:						
grains/DSCF	--	--	--	0.0078	0.0066	0.0072
lb/hr	--	--	--	0.37	.30	0.34
Carbon Balance						
lbs carbon/min			14.32			19.37
ratio (out/in)						1.35
Heat Balance						
Heat input MMBtu/hr			12.46			
Heat output MMBtu/hr						11.92

* The tank used for this sample was reported to have an ambient pressure and high O₂. It was concluded to have a leak and therefore, the data of this sample were not used in calculating the average value.

TABLE 4-6
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 6

Species	Fuel Gas (ppb)	Flare Exhaust (ppb)	Destruction Efficiency %
Acetonitrile	ND (<1000)	ND (<1.0)	NA
Benzene	3400	0.5	99.99
Benzyl Chloride	ND (<1000)	ND (<1.0)	NA
Chlorobenzene	ND (<1000)	ND (<1.0)	NA
Chloroethene (vinyl chloride)	8900	ND (<0.2)	100.00
1,2-Dichlorobenzene ¹	0	0	NA
1,3 + 1,4-Dichlorobenzene	ND (<2000)	ND (<0.4)	NA
1,1-Dichloroethane	3800	ND (<0.2)	>99.99
1,2-Dichloroethane	1600	ND (<0.2)	>99.99
1,1-Dichloroethene	ND (<200)	ND (<0.2)	NA
Dichloromethane	12000	2.3	99.98
Tetrachloroethylene	1000	ND (<0.2)	>99.98
Tetrachloromethane (CCl ₄)	ND (<200)	ND (<0.2)	NA
Toluene	21000	5.1	99.98
1,1,1-Trichloroethane	1100	ND (<0.2)	>99.98
Trichloroethylene	1200	ND (<0.2)	>99.98
Trichloromethane (chloroform)	ND (<200)	ND (<0.2)	NA
Xylenes	6100	3.2	99.95

ND indicates that the species was not detected. Values in parenthesis indicate the detection limit for these species.

¹ The laboratory reports a 1,2-dichlorobenzene contamination in-house and could not report data on this species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSIONS TESTS ON TWO FLARES
AT CALABASAS LANDFILL - FEBRUARY 1991**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

APRIL 1991

CR 12100-2439

TABLE 4-1
GENERAL RESULTS
FLARE NO. 3

2/91 CA

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	5.1		5.1	11.9	11.3	11.6
CO ₂ , % dry	30.9		30.9	8.8	9.3	9.1
N ₂ , % dry	30.6		30.6	76.6		76.6
H ₂ O, %	2.7	3.7	3.2	10.0	11.0	10.5
Flow Rate dscfm	881	869	875	6,554	5,828	6,191
Temperature °F	74	74	74	1,622	1,619	1,621
NO _x :				14.9	14.3	14.6
ppm				29.6	26.7	28.2
ppm @ 3% O ₂				0.71	0.61	0.66
lb/hr						
CO:				<1*	3.3	2.2
ppm				<2.0	6.2	4.1
ppm @ 3% O ₂				<0.03	0.09	0.06
lb/hr						
HC:				<1	<1	<1
CH ₄ ppm	324,000	324,000	324,000	5.6	14.2	9.9
Total NMHC ppm	12,700	11,400	12,050			
as CH ₄				11.1	26.5	18.8
Total NMHC as	14,290	12,920	13,650			
CH ₄ ppm @ 3% O ₂				0.09	0.21	0.15
Total NMHC lb/hr as CH ₄	28.32	25.07	26.70	99.68	99.16	99.42
Destruction Eff. %						
Particulate:				0.0005	0.0004	0.0005
Organic Fraction grains/DSCF				0.0055	0.0051	0.0053
Inorganic Fraction grains/DSCF				0.0060	0.0055	0.0058
Total Particulate grains/DSCF				0.34	0.28	0.31
Total lb/hr						
SO ₂				1.0 0.66	6.8 0.40	8.4 0.53
ppm						
lb/hr						
Sulfur Compounds			15			
H ₂ S, ppm			1.0			
Methyl Mercaptan ppm			0.6			
Ethyl Mercaptan ppm			2.9			
Dimethyl Sulfide ppm			<0.2			
Carbonyl Sulfide ppm			<0.2			
Carbon Disulfide ppm						

* CO data from this test was acquired from the hydrocarbon Tedlar bag samples due to temporary malfunction of the on-site CO analyzer.

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 3

Species	Intake	Exhaust	Destructive Efficiency,
Methylene Chloride, ppb lb/hr	17,000 2.00×10^{-1}	ND < 2 $< 1.66 \times 10^{-4}$	> 99.92
Chloroform, ppb lb/hr	ND < 100 $< 1.65 \times 10^{-3}$	ND < 1 $< 1.17 \times 10^{-4}$	N/A
1,1,1 trichloroethane, ppb lb/hr	400 73.8×10^{-3}	ND < 0.5 $< 6.53 \times 10^{-5}$	> 99.12
Carbon Tetrachloride, ppb lb/hr	ND < 100 $< 2.13 \times 10^{-3}$	ND < 1 $< 1.51 \times 10^{-4}$	N/A
1,1-dichloroethene, ppb lb/hr	100 $< 1.34 \times 10^{-3}$	ND < 1 $< 9.49 \times 10^{-5}$	> 92.92
Trichloroethylene, ppb lb/hr	3,700 6.73×10^{-2}	ND < 1 $< 1.29 \times 10^{-4}$	> 99.81
Tetrachloroethylene, ppb lb/hr	4,900 1.12×10^{-1}	ND < 1 $< 1.62 \times 10^{-4}$	> 99.86
Chlorobenzene, ppb lb/hr	1,400 $< 2.18 \times 10^{-2}$	ND < 2 $< 2.20 \times 10^{-4}$	> 98.99
Vinyl Chloride, ppb lb/hr	8,800 7.61×10^{-2}	ND < 5 $< 3.06 \times 10^{-4}$	> 99.60
1,2-dichlorobenzene, ppb lb/hr	ND < 200 $< 4.07 \times 10^{-3}$	ND < 10 $< 1.44 \times 10^{-3}$	N/A
1,3-dichlorobenzene, ppb lb/hr	ND < 200 $< 4.07 \times 10^{-3}$	ND < 10 $< 1.44 \times 10^{-3}$	N/A
1,4-dichlorobenzene, ppb lb/hr	ND < 200 $< 4.07 \times 10^{-3}$	ND < 10 $< 1.44 \times 10^{-3}$	N/A
1,1-dichloroethane, ppb lb/hr	4,700 6.43×10^{-2}	ND < 1 $< 9.69 \times 10^{-5}$	> 99.85

Continued

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 3

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	1,300 $< 1.78 \times 10^{-2}$	ND < 1 $< 9.69 \times 10^{-5}$	> 99.46
Benzene, ppb lb/hr	4,700 5.08×10^{-2}	ND < 2 $< 1.53 \times 10^{-4}$	> 99.70
Toluene, ppb lb/hr	55,000 7.01×10^{-1}	2.2 1.98×10^{-4}	99.97
Acrylonitrile, ppb lb/hr	ND < 2,000 $< 1.47 \times 10^{-2}$	ND < 2 $< 1.04 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	39,000 5.73×10^{-1}	ND < 3 $< 3.12 \times 10^{-4}$	> 99.95
1,2-dibromoethane, ppb lb/hr	ND < 200 $< 5.20 \times 10^{-3}$	ND < 2 $< 3.68 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND < 400 $< 7.00 \times 10^{-3}$	ND < 10 $< 1.24 \times 10^{-3}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
GENERAL RESULTS
FLARE NO. 7

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	7.8		7.8	10.9	11.3	11.1
CO ₂ , % dry	24.9		24.9	9.5	9.0	9.3
N ₂ , % dry	39.3		39.3	76.4		76.4
H ₂ O, %	2.7	4.6	3.7	10.5	10.9	10.7
Flow Rate dscfm	956	815	886	5,447	6,189	5,818
Temperature °F	94	106	100	1,607	1,583	1,595
NO _x :						
ppm						
ppm @ 3% O ₂				16.6	16.2	16.4
lb/hr				29.7	30.2	30.0
				0.66	0.73	0.70
CO:						
ppm						
ppm @ 3% O ₂				3.2	16.8	10.0
lb/hr				5.7	31.3	18.5
				0.08	0.46	0.27
HC:						
CH ₄ ppm	334,000	332,000	333,000	<1	<1	<1
Total NMHC ppm	9,080	10,200	9,640	<1	<1	<1
as CH ₄						
Total NMHC as	12,410	13,940	13,170	<1.8	<1.9	<1.9
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	21.97	21.04	21.51	<0.01	<0.02	<0.02
Destruction Eff. %				>99.95	>99.91	>99.93
Particulate:						
Organic Fraction grains/DSCF				0.0006	0.0003	0.0005
Inorganic Fraction grains/DSCF				0.0036	0.0055	0.0046
Total Particulate grains/DSCF				0.0042	0.0058	0.0050
Total lb/hr				0.20	0.31	0.26
SO ₂						
ppm				5.5	5.5	5.5
lb/hr				0.30	0.34	0.32
Sulfur Compounds						
H ₂ S, ppm			21			
Methyl Mercaptan ppm			0.9			
Ethyl Mercaptan ppm			0.7			
Dimethyl Sulfide ppm			2.5			
Carbonyl Sulfide ppm			<0.2			
Carbon Disulfide ppm			0.1			

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 7

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	14,000 1.67×10^{-1}	1.2 9.38×10^{-5}	99.94
Chloroform, ppb lb/hr	ND < 100 $< 1.67 \times 10^{-3}$	ND < 0.2 $< 1.10 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	300 5.61×10^{-3}	ND < 0.1 $< 1.23 \times 10^{-5}$	> 99.78
Carbon Tetrachloride, ppb lb/hr	ND < 100 $< 2.15 \times 10^{-3}$	ND < 0.1 $< 1.42 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	100 1.36×10^{-3}	ND < 0.1 $< 8.92 \times 10^{-6}$	> 99.34
Trichloroethylene, ppb lb/hr	3,000 5.52×10^{-2}	ND < 0.1 $< 1.21 \times 10^{-5}$	> 99.98
Tetrachloroethylene, ppb lb/hr	4,000 9.29×10^{-2}	ND < 0.1 $< 1.53 \times 10^{-5}$	> 99.98
Chlorobenzene, ppb lb/hr	1,300 2.05×10^{-2}	ND < 0.2 $< 1.15 \times 10^{-5}$	> 99.90
Vinyl Chloride, ppb lb/hr	7,900 6.92×10^{-2}	ND < 0.1 $< 1.35 \times 10^{-5}$	> 99.98
1,2-dichlorobenzene, ppb lb/hr	ND < 200 $< 4.12 \times 10^{-3}$	ND < 0.2 $< 2.07 \times 10^{-5}$	N/A
1,3-dichlorobenzene, ppb lb/hr	ND < 200 $< 4.12 \times 10^{-3}$	ND < 0.2 $< 2.70 \times 10^{-5}$	N/A
1,4-dichlorobenzene, ppb lb/hr	ND < 200 $< 4.12 \times 10^{-3}$	ND < 0.1 $< 9.10 \times 10^{-6}$	N/A
1,1-dichloroethane, ppb lb/hr	3,800 5.27×10^{-2}	ND < 0.1 $< 9.10 \times 10^{-6}$	> 99.98

Continued

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 7

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	1,000 1.39×10^{-2}	ND <0.1 $<9.10 \times 10^{-6}$	>99.93
Benzene, ppb lb/hr	4,600 5.03×10^{-2}	ND <0.2 $<1.44 \times 10^{-5}$	>99.97
Toluene, ppb lb/hr	45,000 5.81×10^{-1}	5.1 4.32×10^{-4}	99.93
Acetonitrile, ppb lb/hr	ND <2,000 $<1.15 \times 10^{-2}$	ND <2 $<7.55 \times 10^{-5}$	N/A
Xylenes, ppb lb/hr	32,000 4.76×10^{-1}	ND <0.6 $<5.86 \times 10^{-5}$	>99.99
1,2-dibromoethane, ppb lb/hr	ND <200 $<5.26 \times 10^{-3}$	ND <0.2 $<3.46 \times 10^{-5}$	N/A
Benzyl Chloride, ppb lb/hr	ND <400 $<7.09 \times 10^{-3}$	ND <0.4 $<4.66 \times 10^{-5}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-5
TRACE ORGANICS SPECIES RESULTS
AMBIENT AIR AT THE CALABASAS LANDFILL FLARE STATION

	ppb
Methylene Chloride	0.9
Chloroform	ND <0.1
1,1,1 trichloroethane	0.6
Carbon Tetrachloride	ND <0.1
1,1-dichloroethene	ND <0.1
Trichloroethylene	ND <0.1
Tetrachloroethylene	ND <0.1
Chlorobenzene	ND <0.2
Vinyl Chloride	ND <0.2
1,2-dichlorobenzene	ND <0.2
1,3-dichlorobenzene	ND <0.2
1,4-dichlorobenzene	ND <0.2
1,1-dichloroethane	ND <0.1
1,2-dichloroethane	ND <0.1
Benzene	1.0
Toluene	1.6
Acetonitrile	ND <2.0
Xylenes	<1.1
1,2-dibromoethane	ND <0.2
Benzyl Chloride	ND <0.4

ND indicates that the species was not detected. Values indicate the detection limit for these species.

To: Chung (Moon)

31R-106.18.1C
Air Quality

✓ **HORIZON**

L01-003-FR

Air Measurement Services, Inc.

**EMISSIONS TESTS ON FLARES NO. 3 AND NO. 4
AT THE CALABASAS LANDFILL**

FEBRUARY 20 & 21, 1992

1517 AUG 27 AM 9 27

Prepared for:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Post Office Box 4998
Whittier, California 90607**

*Margaret
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TABLE 2-1
Summary of Results - Flare No. 4
Calabasas Landfill
February 20, 1992

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	80	80	80	1602	1631	1617
Moisture (%)	2.8	3.4	3.1	10.8	11.1	11.0
Flow Rate (acfm)	1000*	1000*	1000*	38644	37577	38111
(dscfm)	----	----	----	8850	8461	8656
Fixed Gases						
Oxygen (%)	5.9	5.93	5.92	11.9	11.8	11.85
Carbon Dioxide (%)	29.4	29.0	29.2	7.6	8.0	7.8
EMISSIONS						
Oxides of Nitrogen						
ppm	----	----	----	13.8	15.4	14.6
ppm @ 3% O ₂	----	----	----	27.4	30.3	28.85
lb/hr	----	----	----	0.876	0.934	0.905
Carbon Monoxide						
ppm	----	----	----	5.1	2.3	3.70
ppm @ 3% O ₂	----	----	----	10.1	4.5	7.30
lb/hr	----	----	----	0.197	0.085	0.141
Particulate Matter						
organic fraction gr/dscf	----	----	----	0.0004	0.0009	0.0007
insoluble, gr/dscf	----	----	----	0.0037	0.0034	0.0036
total, gr/dscf	----	----	----	0.0041	0.0043	0.0042
Total, lb/hr	----	----	----	0.310	0.310	0.310

TABLE 2-1 (Cont.)
Summary of Results - Flare No. 4
Calabasas Landfill
February 20, 1992

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
Hydrocarbons						
methane, ppm	322000	324000	323000	<1	<1	<1
TNMHC, ppm (as CH ₄)	6321	6383	6352	4.18	3.5	3.84
TNMHC, lb/hr (as CH ₄)	17.09	17.26	17.18	0.090	0.076	0.083
destruction efficiency				99.5	99.6	99.5
Sulfur Compounds						
hydrogen sulfide (ppm)	----	----	26.5	----	----	----
methyl mercaptan (ppm)	----	----	0.14	----	----	----
ethyl mercaptan (ppm)	----	----	0.17	----	----	----
dimethyl sulfide (ppm)	----	----	2.39	----	----	----
carbonyl sulfide (ppm)	----	----	0.091	----	----	----
carbon disulfide (ppm)	----	----	0.14	----	----	----
dimethyl disulfide	----	----	0.34	----	----	----

* Based upon measurements made by and reported by LACSD. HORIZON measured flow rates were 1147, 1145 and 1146 acfm for Runs 1, 2 and 3, respectively.

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

TABLE 2-2
Summary of Results - Flare No. 3
Calabasas Landfill
February 21, 1992

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	99	99	99	1580	1565	1573
Moisture (%)	3.0	3.6	3.3	9.4	7.7	8.55
Flow Rate (acfm)	1000*	1000*	1000*	41124	50689	45907
(dscfm)	----	----	----	9657	12223	10940
Fixed Gases						
Oxygen (%)	5.8	6.1	5.95	12.0	12.2	12.1
Carbon Dioxide (%)	29.0	28.9	29.0	7.5	7.5	7.5
EMISSIONS						
Oxides of Nitrogen						
ppm	----	----	----	13.1	12.6	12.85
ppm @ 3% O ₂	----	----	----	26.3	25.9	26.1
lb/hr	----	----	----	0.907	1.104	0.974
Carbon Monoxide						
ppm	----	----	----	4.0	<1.0	<2.5
ppm @ 3% O ₂	----	----	----	8.0	<2.1	<5.0
lb/hr	----	----	----	0.169	<0.053	<0.110
Particulate Matter						
organic fraction gr/dscf	----	----	----	0.0004	0.0003	0.0004
insoluble, gr/dscf	----	----	----	0.0026	0.0024	0.0025
total, gr/dscf	----	----	----	0.0030	0.0027	0.0029
Total, lb/hr	----	----	----	0.250	0.290	0.270

TABLE 2-2 (Cont.)
Summary of Results - Flare No. 3
Calabasas Landfill
February 20, 1992

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
Hydrocarbons*						
methane, ppm	333000	332000	332500	< 1	< 1	< 1
TNMHC, ppm (as CH ₄)	6916	6443	6680	3.16	3.37	3.27
TNMHC, lb/hr (as CH ₄)	17.48	16.29	16.89	0.075	0.080	0.078
destruction efficiency				99.6	99.5	99.5
Sulfur Compounds						
hydrogen sulfide (ppm)	----	----	24.0	----	----	----
methyl mercaptan (ppm)	----	----	<0.05	----	----	----
ethyl mercaptan (ppm)	----	----	0.072	----	----	----
dimethyl sulfide (ppm)	----	----	2.20	----	----	----
carbonyl sulfide (ppm)	----	----	<0.05	----	----	----
carbon disulfide (ppm)	----	----	0.13	----	----	----
dimethyl disulfide	----	----	1.17	----	----	----

* Based upon measurements made by and reported by LACSD. HORIZON measured flow rates were 1114, 1115 and 1115 acfm for Runs 1, 2 and 3, respectively.

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

TABLE 2-3
Trace Organic Compound Emissions
Flare No. 4 (Run #1)
Calabasas Landfill
February 20, 1992

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	9700	<0.2 ✓	
lb/hr	0.1442	<.00002	>99.99
Chloroform, ppb	<200	<0.2	
lb/hr	<0.0042	<.00003	NA
1,1,1 - Trichloroethane, ppb	<200	<0.2	
lb/hr	<0.0047	<.00004	NA
Carbon Tetrachloride, ppb	<200	<0.2	
lb/hr	<0.0054	<.00004	NA
1,1 - Dichloroethene, ppb	300	<0.2	
lb/hr	0.0051	<.00003	>99.41
Trichloroethylene, ppb	1900	<0.2	
lb/hr	0.0435	<.00004	>99.41
Tetrachloroethylene, ppb	2200	0.2	
lb/hr	0.0639	.00005	99.92
Chlorobenzene, ppb	500	<0.2	
lb/hr	0.0099	<.00003	>99.70
Vinyl Chloride, ppb	7800	<0.4	
lb/hr	0.0852	<.00004	>99.95
M-Dichlorobenzene, ppb	<200	<0.2 ✓	
lb/hr	<0.0051	<.00004	NA
1,1 - Dichloroethane, ppb	3100	<0.2	
lb/hr	0.0537	<.00003	>99.94
1,2 - Dichloroethane, ppb	800	<0.2	
lb/hr	0.0138	<.00003	>99.78

TABLE 2-3 (Cont.)
Trace Organic Compound Emissions
Flare No. 4 (Run #1)
Calabasas Landfill
February 20, 1992

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	1500	< 1.0	
lb/hr	0.0205	< .0001	> 99.51
Toluene, ppb	35000	< 1.0	
lb/hr	0.5630	< .0001	> 99.98
Acetonitrile, ppb	< 5000	< 5.0	
lb/hr	< 0.0358	< .0003	NA
M+P Xylene, ppb	15000	< 0.4 0.4	
lb/hr	0.2780	< .00006	> 99.98
O Xylene, ppb	5200	< 0.2 ✓	
lb/hr	0.0964	< .00003	> 99.97
1,2 - Dibromomethane, ppb	< 400	< 0.4	
lb/hr	< 0.0122	< .00010	NA
O Dichlorobenzene, ppb	< 200	< 0.2 ✓	
lb/hr	< 0.0051	< .00004	NA
P Dichlorobenzene, ppb	200	< 0.2 ✓	
lb/hr	0.0051	< .00004	> 99.22
Benzyl Chloride, ppb	< 400	< 0.4	
lb/hr	< 0.0089	< .00007	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

TABLE 2-4
Trace Organic Compound Emissions
Flare No. 4 (Run #2)
Calabasas Landfill
February 20, 1992

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	11000	<0.2	
lb/hr	0.1622	<.00002	>99.99
Chloroform, ppb	<200	<0.2	
lb/hr	<0.0041	<.00003	NA
1,1,1 - Trichloroethane, ppb	<200	<0.2	
lb/hr	<0.0046	<.00004	NA
Carbon Tetrachloride, ppb	<200	0.3	
lb/hr	<0.0053	.00006	>98.87
1,1 - Dichloroethene, ppb	400	<0.2	
lb/hr	0.0067	<.00003	>99.55
Trichloroethylene, ppb	2200	<0.2	
lb/hr	0.0500	<.00004	>99.92
Tetrachloroethylene, ppb	3300	<0.2	
lb/hr	0.0950	<.00004	>99.96
Chlorobenzene, ppb	600	<0.2	
lb/hr	0.0118	<.00003	>99.75
Vinyl Chloride, ppb	8000	<0.4	
lb/hr	0.0867	<.00003	>99.97
M-Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0051	<.00004	NA
1,1 - Dichloroethane, ppb	3300	<0.2	
lb/hr	0.0567	<.00003	>99.95
1,2 - Dichloroethane, ppb	900	<0.2	
lb/hr	0.0155	<.00003	>99.81

TABLE 2-4 (Cont.)
Trace Organic Compound Emissions
Flare No. 4 (Run #2)
Calabasas Landfill
February 20, 1992

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	1800	<1.0	
lb/hr	0.0243	<.0001	>99.59
Toluene, ppb	46000	<1.0	
lb/hr	0.7339	<.0001	>99.99
Acetonitrile, ppb	<5000	<5.0	
lb/hr	<0.0356	<.0003	NA
M + P Xylene, ppb	22000	0.4	
lb/hr	0.4044	.00006	99.99
O Xylene, ppb	8000	<0.2	
lb/hr	0.1471	<.00003	>99.98
1,2 - Dibromomethane, ppb	<400	<0.2	
lb/hr	<0.0121	<.00005	NA
O Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0051	<.00004	NA
P Dichlorobenzene, ppb	200	<0.2	
lb/hr	0.0051	<.00004	>99.22
Benzyl Chloride, ppb	<400	<0.4	
lb/hr	<0.0088	<.00007	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

TABLE 2-5
Trace Organic Compound Emissions
Flare No. 3 (Run #1)
Calabasas Landfill
February 21, 1992

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	10000	<0.2 ✓	
lb/hr	0.1389	<.00003	>99.98
Chloroform, ppb	<200	<0.2 ✓	
lb/hr	<0.0039	<.00004	NA
1,1,1 - Trichloroethane, ppb	300	0.6 , <0.2	
lb/hr	0.0065	.0001	98.5
Carbon Tetrachloride, ppb	<200	<0.2 ✓	
lb/hr	<0.0050	<.00005	NA
1,1 - Dichloroethene, ppb	300	<0.2 ✓	
lb/hr	0.0048	<.00003	>99.38
Trichloroethylene, ppb	2200	<0.2 ✓	
lb/hr	0.0471	<.00004	>99.92
Tetrachloroethylene, ppb	2700	0.3 , <0.2	
lb/hr	0.0733	.00008	99.89
Chlorobenzene, ppb	600	<0.2 ✓	
lb/hr	0.0111	<.00003	>99.7
Vinyl Chloride, ppb	8100	<0.4 ✓	
lb/hr	0.0828	<.00004	>99.95
M-Dichlorobenzene, ppb	<200	<0.2 ✓	
lb/hr	<0.0048	<.00004	NA
1,1 - Dichloroethane, ppb	3400	<0.2 ✓	
lb/hr	0.0550	<.00003	>99.95
1,2 - Dichloroethane, ppb	900	<0.2 ✓	
lb/hr	0.0146	<.00003	>99.79

TABLE 2-5 (Cont.)
Trace Organic Compound Emissions
Flare No. 3 (Run #1)
Calabasas Landfill
February 21, 1992

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	1900	<1.0 ✓	
lb/hr	0.0242	<.0001	>99.59
Toluene, ppb	45000	1.4 ✓	
lb/hr	0.6767	.0002	99.97
Acetonitrile, ppb	<2000	<2.0 ✓	
lb/hr	<0.0134	<.0001	NA
M+P Xylene, ppb	20000	<0.4 ✓	
lb/hr	0.3465	<.00006	>99.98
O Xylene, ppb	5100	<0.2 ✓	
lb/hr	0.0884	<.00003	>99.97
1,2 - Dibromomethane, ppb	<400	<0.4 ✓	
lb/hr	<0.0114	<.0001	NA
O Dichlorobenzene, ppb	<200	<0.2 ✓	
lb/hr	<0.0048	<.00004	NA
P Dichlorobenzene, ppb	<200	<0.2 ✓	
lb/hr	<0.0048	<.00004	NA
Benzyl Chloride, ppb	<400	<0.4 ✓	
lb/hr	<0.0083	<.00008	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

TABLE 2-6
Trace Organic Compound Emissions
Flare No. 3 (Run #2)
Calabasas Landfill
February 21, 1992

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	10000	<0.2	
lb/hr	0.1381	<.00003	>99.98
Chloroform, ppb	<200	<0.2	
lb/hr	<0.0039	<.00005	NA
1,1,1 - Trichloroethane, ppb	<200	<0.2	
lb/hr	<0.0043	<.00005	NA
Carbon Tetrachloride, ppb	<200	<0.2	
lb/hr	<0.0050	<.00006	NA
1,1 - Dichloroethene, ppb	300	<0.2	
lb/hr	0.0047	<.00004	>99.15
Trichloroethylene, ppb	2000	<0.2	
lb/hr	0.0426	<.00005	>99.88
Tetrachloroethylene, ppb	2300	<0.2	
lb/hr	0.0620	<.00006	>99.90
Chlorobenzene, ppb	400	<0.2	
lb/hr	0.0073	<.00004	>99.45
Vinyl Chloride, ppb	7800	<0.4	
lb/hr	0.0792	<.00005	>99.94
M-Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0048	<.00006	NA
1,1 - Dichloroethane, ppb	3200	<0.2	
lb/hr	0.0515	<.00004	>99.92
1,2 - Dichloroethane, ppb	800	<0.2	
lb/hr	0.0129	<.00004	>99.69

TABLE 2-6 (Cont.)
Trace Organic Compound Emissions
Flare No. 3 (Run #2)
Calabasas Landfill
February 21, 1992

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	1600	< 1.0	
lb/hr	0.0203	< .0002	> 99.01
Toluene, ppb	38000	< 1.0	
lb/hr	0.5682	< .0002	> 99.96
Acetonitrile, ppb	3400	< 2.0	
lb/hr	0.0227	< .0002	> 99.12
M+P Xylene, ppb	15000	< 0.4	
lb/hr	0.2584	< .00008	> 99.97
O Xylene, ppb	5500	< 0.2	
lb/hr	0.0947	< .00004	> 99.96
1,2 - Dibromomethane, ppb	< 400	< 0.4	
lb/hr	< 0.0113	< .0001	NA
O Dichlorobenzene, ppb	< 200	< 0.2	
lb/hr	< 0.0048	< .00006	NA
P Dichlorobenzene, ppb	< 200	< 0.2	
lb/hr	< 0.0048	< .00006	NA
Benzyl Chloride, ppb	< 400	< 0.4	
lb/hr	< 0.0083	< .00010	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

TABLE 2-7
Trace Organic Compound Concentration
Ambient Air at Flare Station
Calabasas Landfill
February 20, 1992

COMPOUND	CONCENTRATION (ppb, v/v)
Methylene Chloride	0.4
Chloroform	0.2
1,1,1 - Trichloroethane	<1.5
Carbon Tetrachloride	<0.1
1,1 - Dichloroethene	<0.1
Trichloroethylene	<0.1
Tetrachloroethylene	0.4
Chlorobenzene	0.5
Vinyl Chloride	<0.4
M-Dichlorobenzene	<0.2
1,1 - Dichloroethane	<0.1
1,2 - Dichloroethane	<0.1
Benzene	2.2
Toluene	5.6
Acetonitrile	<5.0
M + P Xylene	3.2
O Xylene	1.4
1,2 - Dibromomethane	<1.0
O + P Dichlorobenzene	<0.2
Benzyl Chloride	<1.0



AIR MEASUREMENT SERVICES, INC.

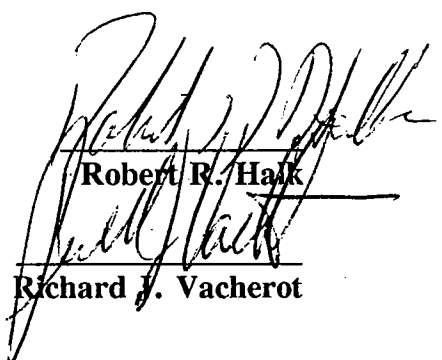
L01-004-FR

**EMISSIONS TESTS ON FLARE NUMBERS 1, 2 AND 5
AT THE CALABASAS LANDFILL**

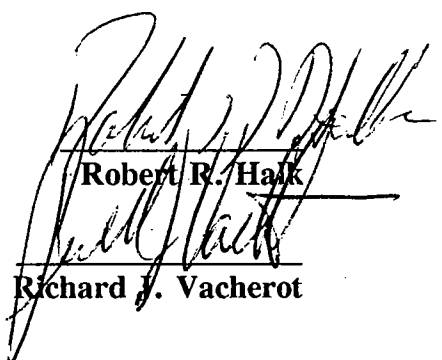
MARCH 9, 10 & 11, 1993

Prepared for:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Post Office Box 4998
Whittier, California 90607**



Robert R. Halk



Richard J. Vacherot

TABLE 2-1
Summary of Test Results
Calabasas Landfill, Flare No. 1
March 10, 1993

PARAMETER	INLET	EXHAUST	PERMIT LIMIT	APPLICABLE SCAQMD RULE
O ₂ , % dry	5.5	12.0		
CO ₂ , % dry	32.2	8.8		
N ₂ , % dry	24.1	79.2		
H ₂ O, %	3.4	8.6		
Flow Rate, dscfm	1000**	9753	1000 (Inlet)	P/O
Temperature, Of		1538	> 1500	P/O
NO _x :				
ppm @ 3% O ₂		31.7		
lb/hr (as NO ₂)		1.12	1.3	P/O
lb/day (as NO ₂)		*	29	P/O
CO:				
ppm @ 3% O ₂		6.8	2000	407
lb/hr		0.017	20.4	P/O
lb/day		*	490	P/O
HC:				
CH ₄ ppm	382000	ND < 1		
NMHC ppm (as CH ₄)	5480	5.0		
NMHC lb/hr (as CH ₄)	15.1	0.12	5.1	P/O
NMHC lb/day (as CH ₄)		*	122	P/O
Destruction Eff. %		99.2		

TABLE 2-1 (Cont'd)
Summary of Test Results
Calabasas Landfill, Flare No. 1
March 10, 1993

PARAMETER	INLET	EXHAUST	PERMIT LIMIT	APPLICABLE SCAQMD RULE
Particulate:				
Total Particulate gr/dscf		0.0026	0.0800	404
gr/dscf @ 3% O ₂		0.0052		
lb/hr		0.22	5.2	P/O
lb/day		*	123	P/O
Total Sulfur, ppm	16.3		800 (inlet)	431.1

Handwritten note:
 16.3 ppm
 not detected
 120-125 ppm

Note: The results in this table are the average of all measurements. See Section 5 for complete emission test results.

* Not measured.

** See discussion in Section 5.

P/O Permit to Operate D71219.

TABLE 2-2
Summary of Test Results
Calabasas Landfill, Flare No. 2
March 9, 1993

PARAMETER	INLET	EXHAUST	PERMIT LIMIT	APPLICABLE SCAQMD RULE
O ₂ , % dry	5.0	12.3		
CO ₂ , % dry	33.4	8.8		
N ₂ , % dry	21.8	78.9		
H ₂ O, %	2.3	9.0		
Flow Rate, dscfm	930	8701	1000 (Inlet)	P/O
Temperature, oF		1544	> 1500	P/O
NO _x :				
ppm @ 3% O ₂		37.6		
lb/hr (as NO ₂)		1.11	1.3	P/O
lb/day (as NO ₂)		*	29	P/O
CO:				
ppm @ 3% O ₂		6.9	2000	407
lb/hr		0.017	20.4	P/O
lb/day		*	490	P/O
HC:				
CH ₄ ppm	398000	ND < 1		
NMHC ppm (as CH ₄)	5901	19.2		
NMHC lb/hr (as CH ₄)	13.4	0.40	5.1	P/O
NMHC lb/day (as CH ₄)		*	122	P/O
Destruction Eff. %		97.1		

TABLE 2-2 (Cont'd)
Summary of Test Results
Calabasas Landfill, Flare No. 2
March 9, 1993

PARAMETER	INLET	EXHAUST	PERMIT LIMIT	APPLICABLE SCAQMD RULE
Particulate:				
Total Particulate gr/dscf		0.0031	0.0835	404
gr/dscf @ 3% O ₂		0.0065		
lb/hr		0.23	5.2	P/O
lb/day		*	123	P/O
Total Sulfur, ppm	16.6		800 (Inlet)	431.1

NOT
 LEVARI!
 120-125 ppm

Note: The results in this table are the average of all measurements. See Section 5 for complete emission test results.

* Not measured.

P/O Permit to Operate D71219.

TABLE 2-3
Summary of Test Results
Calabasas Landfill, Flare No. 5
March 11, 1993

PARAMETER	INLET	EXHAUST	PERMIT LIMIT	APPLICABLE SCAQMD RULE
O ₂ , % dry	5.9	11.3		
CO ₂ , % dry	33.1	9.9		
N ₂ , % dry	23.7	78.8		
H ₂ O, %	3.6	9.1		
Flow Rate, dscfm	1000**	10,553	1000 (Inlet)	P/O
Temperature, oF		1603	> 1500	P/O
NO _x :				
ppm @ 3% O ₂		39.0		
lb/hr (as NO ₂)		1.19	1.3	P/O
lb/day (as NO ₂)		*	29	P/O
CO:				
ppm @ 3% O ₂		1.1	2000	407
lb/hr		0.049	20.4	P/O
lb/day		*	490	P/O
HC:				
CH ₄ ppm	373000	ND < 1		
NMHC ppm (as CH ₄)	5602	4.93		
NMHC lb/hr (as CH ₄)	14.5	0.124	5.1	P/O
NMHC lb/day (as CH ₄)		*	122	P/O
Destruction Eff. %		99.1		

TABLE 2-3 (Cont'd)
Summary of Test Results
Calabasas Landfill, Flare No. 5
March 11, 1993

PARAMETER	INLET	EXHAUST	PERMIT LIMIT	APPLICABLE SCAQMD RULE
Particulate:				
Total Particulate gr/dscf		0.0032	0.0774	404
gr/dscf @ 3% O ₂		0.0060		
lb/hr		0.29	5.2	P/O
lb/day		*	12.3	P/O
Total Sulfur, ppm	16.5		800 (Inlet)	431.1

NOT
 LEAKY!
 1/13/93
 TANT
 TANT
 12/3/93

Note: The results in this table are the average of all measurements. See Section 5 for complete emission test results.

* Not measured.

** See discussion in Section 5.

P/O Permit to Operate D71219.

TABLE 5-1
Summary of Results - Flare No. 1
Calabasas Landfill
March 10, 1993

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	80	84	82	1547	1528	1538
Moisture (%)	2.7	4.0	3.4	8.1	9.0	8.6
Flow Rate (acfm)	1000*	1000*	1000*	42,424	39,298	40,861
(dscfm)	---	---	---	10,127	9379	9753
Fixed Gases						
Oxygen (%)	5.8	5.1	5.5	12		
Carbon Dioxide (%)	31.8	32.5	32.2	8.6		
EMISSIONS						
Oxides of Nitrogen						
ppm	---	---	---	15.8	16.2	16.0
ppm @ 3% O ₂	---	---	---	31.1	32.2	31.7
lb/hr	---	---	---	1.15	1.09	1.12
Carbon Monoxide						
ppm	---	---	---	0.3	0.5	0.4
ppm @ 3% O ₂	---	---	---	0.6	1.0	0.8
lb/hr	---	---	---	0.013	0.020	0.017
Particulate Matter						
organic fraction gr/dscf	---	---	---	0.0001	0.0001	0.0001
insoluble, gr/dscf	---	---	---	0.0031	0.0018	0.0025
total, gr/dscf	---	---	---	0.0032	0.0019	0.0026
Total, lb/hr	---	---	---	0.28	0.15	0.22

↑
use average

Based upon measurements made by and reported by LACSD. HORIZON measured flow rates were 1188 and 1228 for runs 1 and 2, respectively.

TABLE 5-1 (Cont.)
Summary of Results - Flare No. 1
Calabasas Landfill
March 10, 1993

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
Hydrocarbons						
methane, ppm	384000	380000	382000	< 1	< 1	< 1
TNMHC, ppm (as CH ₄)	5636	5323	5480	4.5	5.4	5.0
TNMHC, lb/hr (as CH ₄)	15.5	14.7	15.1	0.11	0.13	0.12
destruction efficiency				99.3	99.1	99.2
Sulfur Compounds						
hydrogen sulfide (ppm)	----	----	12.0	----	----	----
methyl mercaptan (ppm)	----	----	0.8	----	----	----
ethyl mercaptan (ppm)	----	----	0.6	----	----	----
dimethyl sulfide (ppm)	----	----	2.9	----	----	----
carbonyl sulfide (ppm)	----	----	<0.4	----	----	----
carbon disulfide (ppm)	----	----	<0.6	----	----	----
dimethyl disulfide	----	----	<0.5	----	----	----

Handwritten notes:
 6/11/92
 D.E.
 1711-
 6.94
 17

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

TABLE 5-2
Summary of Results - Flare No. 2
Calabasas Landfill
March 9, 1993

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	82	86	84	1511	1577	1544
Moisture (%)	1.7	2.8	2.3	8.9	9.0	9.0
Flow Rate (acfm)	968	994	981	35102	38449	36776
(dscfm)	926	933	930	8453	8949	8701
Fixed Gases						
Oxygen (%)	5.3	4.6	5.0	12.8	11.7	12.3
Carbon Dioxide (%)	32.2	34.5	33.4	8.0	9.6	8.8
EMISSIONS						
Oxides of Nitrogen						
ppm	----	----	----	17.5	18.7	18.1
ppm @ 3% O ₂	----	----	----	38.7	36.4	37.6
lb/hr	----	----	----	1.06	1.2	1.11
Carbon Monoxide						
ppm	----	----	----	0.2	0.7	0.5
ppm @ 3% O ₂	----	----	----	0.4	1.4	0.9
lb/hr	----	----	----	0.007	0.027	0.017
Particulate Matter						
organic fraction gr/dscf	----	----	----	0.0003	0.0003	0.0003
insoluble, gr/dscf	----	----	----	0.0029	0.0026	0.0028
total, gr/dscf	----	----	----	0.0032	0.0029	0.0031
Total, lb/hr	----	----	----	0.230	0.22	0.23

TABLE 5-2 (Cont.)
Summary of Results - Flare No. 2
Calabasas Landfill
March 9, 1993

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
Hydrocarbons						
methane, ppm	386000	410000	398000	<1	<1	<1
TNMHC, ppm (as CH ₄)	5656	6146	5901	19.2	19.1	19.2
TNMHC, lb/hr (as CH ₄)	12.8	13.9	13.4	0.40	0.39	0.40
destruction efficiency				96.9	97.2	97.1
Sulfur Compounds						
hydrogen sulfide (ppm)	----	----	12.0	----	----	----
methyl mercaptan (ppm)	----	----	0.9	----	----	----
ethyl mercaptan (ppm)	----	----	0.6	----	----	----
dimethyl sulfide (ppm)	----	----	3.1	----	----	----
carbonyl sulfide (ppm)	----	----	<0.4	----	----	----
carbon disulfide (ppm)	----	----	<0.6	----	----	----
dimethyl disulfide	----	----	<0.5	----	----	----

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

TABLE 5-3
Summary of Results - Flare No. 5
Calabasas Landfill
March 11, 1993

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	79	88	84	1619	1587	1603
Moisture (%)	2.9	4.3	3.6	9.3	8.8	9.1
Flow Rate (acfm)	1000*	1000*	1000*	45,271	46,551	45,911
(dscfm)	---	---	---	10,299	10,807	10,553
Fixed Gases						
Oxygen (%)	6.2	5.5	5.9	11.3	11.2	11.3
Carbon Dioxide (%)	31.9	34.2	33.1	10.2	9.7	9.9
EMISSIONS						
Oxides of Nitrogen						
ppm	---	---	---	15.4	15.6	15.5
ppm @ 3% O ₂	---	---	---	28.2	28.7	28.5
lb/hr	---	---	---	1.1	1.2	1.19
Carbon Monoxide						
ppm	---	---	---	0.9	1.2	1.1
ppm @ 3% O ₂	---	---	---	1.7	2.2	2.0
lb/hr	---	---	---	0.040	0.057	0.049
Particulate Matter						
organic fraction gr/dscf	---	---	---	0.0002	0.0003	0.0003
insoluble, gr/dscf	---	---	---	0.0023	0.0036	0.0030
total, gr/dscf	---	---	---	0.0025	0.0039	0.0032
Total, lb/hr	---	---	---	0.22	0.36	0.29

* Based upon measurements made by and reported by LACSD. HORIZON measured flow rates were 1112 and 1118 for runs 1 and 2, respectively.

TABLE 5-3 (Cont.)
Summary of Results - Flare No. 5
Calabasas Landfill
March 11, 1993

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
Hydrocarbons						
methane, ppm	378000	368000	373000	<1	<1	<1
TNMHC, ppm (as CH ₄)	5666	5537	5602	3.86	6.00	4.93
TNMHC, lb/hr (as CH ₄)	14.6	14.3	14.5	0.097	0.151	0.124
destruction efficiency				99.3	98.9	99.1
Sulfur Compounds						
hydrogen sulfide (ppm)	----	----	12.1	----	----	----
methyl mercaptan (ppm)	----	----	0.8	----	----	----
ethyl mercaptan (ppm)	----	----	0.6	----	----	----
dimethyl sulfide (ppm)	----	----	3.0	----	----	----
carbonyl sulfide (ppm)	----	----	<0.4	----	----	----
carbon disulfide (ppm)	----	----	<0.6	----	----	----
dimethyl disulfide	----	----	<0.5	----	----	----

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

TABLE 5-4
Trace Organic Compound Emissions
Flare No. 1 (Run #1)
Calabasas Landfill
March 10, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	7100	<0.2	
lb/hr	0.1076	<.000027	>99.97
Chloroform, ppb	<200	<0.2	
lb/hr	<0.0042	<.000038	NA
1,1,1 - Trichloroethane, ppb	300	<0.2	
lb/hr	0.0071	<.000042	>99.41
Carbon Tetrachloride, ppb	<200	<0.2	
lb/hr	<0.0055	<.000049	NA
1,1 - Dichloroethene, ppb	<200	<0.2	
lb/hr	<0.0035	<.000031	NA
Trichloroethylene, ppb	2200	<0.2	
lb/hr	0.0514	<.000042	>99.92
Tetrachloroethylene, ppb	2900	<0.2	
lb/hr	0.0858	<.000053	>99.94
Chlorobenzene, ppb	600	<0.4	
lb/hr	0.0121	<.000072	>99.40
Vinyl Chloride, ppb	5200	<0.4	
lb/hr	0.0580	<.00004	>99.93
M-Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0052	<.000047	NA
1,1 - Dichloroethane, ppb	2700	<0.2	
lb/hr	0.0477	<.000032	>99.93
1,2 - Dichloroethane, ppb	800	<0.2	
lb/hr	0.0141	<.000032	>99.77

TABLE 5-4 (Cont.)
Trace Organic Compound Emissions
Flare No. 1 (Run #1)
Calabasas Landfill
March 10, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	5300	0.2	
lb/hr	0.0737	.000025	99.97
Toluene, ppb	34000	6.8	
lb/hr	0.5578	.001	99.82
Acetonitrile, ppb	<2000	<2.0	
lb/hr	<0.0146	<.00013	NA
M Xylene, ppb	10000	1.6	
lb/hr	0.1890	.00027	99.86
O+P Xylene, ppb	10000	2.0	
lb/hr	0.1890	.00034	99.82
1,2 - Dibromomethane, ppb	<7000	<7.0	
lb/hr	<0.2172	<.0019	NA
O+P Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0052	<.000047	NA
Benzyl Chloride, ppb	<5000	<5.0	
lb/hr	<0.1132	<.001	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

TABLE 5-5
Trace Organic Compound Emissions
Flare No. 1 (Run #2)
Calabasas Landfill
March 10, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	7100	<0.1	
lb/hr	0.1076	<.000012	99.99
Chloroform, ppb	<200	<0.1	
lb/hr	<0.0042	<.000018	NA
1,1,1 - Trichloroethane, ppb	300	<0.1	
lb/hr	0.0072	<.000020	>99.72
Carbon Tetrachloride, ppb	<200	<0.1	
lb/hr	<0.0056	<.000023	NA
1,1 - Dichloroethene, ppb	<200	<0.1	
lb/hr	<0.0035	<.000014	NA
Trichloroethylene, ppb	2200	<0.1	
lb/hr	0.0521	<.000019	>99.96
Tetrachloroethylene, ppb	3100	<0.1	
lb/hr	0.0930	<.000025	>99.97
Chlorobenzene, ppb	800	<0.1	
lb/hr	0.0163	<.000017	>99.96
Vinyl Chloride, ppb	5300	<0.2	
lb/hr	0.0599	<.000019	>99.97
M-Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0053	<.000044	NA
1,1 - Dichloroethane, ppb	2600	<0.1	
lb/hr	0.0465	<.000015	>99.97
1,2 - Dichloroethane, ppb	800	<0.1	
lb/hr	0.0143	<.000015	>99.90

TABLE 5-5 (Cont.)
Trace Organic Compound Emissions
Flare No. 1 (Run #2)
Calabasas Landfill
March 10, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	4500	0.1	
lb/hr	0.0634	.000012	99.98
Toluene, ppb	37000	1.5	
lb/hr	0.6151	.00021	99.9
Acetonitrile, ppb	<2000	<2.0	
lb/hr	<0.0148	<.00012	NA
M Xylene, ppb	12000	0.5	
lb/hr	0.2298	.000079	>99.97
O+P Xylene, ppb	11000	<0.4	
lb/hr	0.2107	<.000063	>99.97
1,2 - Dibromomethane, ppb	<7000	<0.4	
lb/hr	<0.2201	<.0001	NA
O+P Dichlorobenzene, ppb	200	<0.2	
lb/hr	0.0053	<.000044	>99.17
Benzyl Chloride, ppb	<5000	<1.0	
lb/hr	<0.1147	<.00019	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

TABLE 5-6
Trace Organic Compound Emissions
Flare No. 2 (Run #1)
Calabasas Landfill
March 9, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	7700	<0.2	
lb/hr	0.0958	<.000023	>99.98
Chloroform, ppb	<200	<0.2	
lb/hr	<0.0035	<.000032	NA
1,1,1 - Trichloroethane, ppb	300	<0.2	
lb/hr	0.0058	<.000036	>99.38
Carbon Tetrachloride, ppb	<200	<0.2	
lb/hr	<0.0045	<.000041	NA
1,1 - Dichloroethene, ppb	<200	<0.2	
lb/hr	<0.0028	<.000026	NA
Trichloroethylene, ppb	2400	<0.2	
lb/hr	0.0460	<.000035	>99.92
Tetrachloroethylene, ppb	3200	<0.2	
lb/hr	0.0778	<.000044	>99.94
Chlorobenzene, ppb	1100	<0.4	
lb/hr	0.0182	<.000060	>99.67
Vinyl Chloride, ppb	4200	<0.4	
lb/hr	0.0384	<.000033	>99.91
M-Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0043	<.000039	NA
1,1 - Dichloroethane, ppb	2900	<0.2	
lb/hr	0.0420	<.000027	>99.94
1,2 - Dichloroethane, ppb	800	<0.2	
lb/hr	0.0116	<.000027	>99.77

TABLE 5-6 (Cont.)
Trace Organic Compound Emissions
Flare No. 2 (Run #1)
Calabasas Landfill
March 9, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	4600	0.2	
lb/hr	0.0525	.000021	99.96
Toluene, ppb	27000	4.8	
lb/hr	0.3636	.00059	99.84
Acetonitrile, ppb	<2000	<2.0	
lb/hr	<0.0120	<.00011	NA
M Xylene, ppb	11000	1.6	
lb/hr	0.1707	.00023	99.87
O+P Xylene, ppb	7800	1.9	
lb/hr	0.1210	.00027	99.78
1,2 - Dibromomethane, ppb	<7000	<7.0	
lb/hr	<0.1783	<.0016	NA
O+P Dichlorobenzene, ppb	300	<0.2	
lb/hr	0.0065	<.000039	>99.40
Benzyl Chloride, ppb	<5000	<5.0	
lb/hr	<0.0930	<.00085	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

TABLE 5-7
Trace Organic Compound Emissions
Flare No. 2 (Run #2)
Calabasas Landfill
March 9, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	8800	<0.2	
lb/hr	0.1103	<.000024	>99.98
Chloroform, ppb	<200	<0.2	
lb/hr	<0.0035	<.000034	NA
1,1,1 - Trichloroethane, ppb	400	<0.2	
lb/hr	0.0078	<.000038	>99.51
Carbon Tetrachloride, ppb	<200	<0.2	
lb/hr	<0.0045	<.000044	NA
1,1 - Dichloroethene, ppb	300	<0.2	
lb/hr	0.0043	<.000027	>99.37
Trichloroethylene, ppb	2600	<0.2	
lb/hr	0.0502	<.000037	>99.93
Tetrachloroethylene, ppb	3800	<0.2	
lb/hr	0.0930	<.000047	>99.95
Chlorobenzene, ppb	1300	<0.4	
lb/hr	0.0217	<.000064	>99.71
Vinyl Chloride, ppb	4300	<0.4	
lb/hr	0.0396	<.000035	>99.91
M-Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0043	<.000042	NA
1,1 - Dichloroethane, ppb	3300	<0.2	
lb/hr	0.0482	<.000028	>99.94
1,2 - Dichloroethane, ppb	1000	<0.2	
lb/hr	0.0146	<.000028	>99.81

TABLE 5-7 (Cont.)
Trace Organic Compound Emissions
Flare No. 2 (Run #2)
Calabasas Landfill
March 9, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	5100	0.8	
lb/hr	0.0587	.000088	99.85
Toluene, ppb	32000	8.8	
lb/hr	0.4342	.0015	99.65
Acetonitrile, ppb	<2000	<2.0	
lb/hr	<0.0121	<.00011	NA
M Xylene, ppb	13000	<10	
lb/hr	0.2033	<0.0015	>99.26
O+P Xylene, ppb	9300	1.4	
lb/hr	0.1454	.00021	99.86
1,2 - Dibromomethane, ppb	<7000	<7.0	
lb/hr	<0.1797	<.0017	NA
O+P Dichlorobenzene, ppb	400	<0.2	
lb/hr	0.0087	<.000042	>99.52
Benzyl Chloride, ppb	<5000	<3.0	
lb/hr	<0.0937	<.00054	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

TABLE 5-8
Trace Organic Compound Emissions
Flare No. 5 (Run #1)
Calabasas Landfill
March 11, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	6900	<0.2	
lb/hr	0.0979	<.000028	>99.97
Chloroform, ppb	<200	<0.2	
lb/hr	<0.0040	<.000039	NA
1,1,1 - Trichloroethane, ppb	300	<0.2	
lb/hr	0.0067	<.000043	>99.36
Carbon Tetrachloride, ppb	<200	<0.2	
lb/hr	<0.0051	<.000050	NA
1,1 - Dichloroethene, ppb	<200	<0.2	
lb/hr	<0.0032	<.000032	NA
Trichloroethylene, ppb	2100	<0.2	
lb/hr	0.0459	<.000043	>99.91
Tetrachloroethylene, ppb	3000	<0.2	
lb/hr	0.0831	<.000054	99.94
Chlorobenzene, ppb	500	<0.4	
lb/hr	0.0094	<.000074	>99.21
Vinyl Chloride, ppb	5200	<0.4	
lb/hr	0.0543	<.000041	>99.92
M-Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0049	<.000048	NA
1,1 - Dichloroethane, ppb	2600	<0.2	
lb/hr	0.0430	<.000032	>99.93
1,2 - Dichloroethane, ppb	700	<0.2	
lb/hr	0.0116	<.000032	>99.72

TABLE 5-8 (Cont.)
Trace Organic Compound Emissions
Flare No. 5 (Run #1)
Calabasas Landfill
March 11, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	5300	1.7	
lb/hr	0.069	.000216	99.69
Toluene, ppb	36000	24.0	
lb/hr	0.553	.00359	99.42
Acetonitrile, ppb	<2000	<2.0	
lb/hr	<0.014	<.00013	NA
M Xylene, ppb	14000	<13.0	
lb/hr	0.248	<.00224	>99.1
O+P Xylene, ppb	11000	15.0	
lb/hr	0.195	.00259	>98.67
1,2 - Dibromomethane, ppb	<7000	<7.0	
lb/hr	<0.230	<.00198	NA
O+P Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0049	<.000048	NA
Benzyl Chloride, ppb	<5000	<5.0	
lb/hr	<0.106	<.00103	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

TABLE 5-9
Trace Organic Compound Emissions
Flare No. 5 (Run #2)
Calabasas Landfill
March 11, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Methylene Chloride, ppb	7100	<0.2	
lb/hr	0.102	<.000029	>99.97
Chloroform, ppb	<200	<0.2	
lb/hr	<0.0040	<.000041	NA
1,1,1 - Trichloroethane, ppb	300	<0.4	
lb/hr	0.0067	<.000091	>98.64
Carbon Tetrachloride, ppb	<200	<0.2	
lb/hr	<0.0052	<.000053	NA
1,1 - Dichloroethene, ppb	<200	<0.2	
lb/hr	<0.0033	<.000033	NA
Trichloroethylene, ppb	2100	<0.2	
lb/hr	0.0465	<.000045	>99.90
Tetrachloroethylene, ppb	3000	<0.2	
lb/hr	0.0842	<.000057	>99.90
Chlorobenzene, ppb	500	<0.4	
lb/hr	0.0096	<.000077	>99.20
Vinyl Chloride, ppb	5600	<0.4	
lb/hr	0.0591	<.000043	>99.93
M-Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0050	<.000050	NA
1,1 - Dichloroethane, ppb	2600	<0.2	
lb/hr	0.0435	<.000034	>99.92
1,2 - Dichloroethane, ppb	700	<0.2	
lb/hr	0.0117	<.000034	>99.71

TABLE 5-9 (Cont.)
Trace Organic Compound Emissions
Flare No. 5 (Run #2)
Calabasas Landfill
March 11, 1993

COMPOUND	INLET	OUTLET	DESTRUCTION EFFICIENCY (%)
Benzene, ppb	5100	0.1	
lb/hr	0.067	.000013	99.98
Toluene, ppb	35000	2.7	
lb/hr	0.054	.00042	99.22
Acetonitrile, ppb	<2000	<2.0	
lb/hr	<0.014	<.00014	>99.00
M Xylene, ppb	14000	0.2	
lb/hr	0.025	.000036	99.86
O+P Xylene, ppb	12000	0.3	
lb/hr	0.215	.000054	99.97
1,2 - Dibromomethane, ppb	<7000	<7.0	
lb/hr	<0.206	<.00208	NA
O+P Dichlorobenzene, ppb	<200	<0.2	
lb/hr	<0.0049	<.000050	NA
Benzyl Chloride, ppb	<5000	<5.0	
lb/hr	<0.107	<.00108	NA

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.

NA: Not applicable - destruction efficiency was not calculated since both inlet and outlet values are below the detection limit.

1994 - 1996

Source Test Data

Facility ID # 042514

**EMISSION TESTS ON ONE FLARE
(FLARE NO. 6)
AT CALABASAS LANDFILL
FEBRUARY 1994**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

APRIL 1994

**TABLE 1-2
SUMMARY OF TEST RESULTS
CALABASAS LANDFILL, FLARE NO. 6
FEBRUARY 15, 1994**

Parameter	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
O ₂ , % dry	4.88	12.29		
CO ₂ , % dry	31.5	8.24		
N ₂ , % dry	28.7	79.5		
H ₂ O, %	4.6	8.4		
Flow Rate, dscfm	849	7,408	1,000 inlet (scfm)	P/C
Temperature, °F	102	1,571	> 1500	P/C
NO _x :				
ppm		14.6		
lb/hr (as NO ₂)		0.78	4.3	P/C
lb/day (as NO ₂)		*	29 20	P/C
CO:				
ppm		1.1	2,000	407
lb/hr		0.04	20.4	P/C
lb/day		*	490 8	P/C
SO _x :				
ppm		12.9		
lb/hr (as SO ₂)		0.97		
lb/day (as SO ₂)		*	12	
HC:				
CH ₄ ppm	388,500	ND < 1		
TGNMO ppm (as CH ₄)	4,070	5.75		
TGNMO lb/hr (as CH ₄)	8.74	0.11	5.1	P/C
TGNMO lb/day (as CH ₄)		*	122 16	P/C
Destruction Eff. %		98.8		
Particulate:				
Total Particulate gr/dscf		0.0078	0.0886	404
gr/dscf @ 3% O ₂		0.0161		
lb/hr		0.486	5.2	P/C
lb/day		*	123 31	P/C
Total Sulfur, ppm	< 91.8		800 inlet	431.1

Note: The results in this table are the averages of all measurements. See Section 4.0 for complete emission test results.

* - not measured.

P/C - SCAQMD Permit Operating Condition Application No. 172026.

RESULTS

SECTION 4.0

TABLE 4-1
GENERAL RESULTS
CALABASAS LANDFILL, FLARE NO. 6
FEBRUARY 15, 1994

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.98	4.77	4.88	12.25	12.33	12.29
CO ₂ , % dry	31.5	31.4	31.5	8.30	8.18	8.24
N ₂ , % dry	29.1	28.3	28.7	79.5	79.5	79.5
H ₂ O, %	4.1	5.1	4.6	8.6	8.2	8.4
Flow Rate, dscfm	849	849	849	6,913	7,903	7,408
Temperature, °F	98	106	102	1,566	1,576	1,571
NO _x :						
ppm						
ppm @ 3% O ₂				14.3	14.8	14.6
lb/hr (as NO ₂)				29.6	30.9	30.3
				0.72	0.85	0.78
CO:						
ppm						
ppm @ 3% O ₂				0.8	1.4	1.1
lb/hr				1.7	2.9	2.3
				0.024	0.049	0.037
SO _x :						
ppm						
ppm @ 3% O ₂				12.4	13.3	12.9
lb/hr (as SO ₂)				25.7	27.8	26.7
				0.87	1.06	0.97
HC:						
CH ₄ ppm	374,000	403,000	388,500	1.77	ND < 1	< 1.39
Tot NMHC ppm (as CH ₄)	3,980	4,160	4,070	5.59	5.90	5.75
Tot NMHC ppm (as CH ₄) @ 3% O ₂	--	--	--	11.57	12.32	11.95
NMHC lb/hr (as CH ₄)	8.55	8.93	8.74	0.10	0.12	0.11
Destruction Eff. %	--	--	--	98.9	98.7	98.8
Particulate:						
Organic fraction gr/dscf						
Inorganic fraction gr/dscf				0.0000	0.0000	0.0000
Total Particulate gr/dscf				0.0091	0.0064	0.0078
gr/dscf @ 3% O ₂				0.0091	0.0064	0.0078
lb/hr				0.0188	0.0134	0.0161
				0.537	0.435	0.486
Sulfur Compounds:						
H ₂ S, ppm	82	83	82.5			
Methyl Mercaptan, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Ethyl Mercaptan, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Dimethyl Sulfide, ppm	1.5	1.6	1.6			
Carbonyl Sulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Carbon Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Dimethyl Disulfide, ppm	ND < 1.4	ND < 1.4	ND < 1.4			
Total Sulfur Compounds, ppm	< 91.3	< 92.4	< 91.9			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
CALABASAS LANDFILL FLARE NO. 6, TEST NO. 1
FEBRUARY 15, 1994

Flow rate, Inlet dscfm	849		
Flow rate, Exhaust dscfm	6,913		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3,700 ppb	ND < 0.1 ppb ✓	
lb/hr	4.22×10^{-2}	$< 9.28 \times 10^{-6}$	> 99.98
Chloroform:	ND < 100 ppb	ND < 0.1 ppb ✓	
lb/hr	$< 1.60 \times 10^{-3}$	$< 1.30 \times 10^{-5}$	NA
1,1,1 Trichloroethane:	ND < 110 ppb	ND < 0.1 ppb ✓	
lb/hr	$< 1.97 \times 10^{-3}$	$< 1.46 \times 10^{-5}$	NA
Carbon Tetrachloride:	ND < 170 ppb	ND < 0.2 ppb ✓	
lb/hr	$< 3.51 \times 10^{-3}$	$< 3.36 \times 10^{-5}$	NA
1,1-Dichloroethene:	ND < 110 ppb	ND < 0.1 ppb ✓	
lb/hr	$< 1.43 \times 10^{-3}$	$< 1.06 \times 10^{-5}$	NA
Trichloroethylene:	950 ppb	ND < 0.2 ppb ✓	
lb/hr	1.68×10^{-2}	$< 2.87 \times 10^{-5}$	> 99.83
Tetrachloroethylene:	1,800 ppb	ND < 0.2 ppb ✓	
lb/hr	4.01×10^{-2}	$< 3.63 \times 10^{-5}$	> 99.91
Chlorobenzene:	390 ppb	ND < 0.2 ppb ✓	
lb/hr	5.89×10^{-3}	$< 2.46 \times 10^{-5}$	> 99.58
Vinyl Chloride:	3,200 ppb	ND < 0.4 ppb ✓	
lb/hr	2.68×10^{-2}	$< 2.73 \times 10^{-5}$	> 99.90
m-Dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb ✓	
lb/hr	$< 4.54 \times 10^{-3}$	$< 3.21 \times 10^{-5}$	NA
o+p-Dichlorobenzene:	450 ppb	ND < 0.4 ppb ✓	
lb/hr	8.88×10^{-3}	$< 6.43 \times 10^{-5}$	> 99.28
1,1-Dichloroethane:	1,300 ppb	ND < 0.1 ppb ✓	
lb/hr	1.73×10^{-2}	$< 1.08 \times 10^{-5}$	> 99.94
1,2-Dichloroethane:	510 ppb	ND < 0.2 ppb ✓	
lb/hr	6.77×10^{-3}	$< 2.16 \times 10^{-5}$	> 99.68
Benzene:	3,100 ppb	1.1 ppb* 2.45	
lb/hr	3.25×10^{-2}	9.39×10^{-5}	99.71
Toluene:	30,000 ppb	9.2 ppb* 12.1	
lb/hr	3.71×10^{-1}	9.26×10^{-4}	99.75
Acetonitrile:	ND < 5,700 ppb	ND < 5.7 ppb ✓	
lb/hr	$< 3.14 \times 10^{-2}$	$< 2.56 \times 10^{-4}$	NA
m-Xylenes:	14,000 ppb	ND < 0.2 ppb ✓	
lb/hr	1.99×10^{-1}	$< 2.32 \times 10^{-5}$	> 99.99
o+p Xylenes:	12,000 ppb	3.0 ppb* 2.95	
lb/hr	1.71×10^{-1}	3.48×10^{-4}	99.80
1,2-Dibromoethane:	ND < 590 ppb	ND < 0.6 ppb ✓	
lb/hr	$< 1.49 \times 10^{-2}$	$< 1.23 \times 10^{-4}$	NA
Benzyl Chloride:	ND 2,000 ppb	ND < 2.0 ppb ✓	
lb/hr	$< 3.40 \times 10^{-2}$	$< 2.77 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

* - The reported values for these compounds are suspected to be higher than the exhaust concentration due to contamination of the Tedlar bag from the previous sample.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
CALABASAS LANDFILL FLARE NO. 6, TEST NO. 2
FEBRUARY 15, 1994

Flow rate, Inlet dscfm	849		
Flow rate, Exhaust dscfm	6,913		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3,900 ppb	ND < 0.1 ppb	
lb/hr	4.45×10^{-2}	$< 9.28 \times 10^{-6}$	> 99.98
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 1.60 \times 10^{-3}$	$< 1.30 \times 10^{-5}$	NA
1,1,1 Trichloroethane:	110 ppb	ND < 0.1 ppb	
lb/hr	1.97×10^{-3}	$< 1.46 \times 10^{-5}$	> 99.26
Carbon Tetrachloride:	ND < 170 ppb	ND < 0.2 ppb	
lb/hr	$< 3.51 \times 10^{-3}$	$< 3.36 \times 10^{-5}$	NA
1,1-Dichloroethene:	ND < 110 ppb	ND < 0.1 ppb	
lb/hr	$< 1.43 \times 10^{-3}$	$< 1.06 \times 10^{-5}$	NA
Trichloroethylene:	960 ppb	ND < 0.2 ppb	
lb/hr	1.69×10^{-2}	$< 2.87 \times 10^{-5}$	> 99.83
Tetrachloroethylene:	1,800	ND < 0.2 ppb	
lb/hr	4.01×10^{-2}	$< 3.63 \times 10^{-5}$	> 99.91
Chlorobenzene:	550 ppb	ND < 0.2 ppb	
lb/hr	8.31×10^{-3}	$< 2.46 \times 10^{-5}$	> 99.70
Vinyl Chloride:	3,200 ppb	ND < 0.4 ppb	
lb/hr	2.68×10^{-2}	$< 2.73 \times 10^{-5}$	> 99.90
m-Dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	
lb/hr	$< 4.54 \times 10^{-3}$	$< 3.21 \times 10^{-5}$	NA
o+p Dichlorobenzene:	510 ppb	ND < 0.4 ppb	
lb/hr	1.01×10^{-2}	$< 6.43 \times 10^{-5}$	> 99.36
1,1-Dichloroethane:	1,400 ppb	ND < 0.1 ppb	
lb/hr	1.86×10^{-2}	$< 1.08 \times 10^{-5}$	> 99.94
1,2-Dichloroethane:	600 ppb	ND < 0.2 ppb	
lb/hr	7.97×10^{-3}	$< 2.16 \times 10^{-5}$	> 99.73
Benzene:	3,000 ppb	3.8 ppb*	
lb/hr	3.15×10^{-2}	3.24×10^{-4}	98.97
Toluene:	30,000 ppb	15.0 ppb*	
lb/hr	3.71×10^{-1}	1.51×10^{-3}	99.59
Acetonitrile:	ND < 5,700 ppb	ND < 5.7 ppb	
lb/hr	$< 3.14 \times 10^{-2}$	$< 2.56 \times 10^{-4}$	NA
m-Xylenes:	13,000 ppb	ND < 0.2 ppb	
lb/hr	1.85×10^{-1}	$< 2.32 \times 10^{-5}$	> 99.99
o+p Xylenes:	11,000 ppb	2.9 ppb*	
lb/hr	1.57×10^{-1}	3.36×10^{-4}	99.79
1,2-Dibromoethane:	ND < 590 ppb	ND < 0.6 ppb	
lb/hr	$< 1.49 \times 10^{-2}$	$< 1.23 \times 10^{-4}$	NA
Benzyl Chloride:	ND < 2,000 ppb	ND < 2.0 ppb	
lb/hr	$< 3.40 \times 10^{-2}$	$< 2.77 \times 10^{-4}$	NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

* - The reported values for these compounds are suspected to be higher than the exhaust concentration due to contamination of the Tedlar bag from the previous sample.

500/ALP
FILE



AIR MEASUREMENT SERVICES, INC.

L01-009-FR

**OXIDE OF NITROGEN (NO_x) EMISSIONS TEST
ON FLARES NO. 1 AND NO. 3
AT THE CALABASAS LANDFILL**

June 1995

Prepared for:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Post Office Box 4998
Whittier, California 90607**

Prepared by:

**HORIZON AIR MEASUREMENT SERVICES, INC.
996 Lawrence Drive, Suite 108
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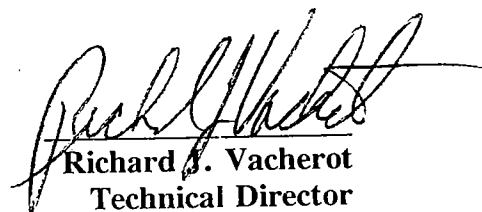

**Richard J. Vacherot
Technical Director**

TABLE 2-1
Summary of Results
Calabasas Landfill
June 5, 1995

	FLARE #1	FLARE #3	PERMIT LIMIT
STACK GAS CHARACTERISTICS			
Temperature (°F)	1619	1611	
Moisture (%)	8.4	9.7	
Flow Rate (acfm)	24,700	24,450	
(dscfm)	5450	5340	
Fixed Gases			
Oxygen (%)	11.5	12.9	
Carbon Dioxide (%)	8.9	7.6	
Nitrogen (%)	79.6	79.5	
EMISSIONS			
Oxides of Nitrogen			
ppm	14.5	11.1	
ppm @ 3% O ₂	27.6	24.8	
lb/hr	0.58	0.43	
lb/day*	13.9	10.3	20

* Based upon a 24-hour day.

SW/AQ



L01-007-FR

**EMISSIONS TESTS ON FLARES No. 1, No. 3, and No. 4
AT THE CALABASAS LANDFILL**

MARCH 1995

Prepared for:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Post Office Box 4998
Whittier, California 90607**

Prepared by:

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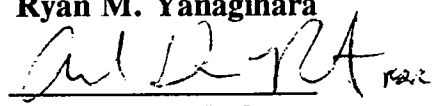

Ryan M. Yanagihara

Richard J. Vacherot

TABLE 5-1
Summary of Results - Flare No. 1
Calabasas Landfill
March 14, 1995

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	112	109	111	1559	1556	1558
Moisture (%)	5.4	5.8	5.6	12.2	11.6	11.9
Flow Rate (acfm)*	879	874	877	38890	39455	39173
(dscfm)	741	738	740	8529	8726	8628
Fixed Gases						
Oxygen (%)	5.6	5.1	5.4	10.6	10.7	10.7
Carbon Dioxide (%)	29.9	30.6	30.3	8.6	9.0	8.8
EMISSIONS						
Oxides of Nitrogen						
ppm	----	----	----	20.1	19.9	20.0
ppm @ 3% O ₂	----	----	----	34.9	34.9	34.9
lb/hr	----	----	----	1.25	1.26	1.26
lb/day	----	----	----	**	**	**
Carbon Monoxide						
ppm	----	----	----	0.0	0.4	0.2
ppm @ 3% O ₂	----	----	----	0.0	0.7	0.4
lb/hr	----	----	----	0.0	0.02	0.01
lb/day	----	----	----	**	**	**
Particulate Matter						
organic fraction gr/dscf	----	----	----	0.0000	0.0000	0.0000
inorganic fraction, gr/dscf	----	----	----	0.0050	0.0121	0.0086
total, gr/dscf	----	----	----	0.0050	0.0121	0.0086
total, gr/dscf @ 12% CO ₂	----	----	----	0.0070	0.0161	0.0116
Total, lb/hr	----	----	----	0.37	0.91	0.64
Total, lb/day	----	----	----	**	**	**
Hydrocarbons						
methane, ppm	380000	380000	380000	2.8	<1	1.9
TNMHC, ppm (as CH ₄)	3690	3560	3625	<1	<1	<1
TNMHC, lb/hr (as CH ₄)	6.92	6.64	6.78	<0.022	<0.022	<0.022
TNMHC, lb/day (as CH ₄)	----	----	----	**	**	**
destruction efficiency	----	----	----	>99.7	>99.7	>99.7
Sulfur Compounds						
hydrogen sulfide (ppm)	100	98	99	----	----	----
total sulfur compounds (ppm as H ₂ S)	101.7	99.7	100.7	----	----	----
Oxides of Sulfur						
ppm	----	----	----	13.7	15.5	14.6
ppm @ 3% O ₂	----	----	----	23.8	27.2	25.5
lb/hr (as SO ₂)	----	----	----	1.11	1.28	1.20
lb/day (as SO ₂)	----	----	----	**	**	**

* The inlet flow rate measurements have an accuracy of $\pm 10\%$ due to flow distribution at the sample location.
Note: All values preceded by "<" are below the quantifiable limit of the Method. Actual values are less than those reported.
** Not Measured

TABLE 5-2
Summary of Results - Flare No. 3
Calabasas Landfill
March 15, 1995

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	91	96	94	1648	1653	1651
Moisture (%)	6.0	6.5	6.3	11.4	10.6	11.0
Flow Rate (acfm)	823	849	836	39773	39685	39729
(dscfm)	713	725	719	8391	8436	8414
Fixed Gases						
Oxygen (%)	5.6	5.5	5.6	10.4	10.7	10.6
Carbon Dioxide (%)	31.0	31.3	31.2	8.5	9.0	8.8
EMISSIONS						
Oxides of Nitrogen						
ppm	---	---	---	18.0	17.0	17.5
ppm @ 3% O ₂	---	---	---	30.7	29.8	30.3
lb/hr	---	---	---	1.10	1.04	1.07
lb/day	---	---	---	**	**	**
Carbon Monoxide						
ppm	---	---	---	0.3	0.0	0.2
ppm @ 3% O ₂	---	---	---	0.5	0.0	0.3
lb/hr	---	---	---	0.01	0.0	0.01
lb/day	---	---	---	**	**	**
Particulate Matter						
organic fraction gr/dscf	---	---	---	0.0002	0.0002	0.0002
insoluble, gr/dscf	---	---	---	0.0015	0.0089	0.0052
total, gr/dscf	---	---	---	0.0017	0.0091	0.0054
total, gr/dscf @ 12% CO ₂	---	---	---	0.0024	0.0121	0.0073
Total, lb/hr	---	---	---	0.12	0.66	0.39
Total, lb/day	---	---	---	**	**	**
Hydrocarbons						
methane, ppm	384000	380000	382000	< 1	< 1	< 1
TNMHC, ppm (as CH ₄)	3700	3610	3655	< 1	< 1	< 1
TNMHC, lb/hr (as CH ₄)	6.67	6.62	6.65	< 0.021	< 0.021	< 0.021
TNMHC, lb/day (as CH ₄)	---	---	---	**	**	**
destruction efficiency	---	---	---	> 99.7	> 99.7	> 99.7
Sulfur Compounds						
hydrogen sulfide (ppm)	110	110	110	---	---	---
total sulfur compounds (ppm as H ₂ S)	111.6	111.7	111.7	---	---	---
Oxides of Sulfur						
ppm	---	---	---	17.4	14.8	16.1
ppm @ 3% O ₂	---	---	---	29.7	25.9	27.8
lb/hr (as SO ₂)	---	---	---	1.38	1.19	1.29
lb/day (as SO ₂)	---	---	---	**	**	**

* The inlet flow rate measurements have an accuracy of $\pm 10\%$ due to flow distribution at the sample location.

Note: All values preceded by "<" are below the quantifiable limit of the Method. Actual values are less than those reported.

** Not measured.

TABLE 5-3
Summary of Results - Flare No. 4
Calabasas Landfill
March 13, 1995

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	116	107	112	1591	1576	1584
Moisture (%)	5.8	6.1	6.0	9.7	10.7	10.2
Flow Rate (acfm)	881	877	879	37410	38654	38032
(dscfm)	733	739	736	8298	8548	8423
Fixed Gases						
Oxygen (%)	5.1	5.0	5.1	11.1	11.3	11.2
Carbon Dioxide (%)	31.5	31.6	31.6	8.6	8.9	8.8
EMISSIONS						
Oxides of Nitrogen						
ppm	---	---	---	14.8	13.9	14.4
ppm @ 3% O ₂	---	---	---	27.0	25.9	26.5
lb/hr	---	---	---	0.893	0.864	0.879
lb/day	---	---	---	**	**	**
Carbon Monoxide						
ppm	---	---	---	0.0	0.2	0.1
ppm @ 3% O ₂	---	---	---	0.0	0.3	0.2
lb/hr	---	---	---	0.00	0.01	0.01
lb/day	---	---	---	**	**	**
Particulate Matter						
organic fraction gr/dscf	---	---	---	0.0001	0.0003	0.0002
insoluble, gr/dscf	---	---	---	0.0017	0.0019	0.0018
total, gr/dscf	---	---	---	0.0018	0.0022	0.0020
total, gr/dscf @ 12% CO ₂	---	---	---	0.0025	0.0030	0.0027
Total, lb/hr	---	---	---	0.13	0.16	0.15
Total, lb/day	---	---	---	**	**	**
Hydrocarbons						
methane, ppm	362000	366000	364000	<1	<1	<1
TNMHC, ppm (as CH ₄)	3400	3610	3505	1.2	1.7	1.5
TNMHC, lb/hr (as CH ₄)	6.30	6.75	6.53	0.025	0.038	0.032
TNMHC, lb/day (as CH ₄)	---	---	---	**	**	**
destruction efficiency	---	---	---	99.6	99.4	99.5
Sulfur Compounds						
hydrogen sulfide (ppm)	65	83	74	---	---	---
total sulfur compounds (ppm as H ₂ S)	66.6	84.7	75.7	---	---	---
Oxides of Sulfur						
ppm	---	---	---	17.0	14.1	15.6
ppm @ 3% O ₂	---	---	---	31.0	26.3	28.6
lb/hr (as SO ₂)	---	---	---	1.34	1.14	1.24
lb/day (as SO ₂)	---	---	---	**	**	**

Note: All values preceded by "<" are below the quantifiable limit of the Method. Actual values are less than those reported.

* The inlet flow rate measurements have an accuracy of $\pm 10\%$ due to flow distribution at the sample location.

** Not measured.

Table 5-4
Trace Organic Species Destruction Efficiency Results
LACSD - Calabasas
Flare #1 - Run #1
March 1995

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Acetonitrile	< 5100	< 2.45E-02	< 13.0	7.19E-04	NA
Benzene	2300	2.10E-02	< 0.3	3.16E-05	> 99.85
Benzylchloride	< 420	< 6.25E-03	< 1.1	1.88E-04	NA
Chlorobenzene	350	4.63E-03	< 0.5	7.62E-05	> 98.36
Dichlorobenzenes	< 1260	< 2.17E-02	< 3.3	6.54E-04	NA
1,1-dichloroethane	1200	1.39E-02	< 0.5	6.67E-05	> 99.52
1,2-dichloroethane	240	2.78E-03	< 0.3	4.00E-05	> 98.56
1,1-dichloroethylene	< 210	< 2.39E-03	< 0.5	6.54E-05	NA
Dichloromethane	2700	2.69E-02	< 1.0	1.15E-04	> 99.57
Perchloroethene	1200	3.33E-02	< 0.3	9.59E-05	> 99.71
Carbon tetrachloride	< 100	< 1.80E-03	< 0.3	6.23E-05	NA
Toluene	20000	2.16E-01	< 1.1	1.36E-04	> 99.94
1,1,1-trichloroethane	< 100	< 1.56E-03	< 0.3	5.38E-05	NA
Trichloroethene	870	1.34E-02	< 0.3	5.30E-05	> 99.60
Chloroform	< 100	< 1.39E-03	< 0.3	4.81E-05	NA
Vinyl Chloride	3300	2.42E-02	< 0.5	4.21E-05	> 99.83
m+p xylenes	12000	1.49E-01	< 1.1	1.57E-04	> 99.89
o xylene	2900	3.60E-02	< 0.5	7.15E-05	> 99.80
TNMHC	3690000	6.92E+00	< 1000.0	2.16E-02	> 99.69

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-5
Trace Organic Species Destruction Efficiency Results
LACSD - Calabasas
Flare #1 - Run #2
March 1995

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)		Concentration (ppb)	Emission Rate (lb/hr)		
Acetonitrile	< 5100	< 2.44E-02		< 13.0	< 7.35E-04		NA
Benzene	2000	1.82E-02		< 0.3	< 3.23E-05	>	99.82
Benzylchloride	< 420	< 6.22E-03		< 1.1	< 1.93E-04		NA
Chlorobenzene	430	5.67E-03		< 0.5	< 7.79E-05	>	98.63
Dichlorobenzenes	< 1260	< 2.16E-02		< 3.3	< 6.69E-04		NA
1,1-dichloroethane	1200	1.39E-02		< 0.5	< 6.83E-05	>	99.51
1,2-dichloroethane	240	2.77E-03		< 0.3	< 4.10E-05	>	98.52
1,1-dichloroethylene	< 210	< 2.38E-03		< 0.5	< 6.69E-05		NA
Dichloromethane	2700	2.68E-02		< 1.0	< 1.17E-04	>	99.56
Perchloroethene	1300	3.59E-02		< 0.3	< 9.81E-05	>	99.73
Carbon tetrachloride	< 100	< 1.80E-03		< 0.3	< 6.37E-05		NA
Toluene	19000	2.04E-01		< 1.1	< 1.40E-04	>	99.93
1,1,1-trichloroethane	< 100	< 1.55E-03		< 0.3	< 5.50E-05		NA
Trichloroethene	840	1.28E-02		< 0.3	< 5.42E-05	>	99.58
Chloroform	< 100	< 1.39E-03		< 0.3	< 4.92E-05		NA
Vinyl Chloride	3400	2.48E-02		< 0.5	< 4.31E-05	>	99.83
m+p xylenes	13000	1.61E-01		< 1.1	< 1.61E-04	>	99.90
o xylene	3600	4.45E-02		< 0.5	< 7.31E-05	>	99.84
TNMHC	3560000	6.65E+00		< 1000.0	< 2.21E-02	>	99.67

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-6
Trace Organic Species Destruction Efficiency Results
LACSD - Calabasas
Flare #3 - Run #1
March 1995

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)		Concentration (ppb)	Emission Rate (lb/hr)		
Acetonitrile	< 5100	< 2.36E-02		< 13.0	< 7.07E-04		NA
Benzene	2300	2.02E-02		< 0.3	< 3.10E-05	>	99.85
Benzylchloride	< 420	< 6.01E-03		< 1.1	< 1.85E-04		NA
Chlorobenzene	470	5.99E-03		< 0.5	< 7.49E-05	>	98.75
Dichlorobenzenes	< 1260	< 2.09E-02		< 3.3	< 6.43E-04		NA
1,1-dichloroethane	1300	1.45E-02		< 0.5	< 6.57E-05	>	99.55
1,2-dichloroethane	230	2.57E-03		< 0.3	< 3.94E-05	>	98.46
1,1-dichloroethylene	< 210	< 2.30E-03		< 0.5	< 6.43E-05		NA
Dichloromethane	2800	2.68E-02		< 1.0	< 1.13E-04	>	99.58
Perchloroethene	1300	3.47E-02		< 0.3	< 9.43E-05	>	99.73
Carbon tetrachloride	< 100	< 1.74E-03		< 0.3	< 6.13E-05		NA
Toluene	19000	1.97E-01		< 1.1	< 1.34E-04	>	99.93
1,1,1-trichloroethane	< 100	< 1.50E-03		< 0.3	< 5.29E-05		NA
Trichloroethene	760	1.12E-02		< 0.3	< 5.21E-05	>	99.54
Chloroform	< 100	< 1.34E-03		< 0.3	< 4.74E-05		NA
Vinyl Chloride	3600	2.54E-02		< 0.5	< 4.15E-05	>	99.84
m+p xylenes	11000	1.31E-01		< 1.1	< 1.55E-04	>	99.88
o xylene	2700	3.23E-02		< 0.5	< 7.03E-05	>	99.78
TNMHC	3700000	6.67E+00		< 1000.0	< 2.12E-02	>	99.68

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-7
Trace Organic Species Destruction Efficiency Results
LACSD - Calabasas
Flare #3 - Run #2
March 1995

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)		Concentration (ppb)	Emission Rate (lb/hr)		
Acetonitrile	< 5100	< 2.40E-02		< 13.0	< 7.11E-04		NA
Benzene	2300	2.06E-02		< 0.3	< 3.12E-05	>	99.85
Benzylchloride	< 420	< 6.11E-03		< 1.1	< 1.86E-04		NA
Chlorobenzene	550	7.12E-03		< 0.5	< 7.54E-05	>	98.94
Dichlorobenzenes	< 1260	< 2.12E-02		< 3.3	< 6.47E-04		NA
1,1-dichloroethane	1300	1.48E-02		< 0.5	< 6.60E-05	>	99.55
1,2-dichloroethane	240	2.72E-03		< 0.3	< 3.96E-05	>	98.55
1,1-dichloroethylene	< 210	< 2.33E-03		< 0.5	< 6.47E-05		NA
Dichloromethane	2900	2.83E-02		< 1.0	< 1.13E-04	>	99.60
Perchloroethene	1400	3.80E-02		< 0.3	< 9.48E-05	>	99.75
Carbon tetrachloride	< 100	< 1.77E-03		< 0.3	< 6.16E-05		NA
Toluene	21000	2.21E-01		2.0	2.45E-04		99.89
1,1,1-trichloroethane	< 100	< 1.52E-03		< 0.3	< 5.32E-05		NA
Trichloroethene	820	1.23E-02		< 0.3	< 5.24E-05	>	99.57
Chloroform	< 100	< 1.36E-03		< 0.3	< 4.76E-05		NA
Vinyl Chloride	3600	2.58E-02		< 0.5	< 4.17E-05	>	99.84
m+p xylenes	13000	1.58E-01		< 1.1	< 1.56E-04	>	99.90
o xylene	4800	5.83E-02		< 0.5	< 7.07E-05	>	99.88
TNMHC	3610000	6.62E+00		< 1000.0	< 2.13E-02	>	99.68

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-8
Trace Organic Species Destruction Efficiency Results
LACSD - Calabasas
Flare #4 - Run #1
March 1995

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)		Concentration (ppb)	Emission Rate (lb/hr)		
Acetonitrile	< 5100	< 2.42E-02	<	13.0	< 6.99E-04		NA
Benzene	2000	1.81E-02	<	0.3	< 3.07E-05	>	99.83
Benzylchloride	< 420	< 6.18E-03	<	1.1	< 1.83E-04		NA
Chlorobenzene	470	6.15E-03	<	0.5	< 7.41E-05	>	98.80
Dichlorobenzenes	< 1260	< 2.15E-02	<	3.3	< 6.36E-04		NA
1,1-dichloroethane	1400	1.61E-02	<	0.5	< 6.49E-05	>	99.60
1,2-dichloroethane	230	2.64E-03	<	0.3	< 3.90E-05	>	98.52
1,1-dichloroethylene	< 210	< 2.36E-03	<	0.5	< 6.36E-05		NA
Dichloromethane	2600	2.56E-02	<	1.0	< 1.12E-04	>	99.56
Perchloroethene	1500	4.12E-02	<	0.3	< 9.33E-05	>	99.77
Carbon tetrachloride	< 100	< 1.78E-03	<	0.3	< 6.06E-05		NA
Toluene	19000	2.03E-01	<	1.1	< 1.33E-04	>	99.93
1,1,1-trichloroethane	< 100	< 1.54E-03	<	0.3	< 5.23E-05		NA
Trichloroethene	760	1.15E-02	<	0.3	< 5.16E-05	>	99.55
Chloroform	< 100	< 1.38E-03	<	0.3	< 4.68E-05		NA
Vinyl Chloride	2800	2.03E-02	<	0.5	< 4.10E-05	>	99.80
m+p xylenes	16000	1.97E-01	<	1.1	< 1.53E-04	>	99.92
o xylene	6100	7.49E-02	<	0.5	< 6.95E-05	>	99.91
TNMHC	3400000	6.30E+00		1180.0	2.48E-02		99.61

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-9
Trace Organic Species Destruction Efficiency Results
LACSD - Calabasas
Flare #4 - Run #2
March 1995

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)		Concentration (ppb)	Emission Rate (lb/hr)		
Acetonitrile	< 5100	< 2.44E-02		< 13.0	< 7.20E-04		NA
Benzene	2100	1.91E-02		< 0.3	< 3.16E-05	>	99.83
Benzylchloride	< 420	< 6.23E-03		< 1.1	< 1.89E-04		NA
Chlorobenzene	340	4.49E-03		< 0.5	< 7.64E-05	>	98.30
Dichlorobenzenes	< 1260	< 2.16E-02		< 3.3	< 6.56E-04		NA
1,1-dichloroethane	1300	1.50E-02		< 0.5	< 6.69E-05	>	99.56
1,2-dichloroethane	220	2.54E-03		< 0.3	< 4.01E-05	>	98.42
1,1-dichloroethylene	< 210	< 2.38E-03		< 0.5	< 6.55E-05		NA
Dichloromethane	2600	2.58E-02		< 1.0	< 1.15E-04	>	99.56
Perchloroethene	1400	3.88E-02		< 0.3	< 9.61E-05	>	99.75
Carbon tetrachloride	< 100	< 1.80E-03		< 0.3	< 6.24E-05		NA
Toluene	17000	1.83E-01		< 1.1	< 1.37E-04	>	99.93
1,1,1-trichloroethane	< 100	< 1.55E-03		< 0.3	< 5.39E-05		NA
Trichloroethene	820	1.25E-02		< 0.3	< 5.31E-05	>	99.58
Chloroform	< 100	< 1.39E-03		< 0.3	< 4.82E-05		NA
Vinyl Chloride	2900	2.12E-02		< 0.5	< 4.22E-05	>	99.80
m+p xylenes	13000	1.61E-01		< 1.1	< 1.58E-04	>	99.90
o xylene	4400	5.45E-02		< 0.5	< 7.16E-05	>	99.87
TNMHC	3610000	6.75E+00		1740.0	3.76E-02		99.44

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

**SOURCE TEST RESULTS FOR EMISSION
TESTING ON ONE HIGH CAPACITY
LANDFILL GAS FLARE AT THE
CALABASAS LANDFILL
(PERMIT TO CONSTRUCT
APPLICATION No. 275193)**

Prepared For:

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California

Prepared By:

Craig H. Fry

CARNOT
Tustin, California

AUGUST 1995

**TABLE 1-2
SUMMARY OF TEST RESULTS
CALABASAS LANDFILL FLARE No. 7
JULY 20, 1995**

Parameter	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
O ₂ , %	5.12	12.60		
CO ₂ , %	31.4	7.71		
N ₂ , %	28.3	79.7		
H ₂ O, %	7.7	9.4		
Flow Rate, dscfm	1,311	10,752	1500 Inlet	P/C
Temperature, F	148	1,587	> 1400	P/C
NOx:				
ppm		13.2		
lb/hr (as NO ₂)		1.03		
lb/day (as NO ₂)		*	31	P/C
lb/MM Btu (as NO ₂)		0.040	0.06	P/C
CO:				
ppm		0.5	2000	407
lb/hr		0.02		
lb/day		*	12	P/C
HC:				
CH ₄ ppm	360,500	ND < 1		
TGNMO ppm	3,300	1.87		
TGNMO ppm @ 3% O ₂	—	4.02		
TGNMO lb/hr (as CH ₄)	10.94	0.05		
TGNMO lb/day (as CH ₄)	—	*	24	P/C
Destruction Eff. %	—	99.54		
Particulate:				
Total Particulate gr/dscf		0.0048	0.0769	404
lb/hr		0.441		
lb/day		*	47	P/C
Total Sulfur, ppm	88.1		Under Variance	431.1

NOTE: The results in this table are the averages of all measurements. See Section 4.0 for complete emission test results.

P/C - SCAQMD Permit To Construct Application No. 275193

* - Not Measured

TABLE 4-1
GENERAL RESULTS
CALABASAS LANDFILL FLARE No. 7
JULY 20, 1995

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	5.29	4.95	5.12	12.55	12.64	12.60
CO ₂ , %	31.1	31.6	31.4	7.72	7.70	7.71
N ₂ , %	28.9	27.6	28.3	79.7	79.7	79.7
H ₂ O, %	7.8	7.6	7.7	9.5	9.2	9.4
Flow Rate, dscfm	1,333	1,289	1311	10,624	10,879	10,752
Temperature, F	138	158	148	1,600	1,575	1,587
NOx:						
ppm						
ppm @ 3% O ₂				12.8	13.5	13.2
lb/hr (as NO ₂)				27.5	29.3	28.4
lb/MM Btu (as NO ₂)				0.99	1.07	1.03
CO:				0.038	0.041	0.040
ppm						
ppm @ 3% O ₂				0.5	0.5	0.5
lb/hr				1.0	1.1	1.0
HC:				0.02	0.02	0.02
CH ₄ ppm	356,000	365,000	360,500	ND < 1	ND < 1	ND < 1
TGNMO ppm	3,130	3,470	3,300	1.55	2.18	1.87
TGNMO ppm @ 3% O ₂	--	--	--	3.32	4.72	4.02
TGNMO lb/hr (as CH ₄)	10.56	11.31	10.94	0.04	0.06	0.05
Destruction Eff. %	--	--	--	99.61	99.47	99.54
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0047	0.0048	0.0048
Total Particulate gr/dscf				0.0047	0.0048	0.0048
gr/dscf @3% O ₂				0.0102	0.0105	0.0103
gr/dscf @12% CO ₂				0.0074	0.0075	0.0074
lb/hr				0.432	0.450	0.441
Sulfur Compounds:						
H ₂ S, ppm	85.0	86.2	85.6			
Methyl Mercaptan, ppm	0.28	0.42	0.35			
Ethyl Mercaptan, ppm	0.094	0.15	0.122			
Dimethyl Sulfide, ppm	1.28	1.43	1.36			
Carbonyl Sulfide, ppm	0.15	0.16	0.16			
Carbon Disulfide, ppm	0.10	0.11	0.11			
isopropyl mercaptan, ppm	0.10	0.14	0.12			
n-propyl mercaptan, ppm	0.053	0.058	0.056			
Dimethyl Disulfide, ppm	0.030	0.042	0.036			
Total Sulfur Compounds, ppm	87.2	88.9	88.1			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 1
CALABASAS LANDFILL FLARE No. 7
JULY 20, 1995

Flow rate, Inlet dscfm		1,333			
Flow rate, Exhaust dscfm		10,624			
Species		Inlet		Exhaust	Destruction Efficiency, %
Acetonitrile:		194 ppb	ND <	0.8 ppb	
lb/hr		1.68×10^{-3}	<	5.52×10^{-5}	> 96.71
Benzene:		2910 ppb		0.35 ppb	
lb/hr		4.79×10^{-2}		4.59×10^{-5}	99.90
Benzylchloride:		20 ppb	ND <	1 ppb	
lb/hr	ND <	5.34×10^{-4}	<	2.13×10^{-4}	NA
Chlorobenzene:		688 ppb	ND <	0.2 ppb	
lb/hr	<	1.63×10^{-2}	<	3.78×10^{-5}	> 99.77
Dichlorobenzenes:		1650 ppb	ND <	1.1 ppb	
lb/hr		5.11×10^{-2}	<	2.72×10^{-4}	> 99.47
1,1-dichloroethane:		1050 ppb	ND <	0.4 ppb	
lb/hr		2.19×10^{-2}	<	6.65×10^{-5}	> 99.70
1,2-dichloroethane:		208 ppb	ND <	0.2 ppb	
lb/hr		4.34×10^{-3}	<	3.32×10^{-5}	> 99.23
1,1-dichloroethylene:		82.8 ppb	ND <	0.5 ppb	
lb/hr		1.69×10^{-3}	<	8.14×10^{-5}	> 95.19
Dichloromethane		2520		5.40 ppb	
lb/hr		4.51×10^{-2}		7.70×10^{-4}	98.29
Perchloroethene:		2290 ppb	ND <	0.1 ppb	
lb/hr		8.01×10^{-2}	<	2.79×10^{-5}	> 99.97
Carbon Tetrachloride:		4 ppb	ND <	0.06 ppb	
lb/hr	ND <	1.30×10^{-4}	<	1.55×10^{-5}	NA
Toluene:		16800 ppb		2.29 ppb	
lb/hr		3.26×10^{-1}		3.54×10^{-4}	99.89
1,1,1-Trichloroethane:		156 ppb	ND <	0.1 ppb	
lb/hr		4.39×10^{-3}	<	2.24×10^{-5}	> 99.49
Trichloroethene:		848 ppb	ND <	0.1 ppb	
lb/hr		1.77×10^{-2}	<	1.66×10^{-5}	> 99.91
Chloroform:		9 ppb		0.23 ppb	
lb/hr	ND <	2.27×10^{-4}		4.61×10^{-5}	NA
Vinyl Chloride:		3060 ppb	ND <	0.2 ppb	
lb/hr		4.03×10^{-2}	<	2.10×10^{-5}	> 99.95
m+p Xylenes:		16200 ppb	ND <	0.4 ppb	
lb/hr		3.63×10^{-1}	<	7.13×10^{-5}	> 99.98
o-Xylenes:		5410 ppb	ND <	0.2 ppb	
lb/hr		1.21×10^{-1}	<	3.57×10^{-5}	> 99.97

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is lower than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

JULY 20, 1995

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is than the presented value.
NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

**EMISSIONS TESTS ON THREE LANDFILL GAS
FLARES (FLARE NOS. 6, 8, AND 9) AT THE
CALABASAS LANDFILL
MARCH, 1996**

Prepared for:

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California

for Submittal to:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California

Prepared by:

Craig H. Fry

CARNOT
Tustin, California

May 1996

TABLE 4-1
GENERAL RESULTS
CALABASAS LANDFILL FLARE No. 6
MARCH 13, 1996

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	6.20	6.23	6.22	11.57	11.88	11.72
CO ₂ , %	33.5	33.6	33.6	8.60	8.40	8.50
N ₂ , %	28.9	27.6	28.3	79.8	79.7	79.8
H ₂ O, %	4.0	4.0	4.0	9.8	10.4	10.1
Flow Rate, dscfm	875	898	887	8,637	8,665	8,651
Temperature, °F	94	100	97	1,512	1,524	1,518
NO _x :						
ppm				13.7	13.5	13.6
ppm @ 3% O ₂				26.3	26.7	26.5
lb/hr (as NO ₂)				0.86	0.85	0.86
lb/MM Btu (as NO ₂)				0.055	0.053	0.054
CO:						
ppm				0.6	0.9	0.7
ppm @ 3% O ₂				1.1	1.7	1.4
lb/hr				0.02	0.03	0.03
HC:						
CH ₄ ppm	324,000	321,000	322,500	ND< 1	ND< 1	ND< 1
TGNMO ppm	4,450	4,240	4,345	1.00	1.00	1.00
TGNMO ppm @ 3% O ₂	—	—	—	1.92	1.98	1.95
TGNMO lb/hr (as CH ₄)	9.85	9.63	9.74	0.02	0.02	0.02
Destruction Eff. %	—	—	—	99.78	99.77	99.78
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0035	0.0064	0.0049
Total Particulate gr/dscf				0.0035	0.0064	0.0049
gr/dscf @3% O ₂				0.0067	0.0127	0.0097
gr/dscf @12% CO ₂				0.0049	0.0091	0.0070
lb/hr				0.260	0.475	0.367
Sulfur Compounds:						
H ₂ S, ppm	73	69	71			
Methyl Mercaptan, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Ethyl Mercaptan, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Dimethyl Sulfide, ppm	1.3	1.3	1.3			
Carbonyl Sulfide, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Carbon Disulfide, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Dimethyl Disulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Total Sulfur Compounds, ppm	74.3	70.3	72.3			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 1
CALABASAS LANDFILL FLARE No. 6
MARCH 13, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		875 8,637			Destruction Efficiency, %
Species		Inlet		Exhaust	
Methylene Chloride:		2700 ppb		1.4 ppb	
lb/hr		3.17E-02		1.62E-04	99.49
Chloroform:	ND<	210 ppb	ND<	0.5 ppb	N/A
lb/hr	<	3.47E-03	<	8.15E-05	
1,1,1 Trichloroethane:		270 ppb	ND<	0.5 ppb	
lb/hr		4.98E-03	<	9.11E-05	>98.17
Carbon Tetrachloride:	ND<	210 ppb	ND<	0.5 ppb	N/A
lb/hr	<	4.47E-03	<	1.05E-04	
1,1-Dichloroethene:		220 ppb	ND<	0.5 ppb	
lb/hr		2.95E-03	<	6.62E-05	>97.76
Trichloroethylene:		820 ppb	ND<	0.3 ppb	
lb/hr		1.49E-02	<	5.38E-05	>99.64
Tetrachloroethylene:		1300 ppb	ND<	0.3 ppb	
lb/hr		2.98E-02	<	6.79E-05	>99.77
Chlorobenzene:		500 ppb	ND<	0.5 ppb	
lb/hr		7.79E-03	<	7.69E-05	>99.01
Vinyl Chloride:		3700	ND<	1.0 ppb	
lb/hr		3.20E-02	<	8.53E-05	>99.73
o-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	N/A
lb/hr	<	8.54E-03	<	2.21E-04	
m-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	N/A
lb/hr	<	8.54E-03	<	2.21E-04	
p-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	N/A
lb/hr	<	8.54E-03	<	2.21E-04	
1,1-Dichloroethane:		1100 ppb	ND<	0.5 ppb	
lb/hr		1.51E-02	<	6.76E-05	>99.55
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb	N/A
lb/hr	<	2.88E-03	<	6.76E-05	
Benzene:		3300 ppb	ND<	0.3 ppb	
lb/hr		3.57E-02	<	3.20E-05	>99.91
Toluene:		15000 ppb	ND<	0.5 ppb	
lb/hr		1.91E-01	<	6.29E-05	>99.97
Ethyl Benzene:		7900	ND<	0.5	
lb/hr		1.16E-01	<	7.25E-05	>99.94
o-Xylenes:		2700 ppb	ND<	0.5 ppb	
lb/hr		3.97E-02	<	7.34E-06	>99.98
Methyl-Tert-Butyl-Ether:	ND<	200 ppb	ND<	0.5 ppb	N/A
lb/hr	<	2.44E-03	<	6.02E-05	
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb	N/A
lb/hr	<	2.90E-02	<	7.29E-04	
Freon 11 (CCL3F):		210 ppb	ND<	0.5 ppb	
lb/hr		3.99E-03	<	9.38E-05	>97.65
1,2-Dibromoethane:	ND<	420 ppb	ND<	1.0 ppb	N/A
lb/hr	<	1.09E-02	<	2.57E-04	
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb	N/A
lb/hr	<	1.50E-03	<	3.69E-05	
cis-1,2-Dichloroethylene:		2700 ppb	ND<	0.5 ppb	
lb/hr		3.62E-02	<	6.62E-05	>99.82
Benzyl Chloride:	ND<	420 ppb	ND<	1.1 ppb	N/A
lb/hr	<	7.36E-03	<	1.90E-04	
m+p-Xylene:		10000 ppb	ND<	1.1 ppb	
lb/hr		1.47E-01	<	1.59E-04	>99.89

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 N/A - indicates that the destruction efficiency cannot be calculated because the inlet concentration is below the detection limit.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 2
CALABASAS LANDFILL FLARE No. 6
MARCH 13, 1996

Flow rate, Inlet dscfm	898		Flow rate, Exhaust dscfm	8,665	
Species	Inlet		Exhaust		Destruction Efficiency, %
Methylene Chloride:		2700 ppb		0.6 ppb	—
lb/hr		3.26E-02		6.98E-05	99.79
Chloroform:	ND<	210 ppb	ND<	0.5 ppb	N/A
lb/hr	<	3.56E-03	<	8.18E-05	N/A
1,1,1 Trichloroethane:		290 ppb	ND<	0.5 ppb	>98.34
lb/hr		5.49E-03	<	9.14E-05	N/A
Carbon Tetrachloride:	ND<	210 ppb	ND<	0.5 ppb	N/A
lb/hr	<	4.59E-03	<	1.05E-04	>97.32
1,1-Dichloroethene:		180 ppb	ND<	0.5 ppb	>99.56
lb/hr		2.48E-03	<	6.64E-05	>99.78
Trichloroethylene:		660 ppb	ND<	0.3 ppb	>98.79
lb/hr		1.23E-02	<	5.40E-05	>99.75
Tetrachloroethylene:		1300 ppb	ND<	0.3 ppb	N/A
lb/hr		3.06E-02	<	6.82E-05	N/A
Chlorobenzene:		400 ppb	ND<	0.5 ppb	N/A
lb/hr		6.39E-03	<	7.71E-05	N/A
Vinyl Chloride:		3800	ND<	1.0 ppb	N/A
lb/hr		3.37E-02	<	8.56E-05	N/A
o-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	N/A
lb/hr	<	8.77E-03	<	2.22E-04	N/A
m-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	N/A
lb/hr	<	8.77E-03	<	2.22E-04	N/A
p-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	N/A
lb/hr	<	8.77E-03	<	2.22E-04	N/A
1,1-Dichloroethane:		1000 ppb	ND<	0.5 ppb	>99.52
lb/hr		1.40E-02	<	6.78E-05	N/A
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb	N/A
lb/hr	<	2.95E-03	<	6.78E-05	N/A
Benzene:		3200 ppb	ND<	0.3 ppb	>99.91
lb/hr		3.55E-02	<	3.21E-05	>99.97
Toluene:		14000 ppb	ND<	0.5 ppb	>99.93
lb/hr		1.83E-01	<	6.31E-05	>99.98
Ethyl Benzene:		7400	ND<	0.5 ppb	N/A
lb/hr		1.12E-01	<	7.27E-05	N/A
o-Xylenes:		2600 ppb	ND<	0.5 ppb	N/A
lb/hr		3.92E-02	<	7.54E-06	N/A
Methyl-Tert-Butyl-Ether:	ND<	200 ppb	ND<	0.5 ppb	N/A
lb/hr	<	2.50E-03	<	6.04E-05	N/A
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb	N/A
lb/hr	<	2.97E-02	<	7.31E-04	N/A
Freon 11 (CCL3F):		240 ppb	ND<	0.5 ppb	>97.99
lb/hr		4.68E-03	<	9.41E-05	N/A
1,2-Dibromoethane:	ND<	420 ppb	ND<	1.0 ppb	N/A
lb/hr	<	1.12E-02	<	2.57E-04	N/A
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb	N/A
lb/hr	<	1.54E-03	<	3.70E-05	N/A
cis-1,2-Dichloroethylene:		2700 ppb	ND<	0.5 ppb	>99.82
lb/hr		3.72E-02	<	6.64E-05	N/A
Benzyl Chloride:	ND<	420 ppb	ND<	1.1 ppb	N/A
lb/hr	<	7.55E-03	<	1.91E-04	N/A
m+p-Xylene:		9600 ppb	ND<	1.1 ppb	>99.89
lb/hr		1.45E-01	<	1.60E-04	>99.89

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
N/A - indicates that the destruction efficiency cannot be calculated because the inlet concentration is below the detection limit.

TABLE 4-4
GENERAL RESULTS
CALABASAS LANDFILL FLARE No. 8
MARCH 11, 1996

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	6.10	5.78	5.94	12.05	12.28	12.16
CO ₂ , %	27.2	27.7	27.5	8.34	8.01	- 8.17
N ₂ , %	34.6	33.5	34.1	79.6	79.7	79.7
H ₂ O, %	5.4	5.8	5.6	9.1	8.9	9.0
Flow Rate, dscfm	1,431	1,422	1,426	9,213	8,602	8,907
Temperature,	107	112	110	1,601	1,586	1,594
NO _x :						
ppm				11.5	11.4	11.4
ppm @ 3% O ₂				23.2	23.6	23.4
lb/hr (as NO ₂)				0.77	0.71	0.74
lb/MM Btu (as NO ₂)				0.031	0.029	0.030
CO:						
ppm				2.1	4.2	3.2
ppm @ 3% O ₂				4.2	8.8	6.5
lb/hr				0.08	0.16	0.12
HC:						
CH ₄ ppm	312,000	314,000	313,000	ND< 1	ND< 1	ND< 1
TGNMO ppm	3,730	4,160	3,945	1.00	1.00	1.00
TGNMO ppm @ 3% O ₂	-	-	-	2.02	2.08	2.05
TGNMO lb/hr (as CH ₄)	13.50	14.96	14.23	0.02	0.02	0.02
Destruction Eff. %	-	-	-	99.83	99.85	99.84
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0040	0.0018	0.0029
Total Particulate gr/dscf				0.0040	0.0018	0.0029
gr/dscf @3% O ₂				0.0082	0.0037	0.0059
gr/dscf @12% CO ₂				0.0058	0.0027	0.0042
lb/hr				0.319	0.132	0.225
Sulfur Compounds:						
H ₂ S, ppm	65	69	67			
Methyl Mercaptan, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Ethyl Mercaptan, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Dimethyl Sulfide, ppm	1.3	1.4	1.4			
Carbonyl Sulfide, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Carbon Disulfide, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Dimethyl Disulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Total Sulfur Compounds, ppm	66.3	70.4	68.4			

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 1
CALABASAS LANDFILL FLARE No. 8
MARCH 11, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		1,431 9,213			
Species	Inlet		Exhaust		Destruction Efficiency, %
Methylene Chloride:		2600 ppb		4.6 ppb	
lb/hr		5.00E-02		5.69E-04	98.86
Chloroform:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	5.67E-03	<	8.70E-05	N/A
1,1,1 Trichloroethane:		240 ppb	ND<	0.5 ppb	
lb/hr		7.24E-03	<	9.72E-05	>98.66
Carbon Tetrachloride:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	7.31E-03	<	1.12E-04	N/A
1,1-Dichloroethene:		140 ppb	ND<	0.5 ppb	
lb/hr		3.07E-03	<	7.06E-05	>97.70
Trichloroethylene:		710 ppb	ND<	0.3 ppb	
lb/hr		2.11E-02	<	5.74E-05	>99.73
Tetrachloroethylene:		1400 ppb	ND<	0.3 ppb	
lb/hr		5.25E-02	<	7.25E-05	>99.86
Chlorobenzene:		420 ppb	ND<	0.5 ppb	
lb/hr		1.07E-02	<	8.20E-05	>99.23
Vinyl Chloride:		3200	ND<	1.0 ppb	
lb/hr		4.52E-02	<	9.10E-05	>99.80
o-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	1.40E-02	<	2.36E-04	N/A
m-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	1.40E-02	<	2.36E-04	N/A
p-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	1.40E-02	<	2.36E-04	N/A
1,1-Dichloroethane:		990 ppb	ND<	0.5 ppb	
lb/hr		2.22E-02	<	7.21E-05	>99.67
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	4.70E-03	<	7.21E-05	N/A
Benzene:		3800 ppb	ND<	0.3 ppb	
lb/hr		6.71E-02	<	3.41E-05	>99.95
Toluene:		16000 ppb	ND<	0.5 ppb	
lb/hr		3.33E-01	<	6.71E-05	>99.98
Ethyl Benzene:		9300	ND<	0.5	
lb/hr		2.23E-01	<	7.73E-05	>99.97
o-Xylenes:		3200 ppb	ND<	0.5 ppb	
lb/hr		7.68E-02	<	1.20E-05	>99.98
Methyl-Tert-Butyl-Ether:		220 ppb	ND<	0.5 ppb	
lb/hr		4.39E-03	<	6.42E-05	>98.54
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb	
lb/hr	<	4.74E-02	<	7.77E-04	N/A
Freon 11 (CCL3F):		250 ppb	ND<	0.5 ppb	
lb/hr		7.77E-03	<	1.00E-04	>98.71
1,2-Dibromoethane:	ND<	420 ppb	ND<	1.0 ppb	
lb/hr	<	1.78E-02	<	2.74E-04	N/A
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb	
lb/hr	<	2.45E-03	<	3.94E-05	N/A
cis-1,2-Dichloroethylene:		2500 ppb	ND<	0.5 ppb	
lb/hr		5.48E-02	<	7.06E-05	>99.87
Benzyl Chloride:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	1.20E-02	<	2.03E-04	N/A
m+p-Xylene:		12000 ppb	ND<	1.1 ppb	
lb/hr		2.88E-01	<	1.70E-04	>99.94

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
N/A - indicates that the destruction efficiency cannot be calculated because the inlet concentration is below the detection limit.

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 2
CALABASAS LANDFILL FLARE No. 8
MARCH 11, 1996

Flow rate, Inlet dscfm		1,422			
Flow rate, Exhaust dscfm		8,602			
Species		Inlet		Exhaust	Destruction Efficiency, %
Methylene Chloride:		2800 ppb		1.1 ppb	
lb/hr		5.35E-02		1.27E-04	99.76
Chloroform:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	5.64E-03	<	8.12E-05	N/A
1,1,1 Trichloroethane:		260 ppb	ND<	0.5 ppb	
lb/hr		7.80E-03	<	9.07E-05	>98.84
Carbon Tetrachloride:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	7.26E-03	<	1.05E-04	N/A
1,1-Dichloroethene:		230 ppb	ND<	0.5 ppb	
lb/hr		5.01E-03	<	6.59E-05	>98.68
Trichloroethylene:		800 ppb	ND<	0.3 ppb	
lb/hr		2.36E-02	<	5.36E-05	>99.77
Tetrachloroethylene:		1500 ppb	ND<	0.3 ppb	
lb/hr		5.59E-02	<	6.77E-05	>99.88
Chlorobenzene:		590 ppb	ND<	0.5 ppb	
lb/hr		1.49E-02	<	7.65E-05	>99.49
Vinyl Chloride:		3600	ND<	1.0 ppb	
lb/hr		5.06E-02	<	8.50E-05	>99.83
o-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	1.39E-02	<	2.20E-04	N/A
m-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	1.39E-02	<	2.20E-04	N/A
p-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	1.39E-02	<	2.20E-04	N/A
1,1-Dichloroethane:		1000 ppb	ND<	0.5 ppb	
lb/hr		2.22E-02	<	6.73E-05	>99.70
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	4.67E-03	<	6.73E-05	N/A
Benzene:		3700 ppb	ND<	0.3 ppb	
lb/hr		6.50E-02	<	3.19E-05	>99.95
Toluene:		16000 ppb	ND<	0.5 ppb	
lb/hr		3.31E-01	<	6.26E-05	>99.98
Ethyl Benzene:		10000	ND<	0.5	
lb/hr		2.39E-01	<	7.22E-05	>99.97
o-Xylenes:		4600 ppb	ND<	0.5 ppb	
lb/hr		1.10E-01	<	1.19E-05	>99.99
Methyl-Tert-Butyl-Ether:	ND<	200 ppb	ND<	0.5 ppb	
lb/hr	<	3.96E-03	<	5.99E-05	N/A
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb	
lb/hr	<	4.71E-02	<	7.26E-04	N/A
Freon 11 (CCL3F):	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	6.48E-03	<	9.34E-05	N/A
1,2-Dibromoethane:	ND<	420 ppb	ND<	1.0 ppb	
lb/hr	<	1.77E-02	<	2.56E-04	N/A
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb	
lb/hr	<	2.43E-03	<	3.68E-05	N/A
cis-1,2-Dichloroethylene:		2700 ppb	ND<	0.5 ppb	
lb/hr		5.88E-02	<	6.59E-05	>99.89
Benzyl Chloride:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	1.19E-02	<	1.89E-04	N/A
m+p-Xylene:		13000 ppb	ND<	1.1 ppb	
lb/hr		3.10E-01	<	1.59E-04	>99.95

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
N/A - indicates that the destruction efficiency cannot be calculated because the inlet concentration is below the detection limit.

TABLE 4-7
GENERAL RESULTS
CALABASAS LANDFILL FLARE No. 9
MARCH 12, 1996

Parameter	First Run	INLET Second Run	Average	First Run	EXHAUST Second Run	Average
O ₂ , %	7.29	5.85	6.57	11.61	11.84	11.72
CO ₂ , %	37.2	32.5	34.9	8.61	8.43	8.52
N ₂ , %	28.9	27.6	28.3	79.8	79.7	79.8
H ₂ O, %	2.7	3.1	2.9	10.3	10.2	10.3
Flow Rate, dscfm	1,124	1,194	1,159	7,873	7,266	7,570
Temperature,	92	82	87	1,591	1,583	1,587
NO _x :						
ppm				13.9	13.8	13.9
ppm @ 3% O ₂				26.8	27.2	27.0
lb/hr (as NO ₂)				0.80	0.73	0.76
lb/MM Btu (as NO ₂)				0.040	0.034	0.037
CO:						
ppm				1.4	1.1	1.3
ppm @ 3% O ₂				2.8	2.2	2.5
lb/hr				0.05	0.04	0.04
HC:						
CH ₄ ppm	320,000	324,000	322,000	ND< 1	ND< 1	ND< 1
TGNMO ppm	4,140	3,940	4,040	1.00	1.00	1.00
TGNMO ppm @ 3% O ₂	—	—	—	1.93	1.97	1.95
TGNMO lb/hr (as CH ₄)	11.78	11.90	11.84	0.02	0.02	0.02
Destruction Eff. %	—	—	—	99.83	99.85	99.84
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0027	0.0048	0.0038
Total Particulate gr/dscf				0.0027	0.0048	0.0038
gr/dscf @3% O ₂				0.0053	0.0095	0.0074
gr/dscf @12% CO ₂				0.0038	0.0069	0.0054
lb/hr				0.185	0.301	0.243
Sulfur Compounds:						
H ₂ S, ppm	62	69	66			
Methyl Mercaptan, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Ethyl Mercaptan, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Dimethyl Sulfide, ppm	1.3	1.4	1.4			
Carbonyl Sulfide, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Carbon Disulfide, ppm	ND< 1.2	ND< 1.2	ND< 1.2			
Dimethyl Disulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Total Sulfur Compounds, ppm	63.3	70.4	66.9			

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 1
CALABASAS LANDFILL FLARE No. 9
MARCH 12, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		1,124 7,873				Destruction Efficiency, %
Species		Inlet		Exhaust		
Methylene Chloride:		2400 ppb		2.0 ppb		
lb/hr		3.62E-02		2.11E-04		99.42
Chloroform:	ND<	210 ppb	ND<	0.5 ppb		N/A
lb/hr	<	4.46E-03	<	7.43E-05		
1,1,1 Trichloroethane:		230 ppb	ND<	0.5 ppb		>98.48
lb/hr		5.46E-03	<	8.30E-05		
Carbon Tetrachloride:	ND<	210 ppb	ND<	0.5 ppb		N/A
lb/hr	<	5.74E-03	<	9.57E-05		
1,1-Dichloroethene:		190 ppb	ND<	0.5 ppb		>98.16
lb/hr		3.27E-03	<	6.03E-05		
Trichloroethylene:		640 ppb	ND<	0.3 ppb		>99.67
lb/hr		1.50E-02	<	4.91E-05		
Tetrachloroethylene:		1200 ppb	ND<	0.3 ppb		>99.82
lb/hr		3.54E-02	<	6.19E-05		
Chlorobenzene:		460 ppb	ND<	0.5 ppb		>99.24
lb/hr		9.21E-03	<	7.01E-05		
Vinyl Chloride:		3500	ND<	1.0 ppb		>99.80
lb/hr		3.89E-02	<	7.78E-05		
o-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb		N/A
lb/hr	<	1.10E-02	<	2.01E-04		
m-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb		N/A
lb/hr	<	1.10E-02	<	2.01E-04		
p-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb		N/A
lb/hr	<	1.10E-02	<	2.01E-04		
1,1-Dichloroethane:		1000 ppb	ND<	0.5 ppb		>99.65
lb/hr		1.76E-02	<	6.16E-05		
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb		N/A
lb/hr	<	3.69E-03	<	6.16E-05		
Benzene:		3100 ppb	ND<	0.3 ppb		>99.93
lb/hr		4.30E-02	<	2.92E-05		
Toluene:		13000 ppb	ND<	0.5 ppb		>99.97
lb/hr		2.13E-01	<	5.73E-05		
Ethyl Benzene:		7800	ND<	0.5		>99.96
lb/hr		1.47E-01	<	6.61E-05		
o-Xylenes:		2900 ppb	ND<	0.5 ppb		>99.98
lb/hr		5.47E-02	<	9.44E-06		
Methyl-Tert-Butyl-Ether:	ND<	200 ppb	ND<	0.5 ppb		N/A
lb/hr	<	3.13E-03	<	5.49E-05		
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb		N/A
lb/hr	<	3.72E-02	<	6.64E-04		
Freon 11 (CCL3F):	ND<	210 ppb	ND<	0.5 ppb		N/A
lb/hr	<	5.13E-03	<	8.55E-05		
1,2-Dibromoethane:	ND<	420 ppb	ND<	1.0 ppb		N/A
lb/hr	<	1.40E-02	<	2.34E-04		
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb		N/A
lb/hr	<	1.92E-03	<	3.37E-05		
cis-1,2-Dichloroethylene:		2400 ppb	ND<	0.5 ppb		>99.85
lb/hr		4.14E-02	<	6.03E-05		
Benzyl Chloride:	ND<	420 ppb	ND<	1.1 ppb		N/A
lb/hr	<	9.45E-03	<	1.73E-04		
m+p-Xylene:		10000 ppb	ND<	1.1 ppb		>99.92
lb/hr		1.89E-01	<	1.45E-04		

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 N/A - indicates that the destruction efficiency cannot be calculated because the inlet concentration is below the detection limit.

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 2
CALABASAS LANDFILL FLARE No. 9
MARCH 12, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		1,194 7,266				Destruction Efficiency, %
Species		Inlet		Exhaust		
Methylene Chloride:		2600 ppb		1.0 ppb		99.77
lb/hr		4.17E-02		9.76E-05		
Chloroform:	ND<	210 ppb	ND<	0.5 ppb		N/A
lb/hr	<	4.73E-03	<	6.86E-05		
1,1,1 Trichloroethane:	ND<	200 ppb	ND<	0.5 ppb		N/A
lb/hr	<	5.04E-03	<	7.66E-05		
Carbon Tetrachloride:	ND<	210 ppb	ND<	0.5 ppb		N/A
lb/hr	<	6.10E-03	<	8.84E-05		
1,1-Dichloroethene:		150 ppb	ND<	0.5 ppb		>97.97
lb/hr		2.75E-03	<	5.57E-05		
Trichloroethylene:		580 ppb	ND<	0.3 ppb		>99.69
lb/hr		1.44E-02	<	4.53E-05		
Tetrachloroethylene:		950 ppb	ND<	0.3 ppb		>99.81
lb/hr		2.98E-02	<	5.72E-05		
Chlorobenzene:		420 ppb	ND<	0.5 ppb		>99.28
lb/hr		8.93E-03	<	6.47E-05		
Vinyl Chloride:		3400	ND<	1.0 ppb		>99.82
lb/hr		4.01E-02	<	7.18E-05		
o-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb		N/A
lb/hr	<	1.17E-02	<	1.86E-04		
m-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb		N/A
lb/hr	<	1.17E-02	<	1.86E-04		
p-Dichlorobenzene:	ND<	420 ppb	ND<	1.1 ppb		N/A
lb/hr	<	1.17E-02	<	1.86E-04		
1,1-Dichloroethane:		930 ppb	ND<	0.5 ppb		>99.67
lb/hr		1.74E-02	<	5.68E-05		
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb		N/A
lb/hr	<	3.92E-03	<	5.68E-05		
Benzene:		2700 ppb	ND<	0.3 ppb		>99.93
lb/hr		3.98E-02	<	2.69E-05		
Toluene:		11000 ppb	ND<	0.5 ppb		>99.97
lb/hr		1.91E-01	<	5.29E-05		
Ethyl Benzene:		5600	ND<	0.5		>99.95
lb/hr		1.12E-01	<	6.10E-05		
o-Xylenes:		2100 ppb	ND<	0.5 ppb		>99.98
lb/hr		4.21E-02	<	1.00E-05		
Methyl-Tert-Butyl-Ether:	ND<	200 ppb	ND<	0.5 ppb		N/A
lb/hr	<	3.33E-03	<	5.06E-05		
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb		N/A
lb/hr	<	3.95E-02	<	6.13E-04		
Freon 11 (CCL3F):	ND<	210 ppb	ND<	0.5 ppb		N/A
lb/hr	<	5.45E-03	<	7.89E-05		
1,2-Dibromoethane:	ND<	420 ppb	ND<	1.0 ppb		N/A
lb/hr	<	1.49E-02	<	2.16E-04		
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb		N/A
lb/hr	<	2.04E-03	<	3.11E-05		
cis-1,2-Dichloroethylene:		2400 ppb	ND<	0.5 ppb		>99.87
lb/hr		4.39E-02	<	5.57E-05		
Benzyl Chloride:	ND<	420 ppb	ND<	1.1 ppb		N/A
lb/hr	<	1.00E-02	<	1.60E-04		
m+p-Xylene:		7600 ppb	ND<	1.1 ppb		>99.91
lb/hr		1.52E-01	<	1.34E-04		

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 N/A - indicates that the destruction efficiency cannot be calculated because the inlet concentration is below the detection limit.

1993 - 1996

Source Test Data

Facility ID # 037336

**ANNUAL COMPLIANCE TESTING AT THE
COMMERCE REFUSE-TO-ENERGY
FACILITY**

Prepared For:

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California

Prepared By:

Derek V. Kumm

CARNOT
Tustin, California

JANUARY 1994

TABLE 4-1
SUMMARY OF COMMERCE TEST RESULTS
SEPTEMBER 1993

Parameter	Test No. 5	Test No. 6	Average
O ₂ , % dry	9.87	9.99	9.93
CO ₂ , % dry	9.85	9.49	9.67
H ₂ O, %	16.6	15.6	16.1
Flow Rate, wacfm	90,685	97,440	94,062
Flow Rate, dscfm	52,612	57,134	54,873
NO _x :			
ppm @ 3% O ₂	114.9	98.7	106.8
lb/hr (as NO ₂)	27.1	25.0	26.0
CO:			
ppm @ 3% O ₂	94.8	51.2	73.0
lb/hr	13.6	7.90	10.8
SO _x :			
ppm @ 3% O ₂	13.9	2.62	8.27
lb/hr (as SO ₂)	4.57	0.923	2.74
Total Particulate:			
grains/dscf	0.02	0.004	0.01
grains/dscf @12% CO ₂	0.02	0.01	0.01
lb/hr	8.61	1.98	5.30
	<u>Test No. 4B</u>	<u>Test No. 4A</u>	<u>Average</u>
NMHC:			
ppm (as CH ₄)	7.32	7.88	7.60
ppm @3% O ₂	12.3	13.3	12.8
lb/hr (as CH ₄)	1.01	1.08	1.04
	<u>Test No. 7</u>	<u>Test No. 8</u>	<u>Average</u>
HCl:			
ppm	3.55	3.47	3.51
ppm @3% O ₂	5.80	5.82	5.81
lb/hr	1.08	1.08	1.08
	<u>Test No. 10</u>		
PM ₁₀ *:			
grains/dscf	0.0005		
grains/dscf @12% CO ₂	0.0007		
lb/hr	0.27		

NOTES:

The NMHC mass emissions results are calculated using the flow rate from test no. 4-Metals.

NO_x and CO emissions for each test are the averages of two one-hour runs.

SO_x emissions were based on duplicate 2-hour SCAQMD Method 6.1 tests.

* The solid PM₁₀ results are from a traverse of one port (6 points) instead of two. No analysis for condensibles was performed on the impinger contents.

TABLE 4-2
TRACE METALS EMISSIONS SUMMARY
COMMERCE
SEPTEMBER 1993

TEST NO.	3-Metals	4-Metals	AVERAGE	FIELD BLANK*
DATE	09/22/93	09/22/93		
FLOW RATE, dscfm	53,941	54,150		
SAMPLE VOLUME, dscf	170.743	170.868		
O ₂ , %	10.26	10.38		
CO ₂ , %	9.50	9.37		
SPECIES	$\mu\text{g}/\text{m}^3$ @ 12% CO ₂	$\mu\text{g}/\text{m}^3$ @ 12% CO ₂	$\mu\text{g}/\text{m}^3$ @ 12% CO ₂	$\mu\text{g}/\text{m}^3$ @ 12% CO ₂
Arsenic	ND < 2.6	ND < 2.6	ND < 2.6	ND < 4.2 x 10 ⁻⁴
Beryllium	ND < 0.03	ND < 0.03	ND < 0.03	ND < 4.2 x 10 ⁻⁶
Cadmium	ND < 0.08	0.42	< 0.3	< 4.0 x 10 ⁻⁵
Chromium	2.4	6.1	4.2	6.7 x 10 ⁻⁴
Lead	1.2	1.3	1.3	2.0 x 10 ⁻⁴
Mercury	7.6	2.9	5.3	8.4 x 10 ⁻⁴
Nickel	0.8	0.5	0.7	1.0 x 10 ⁻⁴
				0.2
				ND < 0.03
				0.6
				1.1
				0.39
				ND < 0.29
				ND < 0.2

*The field blank concentration was calculated using the average sample volume and CO₂ value for these tests.

ND < species not detected

TABLE 4-4
PCDD/PCDF TOXIC EQUIVALENTS BY CA DOHS METHOD
COMMERCE
SEPTEMBER 1993

Test No.		1-Dioxin		2-Dioxin		Average
Species	CA DOHS Factors	ng/m ³	CA	ng/m ³	CA	CA
		@ 12% CO ₂	Toxic Equiv. ng/m ³ @ 12% CO ₂	@ 12% CO ₂	Toxic Equiv. ng/m ³ @ 12% CO ₂	Toxic Equiv. ng/m ³ @ 12% CO ₂
2378 TCDD	1.00000	ND < 0.0013	ND < 0.00133	ND < 0.0019	ND < 0.00194	ND < 0.00164
12378 PCDD	1.00000	ND < 0.0031	ND < 0.00312	ND < 0.0029	ND < 0.00286	ND < 0.00299
123478 HXCDD	0.03000	0.0026	0.00008	ND < 0.0046	ND < 0.00014	< 0.00011
123678 HXCDD	0.03000	0.0024	0.00007	ND < 0.0034	ND < 0.00010	< 0.00009
123789 HXCDD	0.03000	0.0022	0.00007	ND < 0.0043	ND < 0.00013	< 0.00010
1234678 HPCDD	0.03000	0.017	0.00050	0.0106	0.00032	0.00041
OCDD	0.00000	0.0767	0.00000	0.0600	0.00000	0.00000
2378 TCDF	1.00000	0.002	0.00193	0.0025	0.00251	0.00222
12378 PCDF	1.00000	0.004	0.00398	0.0029	0.00286	0.00342
23478 PCDF	1.00000	0.0028	0.00284	0.0031	0.00314	0.00299
123478 HXCDF	0.03000	0.0043	0.00013	0.0029	0.00009	0.00011
123678 HXCDF	0.03000	0.0034	0.00010	0.0015	0.00005	0.00007
234678 HXCDF	0.03000	ND < 0.0025	ND < 0.00008	ND < 0.0027	ND < 0.00008	ND < 0.00008
123789 HXCDF	0.03000	ND < 0.0040	ND < 0.00012	ND < 0.0043	ND < 0.00013	ND < 0.00012
1234678 HPCDF	0.03000	0.0114	0.00034	0.0071	0.00021	0.00028
1234789 HPCDF	0.03000	ND < 0.0021	ND < 0.00006	ND < 0.0034	ND < 0.00010	ND < 0.00008
OCDF	0.00000	0.0051	0.00000	0.0034	0.00000	0.00000
Total PCDD Toxic Equiv., ng/m ³ @ 12% CO ₂			< 0.0052		< 0.0055	< 0.0053
Total PCDF Toxic Equiv., ng/m ³ @ 12% CO ₂			< 0.0096		< 0.0092	< 0.0094
Total Toxic Equiv., ng/m ³ @ 12% CO ₂ (2,3,7,8 TCDD Equiv.)			< 0.015		< 0.015	< 0.015
Total Toxic Equiv., lb/hr			< 2.38 x 10 ⁻⁹		< 2.24 x 10 ⁻⁹	< 2.31 x 10 ⁻⁹

Tetra- through hexa- 2,3,7,8 substituted isomers data are from the SP-2331 confirmation column.

Data for hepta- and octa- 2,3,7,8 substituted isomers and totals for each homologue class are from the DB-5 Primary column.

Species other than those presented have CA DOHS factors equal to zero.



AIR MEASUREMENT SERVICES, INC.

L01-006-FR

**ANNUAL COMPLIANCE TEST
OF THE COMMERCE
REFUSE-TO-ENERGY FACILITY**

SEPTEMBER 1994

Facility:

**COMMERCE REFUSE-TO-ENERGY FACILITY
5926 Sheila Street
Commerce, California 90040**

Prepared for:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
1955 Workman Mill Road
Whittier, California 90601**

Prepared by:

**HORIZON AIR MEASUREMENT SERVICES, INC.
996 Lawrence Drive, Suite 108
Newbury Park, California 91320**

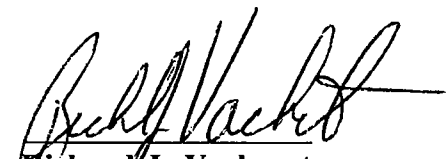

Richard J. Vacherot

TABLE 5-1
Criteria Pollutant Emission Test Results
Commerce Refuse-to-Energy Facility
September 1994

	<u>RUN</u> <u>1</u>	<u>RUN</u> <u>2</u>	<u>RUN</u> <u>3</u>	<u>RUN</u> <u>4</u>	<u>RUN</u> <u>5</u>	<u>Run</u> <u>6</u>	<u>AVG.</u>
<u>STACK GAS CHARACTERISTICS</u>							
Temperature, °F	277	278	281	275	283	283	280
Moisture, %	15.8	17.4	14.4	18.2	17.7	18.4	17.0
Fixed Gases,							
CO ₂	8.5	8.7	8.7	9.0	9.6	9.3	9.0
O ₂	10.2	10.3	10.6	10.0	9.8	10.2	10.2
N ₂	81.3	81.0	80.7	81.0	80.6	80.5	80.9
Flow Rate,							
acfm	100,900	100,100	104,700	93,000***	101,900***	108,420***	101,500
dscfm	59,740	58,050	62,670	54,480***	59,450***	62,680***	59,510
<u>EMISSIONS</u>							
NO _x , ppm @ 3% O ₂	112	111	120	122	112	126	117
lb/hr (as NO ₂)	29.1	27.7	31.4	31.7*	28.4*	34.2*	30.4
CO, ppm @ 3% O ₂	180	70	70	58	93	46*	86
lb/hr	28.4	10.6	11.2	9.25*	14.3*	7.57*	13.6
SO _x , ppm @ 3% O ₂	2.2	16.5	6.1	---	---	---	8.3
lb/hr (as SO ₂)	0.72	5.36	2.06	---	---	---	2.71
Particulate Matter,							
grains/dscf	0.0031	0.0041	0.0036	---	---	---	0.0036
grains/dscf @ 12% CO ₂	0.0044	0.0057	0.0050	---	---	---	0.0050
lb/hr	1.58	2.05	1.95	---	---	---	1.86
Total Non-Methane Hydrocarbons							
ppm @ 3% O ₂	5.5	7.3	6.6	---	---	---	6.5
lb/hr (as CH ₄)	0.48	0.64	0.60	---	---	---	0.57
Hydrogen Chloride							
ppm @ 3% O ₂	---	---	---	5.75	5.97	5.35	5.69
lb/hr	---	---	---	1.03	1.20	1.09	1.11
PM ₁₀							
grains/dscf	---	---	---	0.0091**	0.0023**	0.0047**	0.0054**
grains/dscf @ 12% CO ₂	---	---	---	0.0119**	0.0030**	0.0061**	0.0070**
lb/hr***	---	---	---	4.22**	1.15**	2.42**	2.60**

* Based on flow rate from corresponding PAH test runs.

** Includes sulfate particulate. Sulfate has not been subtracted from the reported values.

*** Flow rate measured during HCl testing.

Table 5-2
Trace Metal Emission Results
Commerce Refuse-to-Energy Facility
September 1994

	Run 1	Run 2	Run 3	Average	Blank Train
<u>Stack Gas Characteristics</u>					
Temperature, F	280	280	281	280	NA
Moisture, %	15.8	18.7	18.8	17.8	NA
Fixed Gases,					
CO2, %	8.7	8.9	8.9	8.8	NA
O2, %	10.2	10.3	10.1	10.2	NA
N2, %	81.1	80.8	81.0	81.0	NA
Flow rate,					
dscfm	58930	55208	57884	57341	NA
acfm	99799	96760	101804	99454	NA
<u>Trace Metals Emisissions</u>					
Arsenic,					
ug/dscm @ 12 % CO2	0.65	< 0.66	< 0.64	< 0.65	< 0.65
lb/hr	0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Beryllium					
ug/dscm @ 12 % CO2	0.14	< 0.13	< 0.13	< 0.13	< 0.13
lb/hr	0.000022	< 0.000020	< 0.000020	< 0.000021	< 0.000020
Cadmium,					
ug/dscm @ 12 % CO2	0.20	1.94	0.09	0.75	0.65
lb/hr	0.00003	0.00030	0.00001	0.00011	0.00010
Chromium,					
ug/dscm @ 12 % CO2	0.59	3.36	1.21	1.72	< 0.325
lb/hr	0.000094	0.000515	0.000194	0.000268	< 0.000050
Lead,					
ug/dscm @ 12 % CO2	2.85	10.65	4.83	6.11	0.85
lb/hr	0.000456	0.001631	0.000776	0.000954	0.000130
Mercury,					
ug/dscm @ 12 % CO2	21.00	41.73	25.78	29.50	< 0.0033
lb/hr	0.00336	0.00639	0.00414	0.00463	< 0.00001
Nickel,					
ug/dscm @ 12 % CO2	1.57	1.58	1.53	1.56	< 1.56
lb/hr	0.000251	0.000242	0.000245	0.000246	< 0.000250

< - Below Quantifiable Limit. Reported values are based upon the lowest quantifiable limit.

**Table 5-3
PCDD/PCDF Emissions Results
Commerce Refuse-to-Energy Facility
September 1994**

	<u>Run #1</u>	<u>Run #2</u>	<u>Run #3</u>
<u>Stack Gas Characteristics</u>			
Temperature, F	278	282	278
Moisture, %	18.1	18.9	17.1
Fixed Gases,			
CO ₂ , %	9.4	9.2	8.3
O ₂ , %	10.1	9.7	10.5
N ₂ , %	80.5	81.1	81.2
Flow rate,			
dscfm	57072	57958	58315
acfm	99045	102364	100213

	<u>Run #1</u>		<u>Run #2</u>		<u>Run #3</u>		<u>Blank Train</u>	
	Conc.	Emission	Conc.	Emission	Conc.	Emission	Conc.	Emission
	@ 12% CO ₂	Rate	@ 12% CO ₂	Rate	@ 12% CO ₂	Rate	@ 12% CO	Rate
	(ng/dscm)	(lb/hr)	(ng/dscm)	(lb/hr)	(ng/dscm)	(lb/hr)	(ng/dscm)	(lb/hr)
<u>PCDD/PCDF Emissions</u>								
2,3,7,8-TCDD	0.0036	6.05E-10	0.0036	6.03E-10	0.0040	6.04E-10	< 0.0012	< 1.97E-10
Total TCDD	0.2070	3.47E-08	0.1585	2.64E-08	0.3733	5.64E-08	< 0.0012	< 1.97E-10
1,2,3,7,8-PeCDD	0.0077	1.29E-09	0.0088	1.47E-09	0.0101	1.53E-09	< 0.0009	< 1.38E-10
Total PeCDD	0.2647	4.43E-08	0.2038	3.39E-08	0.3200	4.83E-08	< 0.0009	< 1.38E-10
1,2,3,4,7,8-HxCDD	0.0036	6.05E-10	0.0043	7.16E-10	0.0056	8.46E-10	< 0.0010	< 1.58E-10
1,2,3,6,7,8-HxCDD	0.0067	1.13E-09	0.0084	1.39E-09	0.0080	1.21E-09	< 0.0009	< 1.50E-10
1,2,3,7,8,9-HxCDD	0.0023	3.79E-10	0.0032	5.28E-10	0.0029	4.43E-10	< 0.0009	< 1.38E-10
Total HxCDD	0.1468	2.46E-08	0.1631	2.71E-08	0.1813	2.74E-08	< 0.0010	< 1.58E-10
1,2,3,4,6,7,8-HpCDD	0.0224	3.75E-09	0.0385	6.41E-09	0.0320	4.83E-09	< 0.0009	< 1.42E-10
Total HpCDD	0.0529	8.87E-09	0.0793	1.32E-08	0.0853	1.29E-08	< 0.0009	< 1.42E-10
OCDD	0.0166	2.78E-09	0.0272	4.52E-09	0.0224	3.38E-09	< 0.0039	< 6.31E-10
2,3,7,8-TCDF	0.0337	5.64E-09	0.0272	4.52E-09	0.0453	6.85E-09	< 0.0004	< 7.10E-11
Total TCDF	3.8506	6.45E-07	3.1706	5.28E-07	4.7993	7.25E-07	< 0.0004	< 7.10E-11
1,2,3,7,8-PeCDF	0.0481	8.06E-09	0.0476	7.92E-09	0.0640	9.67E-09	< 0.0008	< 1.26E-10
2,3,4,7,8-PeCDF	0.0361	6.05E-09	0.0498	8.29E-09	0.0480	7.25E-09	< 0.0008	< 1.26E-10
Total PeCDF	1.4921	2.50E-07	1.4041	2.34E-07	1.8131	2.74E-07	< 0.0008	< 1.26E-10
1,2,3,4,7,8-HxCDF	0.0200	3.35E-09	0.0340	5.65E-09	0.0237	3.59E-09	< 0.0004	< 6.70E-11
1,2,3,6,7,8-HxCDF	0.0231	3.87E-09	0.0340	5.65E-09	0.0293	4.43E-09	< 0.0004	< 5.91E-11
2,3,4,6,7,8-HxCDF	0.0140	2.34E-09	0.0272	4.52E-09	0.0192	2.90E-09	< 0.0004	< 6.31E-11
1,2,3,7,8,9-HxCDF	< 0.0007	< 1.21E-10	0.0041	6.79E-10	< 0.0008	< 1.21E-10	< 0.0005	< 7.49E-11
Total HxCDF	0.2647	4.43E-08	0.4077	6.79E-08	0.3466	5.24E-08	< 0.0005	< 7.49E-11
1,2,3,4,6,7,8-HpCDF	0.0226	3.79E-09	0.0566	9.42E-09	0.0267	4.03E-09	< 0.0006	< 9.46E-11
1,2,3,4,7,8,9-HpCDF	< 0.0005	< 8.06E-11	0.0032	5.28E-10	< 0.0007	< 1.09E-10	< 0.0008	< 1.22E-10
Total HpCDF	0.0241	4.03E-09	0.0815	1.36E-08	0.0267	4.03E-09	< 0.0008	< 1.22E-10
OCDF	< 0.0012	< 2.02E-10	0.0052	8.67E-10	0.0021	3.22E-10	< 0.0010	< 1.58E-10
Total	6.5659	1.10E-06	6.0513	1.01E-06	8.2905	1.25E-06	< 0.0220	< 3.54E-09
EPA PCDD/PCDF Toxic Equivalent	0.0388	6.50E-09	0.0506	8.42E-09	0.0504	7.61E-09	< 0.0026	< 4.18E-10
CARB PCDD/PCDF Toxic Equivalent	0.1328	2.23E-08	0.1434	2.38E-08	0.1759	2.66E-08	< 0.0043	< 6.91E-10

< - Below Quantifiable Limit. Reported values are based upon the lowest quantifiable limit.

**1995 ANNUAL COMPLIANCE TEST
REPORT FOR THE COMMERCE REFUSE-
TO-ENERGY FACILITY
VOLUME I**

Prepared For:

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California

Prepared By:

Kusha D. Janati
Craig H. Fry

CARNOT
Tustin, California

FEBRUARY 1996

TABLE 1-1
CRITERIA POLLUTANT AND HYDROGEN CHLORIDE EMISSIONS SUMMARY
LACSD COMMERCE
NOVEMBER/DECEMBER 1995

Parameter	Exhaust ⁽³⁾	SCAQMD Permit to Operate Emission Limits (Permit Nos. D96066, D96114)
O ₂ , % dry	9.37	
CO ₂ , % dry	9.47	
H ₂ O, %	16.8	
Flow Rate, wacfm	89,100	
Flow Rate, dscfm	52,200	
NO _x , ppm	61.7	
ppm @ 3 % O ₂	108.3	190 (hourly avg.), 225 (15 min avg.)
lb/hr (as NO ₂)	25.5	40
lb/day (as NO ₂)	(1)	825
CO, ppm	46.3	
ppm @ 3 % O ₂	81.8	215 (hourly avg.)
lb/hr	11.6	18
lb/day	(1)	300
SO _x , ppm	8.8	
ppm @ 3 % O ₂	13.6	
lb/hr (as SO ₂)	4.5	
lb/day (as SO ₂)	(1)	100
Non-Methane Hydrocarbons		
ppm	2.5	
ppm @ 3 % O ₂ (as CH ₄)	4.4	
lb/hr (as CH ₄)	0.34	3
lb/day (as CH ₄)	8.3	58
PM ₁₀ ⁽²⁾		
grains/dscf	0.0013	
grains/dscf @12% CO ₂	0.0016	
lb/hr	0.57	5.5
lb/day	14	123
Hydrogen Chloride		
ppm	2.5	
ppm @ 3 % O ₂	3.8	
lb/hr	0.72	
lb/day	17	

Notes:

- (1) Carnot CEM measurements were not made for a 24-hr averaging period; however, plant continuous emission monitoring systems show complete compliance with 24-hour standards.
- (2) Measured as total particulate corrected for ammonium sulfate according to SCAQMD Method 5.2.
- (3) Emission summary results are the average of triplicate measurements.

TABLE 4-1
NO_x and CO EMISSIONS SUMMARY
LACSD COMMERCE
NOVEMBER/DECEMBER 1995

Test No.	7A-CEM	7B-CEM	7C-CEM	AVERAGE
Date	12/1/95	12/1/95	12/1/95	
Time	0730/0800	0830/0900	0930/1000	
Flow Rate, dscfm*	56,692	56,692	56,692	
O ₂ , %	10.78	9.98	11.36	
CO ₂ , %	8.47	9.50	8.17	
NO _x				
ppm	50.9	72.9	61.5	61.7
ppm @ 3% O ₂	90.0	119.4	115.3	108.3
ppm @ 7% O ₂	69.9	92.7	89.6	84.1
lb/hr (as NO ₂)	21.0	30.0	25.3	25.5
CO				
ppm	78.5	28.3	32.1	46.3
ppm @ 3% O ₂	138.9	46.4	60.3	81.8
ppm @ 7% O ₂	107.8	36.0	46.8	63.6
lb/hr	19.7	7.1	8.1	11.6

*Flow rate averaged from corresponding isokinetic tests (7-DIOXIN & 7-PAH)

TABLE 4-2
METHANE AND NON-METHANE ORGANICS EMISSION SUMMARY
SCAQMD 25.2 – FID/TCA
LACSD COMMERCE FACILITY
NOVEMBER/DECEMBER 1995

Test No.	6A-HC	6B-HC	6C-HC	AVERAGE
Date	11/30/95	11/30/95	11/30/95	
Time	1420/1440	1515/1535	1600/1620	
Flow Rate, dscfm*	55,486	55,486	55,486	
O ₂ , %	10.98	10.98	10.98	
CO ₂ , %	8.45	8.45	8.45	
Methane (CH ₄):				
ppm	ND<1	ND<1	ND<1	ND<1
Total Gaseous Non-Methane Organics (as CH ₄):				
ppm	1.36	1.81	4.20	2.46
ppm @ 3% O ₂	2.45	3.27	7.58	4.43
lb/hr	0.19	0.25	0.59	0.34
lb/day	4.6	6.1	14	8.3

ND<: not detected in sample

* Flow rate averaged from corresponding isokinetic tests.

TABLE 4-3
PM₁₀ RESULTS SUMMARY
LACSD COMMERCE FACILITY
NOVEMBER/DECEMBER 1995

Test No.	9-PM	10-PM	11-PM	Average
Date	12/5/95	12/5/95	12/5/95	
Pitot flow rate, dscfm	56,150	49,958	50,610	
Sample Volume, dscf	70.05	63.01	66.50	
O ₂ , %	9.20	9.58	9.32	
CO ₂ , %	9.58	9.45	9.38	
H ₂ O, %	16.0	17.1	17.4	
<u>Total Corrected Particulate⁽¹⁾</u>				
Grain loading, gr/dscf	0.0009	0.0015	0.0015	0.0013
Grain loading @ 12% CO ₂	0.0011	0.0019	0.0019	0.0016
Mass Emissions, lb/hr	0.42	0.64	0.65	0.57
lb/day	10	15	16	14

Note: (1) Total corrected particulate corrected for ammonium sulfate according to SCAQMD 5.2.

TABLE 1-2
POLYNUCLEAR AROMATIC HYDROCARBON EMISSIONS SUMMARY
LACSD COMMERCE
NOVEMBER/DECEMBER 1995

Species	Average Sample Results				Field Blank Level ug/dscm@12%CO ₂
	ug/dscm	ug/dscm@7%O ₂	ug/dscm@12%CO ₂	lb/hr	
Naphthalene	0.30	0.43	0.42	6.4E-05	0.42
2-Methylnaphthalene	0.054	0.077	0.075	1.2E-05	0.077
Acenaphthylene	< 0.0021	< 0.0030	< 0.0030	< 4.5E-07	0.0030
Acenaphthene	< 0.0034	< 0.0049	< 0.0048	< 7.4E-07	0.0042
Fluorene	0.0042	0.0059	0.0059	8.8E-07	0.0056
Phenanthrene	< 0.0040	< 0.0056	< 0.0056	< 8.4E-07	0.0129
Anthracene	ND< 0.001	ND< 0.002	ND< 0.002	ND< 3E-07	ND< 0.002
Fluoranthene	0.0018	0.0026	0.0026	3.9E-07	0.0059
Pyrene	0.0021	0.0030	0.0029	4.4E-07	0.0080
Benz(a)anthracene*	ND< 0.0005	ND< 0.0007	ND< 0.0007	ND< 1E-07	ND< 0.0007
Chrysene*	ND< 0.0007	ND< 0.0010	ND< 0.0010	ND< 2E-07	0.0045
Benzo(b)fluoranthene*	< 0.0003	< 0.0004	< 0.0004	< 6E-08	0.0004
Benzo(k)fluoranthene*	ND< 0.0005	ND< 0.0007	ND< 0.0007	ND< 1E-07	ND< 0.0007
Benzo(e)pyrene*	ND< 0.0005	ND< 0.0007	ND< 0.0007	ND< 1E-07	ND< 0.0007
Benzo(a)pyrene*	ND< 0.0010	ND< 0.0014	ND< 0.0014	ND< 2E-07	ND< 0.0014
Perylene	ND< 0.0010	ND< 0.0014	ND< 0.0014	ND< 2E-07	ND< 0.0014
Indeno(1,2,3-cd)pyrene*	< 0.0005	< 0.0007	< 0.0007	< 1E-07	ND< 0.0007
Dibenzo(a,h)anthracene*	ND< 0.0005	ND< 0.0007	ND< 0.0007	ND< 1E-07	ND< 0.0007
Benzo(g,h,i)perylene*	< 0.0005	< 0.0008	< 0.0008	< 1E-07	ND< 0.0007
Total PAH	< 0.38	< 0.54	< 0.53	< 8.0E-05	< 0.55
Total PAH w.o./ Naphthalene	< 0.08	< 0.11	< 0.11	< 1.7E-05	< 0.13
Total Carcinogenic PAH	< 0.005	< 0.007	< 0.007	< 1.1E-06	< 0.011

*Carcinogenic PAH

ND< - species not detected in sample or sample fraction

< - species detected in one sample or one sample fraction but not in all samples or fractions.

Note: Emission summary results are the average of triplicate measurements.

TABLE 4-6
POLYCYCLIC AROMATIC HYDROCARBON EMISSION RESULTS
LACSD COMMERCE
NOVEMBER/DECEMBER 1995

Test No.	6-PAH	7-PAH	8-PAH	AVERAGE		Field Blank
Date	11/30/95	12/1/95	12/1/95			12/1/95
Pitot Flow Rate, dscfm	56,021	57,343	56,139			—
Sample Volume, dscf	144.81	143.77	141.71			143.43
O ₂ , %	10.98	11.05	11.30			—
CO ₂ , %	8.45	8.99	8.02			—

Species	ug/dscm	ug/dscm	ug/dscm	ug/dscm	lb/hr	ug/dscm
Naphthalene	0.18	0.37	0.35	0.30	6.4E-05	0.30
2-Methylnaphthalene	0.010	0.11	0.045	0.054	1.2E-05	0.054
Acenaphthylene	ND< 0.0017	0.0025	0.0021	< 0.0021	< 4.5E-07	0.0021
Acenaphthene	ND< 0.0005	0.0074	0.0025	< 0.0034	< 7.4E-07	0.0030
Fluorene	0.0063	0.0034	0.0027	0.0042	8.8E-07	0.0039
Phenanthrene	ND< 0.0002	0.0064	0.0052	< 0.0040	< 8.4E-07	0.0091
Anthracene	ND< 0.001	ND< 0.001	ND< 0.001	ND< 0.001	ND< 3E-07	ND< 0.001
Fluoranthene	0.0008	0.0024	0.0022	0.0018	3.9E-07	0.0042
Pyrene	0.0008	0.0029	0.0025	0.0021	4.4E-07	0.0057
Benz(a)anthracene*	ND< 0.0005	ND< 0.0005	ND< 0.0005	ND< 0.0005	ND< 1E-07	ND< 0.0005
Chrysene*	ND< 0.0007	ND< 0.0007	ND< 0.0007	ND< 0.0007	ND< 2E-07	0.0032
Benzo(b)fluoranthene*	ND< 0.0002	ND< 0.0002	0.0004	< 0.0003	< 6E-08	0.0003
Benzo(k)fluoranthene*	ND< 0.0005	ND< 0.0005	ND< 0.0005	ND< 0.0005	ND< 1E-07	ND< 0.0005
Benzo(e)pyrene*	ND< 0.0005	ND< 0.0005	ND< 0.0005	ND< 0.0005	ND< 1E-07	ND< 0.0005
Benzo(a)pyrene*	ND< 0.0010	ND< 0.0010	ND< 0.0010	ND< 0.0010	ND< 2E-07	ND< 0.0010
Perylene	ND< 0.0010	ND< 0.0010	ND< 0.0010	ND< 0.0010	ND< 2E-07	ND< 0.0010
Indeno(1,2,3-cd)pyrene*	ND< 0.0005	ND< 0.0005	0.0005	< 0.0005	< 1E-07	ND< 0.0005
Dibenzo(a,h)anthracene*	ND< 0.0005	ND< 0.0005	ND< 0.0005	ND< 0.0005	ND< 1E-07	ND< 0.0005
Benzo(g,h,i)perylene*	ND< 0.0005	0.0005	0.0006	< 0.0005	< 1E-07	ND< 0.0005
Total PAH	< 0.21	< 0.51	< 0.42	< 0.38	< 8.0E-05	< 0.39
Total PAH w.o./ Naphthalene	< 0.03	< 0.14	< 0.07	< 0.08	< 1.7E-05	< 0.09
Total Carcinogenic PAH	ND< 0.005	< 0.005	< 0.005	< 0.005	< 1.1E-06	< 0.007

*Carcinogenic PAH

ND< - species not detected in sample or sample fraction

< - species detected in one sample or one sample fraction but not in all samples or fractions.

Note: Field blank levels calculated from average sample volume.

TABLE 4-7
PCDD/PCDF EMISSION RESULTS
LACSD COMMERCE
NOVEMBER/DECEMBER 1995

Test No.	6-DIOXIN	7-DIOXIN	8-DIOXIN	AVERAGE		Field Blank
Date	11/30/95	12/1/95	12/1/95			12/1/95
Pitot Flow Rate, dscfm	54,950	56,041	56,099			--
Sample Volume, dscf	141.17	159.66	162.50			154.44
O ₂ , %	10.98	11.05	11.30			--
CO ₂ , %	8.45	8.99	8.02			--
Species	ng/dscm	ng/dscm	ng/dscm	ng/dscm	lb/hr	ng/dscm
2378-TCDD	0.0017	0.0020	0.0016	0.0018	3.7E-10	0.0015
12378 PeCDD	0.0016	0.0033	0.0014	0.0021	4.4E-10	0.0014
123478 HxCDD	0.0028	0.0040	0.0026	0.0031	6.5E-10	0.0023
123678 HxCDD	0.0014	0.0033	0.0014	0.0020	4.3E-10	0.0012
123789 HxCDD	0.0015	0.0044	0.0014	0.0024	5.1E-10	0.0014
1234678 HpCDD	0.0053	0.0153	0.0063	0.0089	1.9E-09	0.0041
OCDD	0.0088	0.015	0.011	0.011	2.4E-09	0.0089
2378 TCDF	ND< 0.0053	ND< 0.0046	0.0026	< 0.0042	< 8.7E-10	0.0013
12378 PeCDF	0.0035	0.0111	0.0039	0.0062	1.3E-09	0.0017
23478 PeCDF	0.0030	0.0119	0.0046	0.0065	1.4E-09	0.0017
123478 HxCDF	0.0030	0.0175	0.0041	0.0082	1.7E-09	0.0019
123678 HxCDF	0.0017	0.0084	0.0022	0.0041	8.5E-10	0.0012
234678 HxCDF	0.0019	0.0086	0.0026	0.0044	9.2E-10	0.0009
123789 HxCDF	0.0035	0.0024	0.0024	0.0028	5.8E-10	0.0022
1234678 HpCDF	0.0050	0.0265	0.0078	0.0131	2.7E-09	0.0027
1234789 HpCDF	ND< 0.0009	0.0020	ND< 0.0004	< 0.0011	< 2.3E-10	0.0009
OCDF	0.0028	0.0049	0.0022	0.0033	6.8E-10	0.0032
Total TCDD	0.021	0.024	0.014	0.020	4.1E-09	0.0022
Total PeCDD	0.0098	0.029	0.0093	0.016	3.3E-09	0.0037
Total HxCDD	0.018	0.071	0.024	0.038	7.9E-09	0.013
Total HpCDD	0.011	0.033	0.014	0.019	4.0E-09	0.0071
Total TCDF	0.43	0.42	0.20	0.35	7.2E-08	0.037
Total PeCDF	0.10	0.24	0.098	0.15	3.1E-08	0.025
Total HxCDF	0.020	0.097	0.026	0.048	1.0E-08	0.012
Total HpCDF	0.0055	0.040	0.0087	0.018	3.8E-09	0.0046
Total PCDD/PCDF	< 0.62	< 0.98	< 0.40	< 0.67	< 1.4E-07	< 0.12

ND< - species not detected in sample or sample fraction

<- species detected in one sample or one sample fraction but not in all samples or fractions.

Note: Field blank levels calculated from average sample volume.

TABLE 1-3
PCDD/PCDF EMISSIONS SUMMARY
LACSD COMMERCE
NOVEMBER/DECEMBER 1995

Component	Average Sample Results				Field Blank Level ng/dscm@12%CO ₂
	ng/dscm	ng/dscm@7%O ₂	ng/dscm@12%CO ₂	lb/hr	
2378-TCDD	0.0018	0.0025	0.0025	3.7E-10	0.0022
12378 PeCDD	0.0021	0.0030	0.0030	4.4E-10	0.0020
123478 HxCDD	0.0031	0.0044	0.0044	6.5E-10	0.0032
123678 HxCDD	0.0020	0.0029	0.0028	4.3E-10	0.0017
123789 HxCDD	0.0024	0.0035	0.0034	5.1E-10	0.0020
1234678 HpCDD	0.0089	0.0127	0.0124	1.9E-09	0.0058
OCDD	0.011	0.016	0.016	2.37E-09	0.013
2378 TCDF	< 0.0042	< 0.0059	< 0.0059	< 8.7E-10	0.0019
12378 PeCDF	0.0062	0.0087	0.0085	1.3E-09	0.0024
23478 PeCDF	0.0065	0.0092	0.0090	1.4E-09	0.0024
123478 HxCDF	0.0082	0.0116	0.0113	1.7E-09	0.0027
123678 HxCDF	0.0041	0.0058	0.0056	8.5E-10	0.0017
234678 HxCDF	0.0044	0.0062	0.0060	9.2E-10	0.0013
123789 HxCDF	0.0028	0.0039	0.0039	5.8E-10	0.0032
1234678 HpCDF	0.0131	0.0186	0.0181	2.7E-09	0.0039
1234789 HpCDF	< 0.0011	< 0.0015	< 0.0015	< 2.3E-10	0.0013
OCDF	0.0033	0.0046	0.0046	6.8E-10	0.0045
Total TCDD	0.020	0.028	0.028	4.1E-09	0.0031
Total PeCDD	0.016	0.023	0.022	3.3E-09	0.0052
Total HxCDD	0.038	0.053	0.052	7.9E-09	0.019
Total HpCDD	0.019	0.027	0.027	4.0E-09	0.010
Total TCDF	0.35	0.49	0.49	7.2E-08	0.052
Total PeCDF	0.15	0.21	0.20	3.1E-08	0.036
Total HxCDF	0.048	0.068	0.066	1.0E-08	0.016
Total HpCDF	0.018	0.025	0.025	3.8E-09	0.0065
Total PCDD/PCDF	< 0.67	< 0.94	< 0.93	< 1.4E-07	< 0.16
<u>Toxicity Factors</u>					
CA DOHS	0.022	0.031	0.031	4.6E-09	
USEPA	0.010	0.014	0.014	2.0E-09	

< - species detected in one sample or one sample fraction but not in all samples or fractions.

Note: Emission summary results are the average of triplicate measurements.

TABLE 1-4
HEAVY METALS EMISSIONS SUMMARY
LACSD COMMERCE – STACK
NOVEMBER/DECEMBER 1995

Species	Average Sample Results				Field Blank Level
	ug/dscm	ug/dscm @ 7% O ₂	ug/dscm @ 12% CO ₂	lb/hr	ug/dscm @ 12% CO ₂
Arsenic	ND< 0.09	ND< 0.12	ND< 0.12	ND< 1.7E-05	ND< 0.12
Beryllium	ND< 0.03	ND< 0.05	ND< 0.05	ND< 6.8E-06	ND< 0.05
Cadmium	ND< 0.09	ND< 0.12	ND< 0.12	ND< 1.7E-05	ND< 0.12
Chromium	0.26	0.35	0.36	5.2E-05	0.85
Lead	0.81	1.1	1.1	1.6E-04	0.37
Mercury	< 0.79	< 1.1	< 1.1	< 1.6E-04	ND< 0.50
Nickel	0.45	0.61	0.62	9.0E-05	0.93

ND< - species not detected in sample or sample fraction

< - species detected in one sample or one sample fraction but not in all samples or fractions.

Note: Emission summary results are the average of triplicate measurements.

TABLE 4-9
TRACE METALS EMISSIONS RESULTS
LACSD COMMERCE -- STACK
NOVEMBER/DECEMBER 1995

Test No.	3-MTSL-OUT			4-MTSL-OUT		5-MTSL-OUT		AVERAGE		Field Blank 11/30/95	Average Reagent Blank Correction, % of Sample Value
	Date	11/29/95	11/29/95	11/29/95	11/30/95	11/30/95	11/30/95	11/30/95	11/30/95		
Pitot Flow Rate, dscfm		52,606	52,780	53,431						--	
Sample Volume, dscf		118.17	103.51	121.38						114.35	
O ₂ , %		10.74	10.28	10.55						--	
CO ₂ , %		8.57	9.07	8.67						--	
H ₂ O, %		15.2	17.1	16.3						--	
Element	ug/dscm	ug/dscm	ug/dscm	ug/dscm	ug/dscm	ug/dscm	lb/hr	ug/dscm	ug/dscm		
Arsenic	ND< 0.08	ND< 0.10	ND< 0.08	ND< 0.09	ND< 1.7E-05	0.09	0.09	0.09	0.09	ND< 0.09	0.0%
Beryllium	ND< 0.03	ND< 0.04	ND< 0.03	ND< 0.03	ND< 6.8E-06	0.03	0.03	0.03	0.03	ND< 0.03	0.0%
Cadmium	ND< 0.08	ND< 0.10	ND< 0.08	ND< 0.09	ND< 1.7E-05	0.09	0.09	0.09	0.09	ND< 0.09	0.0%
Chromium	0.42	0.20	0.16	0.26	5.2E-05	0.26	0.26	0.26	0.62	0.62	75.1%
Lead	0.76	1.0	0.66	0.81	1.6E-04	0.81	0.81	0.81	0.27	0.27	14.6%
Mercury	0.65	ND< 0.17	1.6	< 0.79	< 1.6E-04	< 0.79	< 1.6E-04	< 1.6E-04	ND< 0.37	ND< 0.37	0.0%
Nickel	0.60	0.44	0.32	0.45	9.0E-05	0.45	0.45	0.45	0.68	0.68	65.6%

ND< - species not detected in sample or sample fraction

< - species detected in one sample or one sample fraction but not in all samples or fractions.

Note: Field blank levels calculated from average sample volume.

TABLE 4-10
FLUE GAS FLOWS AND CONDITIONS
LACSD COMMERCE
NOVEMBER/DECEMBER 1995

Test Number	Date	Time	O ₂ , %	CO ₂ , %	H ₂ O, %	Flue Gas Temp., °F	Sample Vol., dscf	Pitot Flow Rate, dscfm	Isokinetic Ratio, %
3-MTLS-OUT	11/29/95	0820/1128	10.74	8.57	15.2	279	118.17	52,606	97.0
4-MTLS-OUT	11/29/95	1215/1520	10.28	9.07	17.1	283	103.51	52,780	99.4
5-MTLS-OUT	11/30/95	0800/1108	10.55	8.67	16.3	281	121.38	53,431	98.1
6-DIOXIN	11/30/95	1300/1726	10.98	8.45	17.7	284	141.17	54,950	97.7
6-PAH	11/30/95	1300/1726	10.98	8.45	17.4	288	144.81	56,021	98.3
7-DIOXIN	12/1/95	0755/1215	11.05	8.99	17.3	286	159.66	56,041	92.3
7-PAH	12/1/95	0755/1215	11.05	8.99	17.4	290	143.77	57,343	95.3
8-DIOXIN	12/1/95	1315/1720	11.30	8.02	16.2	284	162.50	56,099	93.8
8-PAH	12/1/95	1315/1720	11.30	8.02	16.2	291	141.71	56,139	96.0
9-PM	12/5/95	0845/1113	9.20	9.58	16.0	287	70.05	56,150	94.9
9-HCl	12/5/95	0845/1113	9.20	9.58	15.3	275	69.01	54,126	96.9
10-PM	12/5/95	1200/1409	9.58	9.45	17.1	267	63.01	49,958	95.9
10-HCl	12/5/95	1200/1409	9.58	9.45	16.6	271	63.53	50,309	96.0
11-PM	12/5/95	1445/1655	9.32	9.38	17.4	277	66.50	50,610	99.9
11-HCl	12/5/95	1445/1655	9.32	9.38	16.8	281	64.95	49,284	100.2
AVERAGES:			10.30	8.94	16.7	282		53,723	

Note: Test numbers 1 and 2 were voided due to baghouse operational problems.

FY 95/96

CEMS Data

Facility ID # 037336

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT

MONTHLY OPERATIONS SUMMARY
JULY 1995

Day	Moni- tor On hrs	In Opera- tion hrs	Nat Gas SCF x 1000	Ref Comb tons	Max 15Mn Avg NOX ppm	Maximum 1 Hour Average						24 Hour Average						Average						Total					
						ppm			ppm - Corr			lbs per hr			ppm - Corr			lbs per hr			ppm - Corr			lbs per day			ppm - Corr		
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO
01	24	24	120	316	132	47	4	53	115	9	108	24	3	16	84	6	72	19	2	10	84	6	72	451	43	243	24	2	10
02	24	24	55	268	137	53	8	60	125	19	126	25	6	17	84	12	65	18	4	9	84	12	65	435	87	210	18	4	9
03	24	24	309	295	115	48	5	61	101	18	127	22	5	15	65	9	72	14	3	10	65	9	72	334	68	237	14	3	10
04	24	24	38	265	130	45	5	61	113	13	152	23	4	17	79	6	85	16	2	10	79	6	85	381	39	251	16	2	10
05	24	24	77	297	175	47	4	67	119	14	146	25	4	18	70	6	83	16	2	11	70	6	83	375	46	274	16	2	11
06	24	24	132	298	152	44	11	67	121	24	138	24	4	19*	84	8	63	19	2	9	84	8	63	452	58	205	19	2	9
07	24	24	193	319	191	42	5	53	106	12	145	21	4	16	68	4	78	15	1	10	68	4	78	353	31	251	15	1	10
08	24	24	357	180	180	51	7	64	159	16	176	22	5	16	72	6	79	14	2	9	72	6	79	327	43	226	14	2	9
09	24	24	100	275	131	45	10	57	117	23	144	31	7	15	64	12	71	13	3	9	64	12	71	314	83	206	13	3	9
10	24	24	701	205	127	48	13	54	116	28	147	23	9	13	71	9	60	14	2	7	71	9	60	332	59	160	14	2	7
11	24	24	148	290	143	50	13	55	129	27	126	25	8	18	75	10	65	16	3	9	75	10	65	382	70	209	16	3	9
12	24	24	0	295	146	53	10	31	128	24	75	26	8	10	91	10	43	21	3	6	91	10	43	494	78	142	21	3	6
13	24	24	52	261	132	51	11	63	105	26	146	23	8	17	88	11	64	20	3	9	88	11	64	469	77	204	20	3	9
14	24	24	218	226	165	56	13	76	123	32	147	27	9	13	78	8	56	16	2	7	78	8	56	385	53	163	16	2	7
15	24	24	188	0	49	21	3	17	24	3	11	5	1	2	1	0	0	1	0	1	1	0	0	24	11	18	1	0	1
16	24	24	0	0	0	25	3	12	0	0	0	0	1	3	0	0	0	0	1	1	0	0	0	5	14	16	0	1	1
17	24	24	309	135	177	58	10	64	127	22	125	29	7	17	44	3	24	10	1	4	44	3	24	248	27	90	10	1	4
18	24	24	247	270	119	47	12	47	105	31	109	24	8	15	88	9	59	18	2	7	88	9	59	429	57	177	18	2	7
19	24	24	157	285	157	57	12	47	115	27	116	27	8	16	103	8	70	22	2	9	103	8	70	522	59	218	22	2	9
20	24	24	212	300	155	52	12	48	136	27	146	26	8	17	101	10	71	22	2	3	101	10	71	523	73	217	22	2	3
21	24	24	86	281	126	47	12	55	109	25	163	23	7	17	94	9	75	21	3	3	94	9	75	498	69	235	21	3	3
22	24	24	153	318	114	47	10	49	109	23	127	25	8	16	98	10	77	21	3	3	98	10	77	505	70	239	21	3	3
23	24	24	376	308	120	50	11	41	105	24	113	24	8	16	93	13	69	19	4	4	93	13	69	451	90	131	19	4	4
24	24	24	226	331	112	49	6	56	104	13	123	26	6	16	79	5	80	17	2	9	79	5	80	417	36	214	17	2	9
25	24	24	221	246	112	49	8	57	107	20	159	26	3	16	78	8	88	17	2	2	78	8	88	398	60	241	17	2	2
26	24	24	357	289	132	48	5	58	108	13	134*	22	3	16*	87	5	88	18	2	1	87	5	88	440	37	267	18	2	1
27	24	24	41	99	269*	42	4	150	97	12	416*	22	0	40*	35	2	54	7	1	0	35	2	54	170	25	236	7	1	0
28	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	24	24	376	70	125	45	10	65	107	22	158	21	6	19*	21	2	0	5	1	4	21	2	0	123	19	84	5	1	4
30	24	24	338	293	117	46	17	65	111	38	158	23	9	16	78	14	75	16	2	2	78	14	75	393	94	220	16	2	2
31	24	24	119	322	121	51	7	67	109	16	132	26	5	17	59	5	47	13	2	6	59	5	47	320	38	148	13	2	6

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
 COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT
 MONTHLY OPERATIONS SUMMARY
 AUGUST 1995

Day	Moni- tor On	In Opera- tion	Nat Gas SCF x 1000	Ref. Comb tons	Max 15Mn Avg NOX ppm	Maximum 1 Hour Average						24 Hour Average						Total								
						ppm			lbs per hr			ppm - Corr			lbs per hr			ppm			lbs per hr			lbs per day		
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO
01	24	24	90	339	120	53	9	55	25	7	17	22	129	129	25	7	17	94	8	80	21	2	10	496	56	251
02	24	24	0	311	124	55	5	49	27	4	14	11	112	112	27	4	14	97	6	73	21	2	10	513	43	233
03	24	24	287	279	140	53	11	76	27	8	19*	24	141	141	27	8	19*	91	10	91	19	3	12	463	72	280
04	24	24	154	279	126	53	11	49	24	8	15	23	120	120	24	8	15	94	10	69	20	3	9	489	73	217
05	24	24	30	331	122	48	10	56	24	7	17	25	140	140	24	7	17	94	10	70	20	3	10	490	75	245
06	24	24	459	282	162	46	13	60	24	8	17	28	166	166	24	8	17	91	13	70	18	3	4	427	91	198
07	24	24	59	282	157	51	8	63	25	5	17	16	139	139	25	5	17	89	9	86	19	3	11	449	65	266
08	24	24	50	228	150	46	7	59	23	4	17	16	158	158	23	4	17	80	6	94	17	2	2	418	43	219
09	24	24	273	252	144	48	13	54	25	7	17	30	155	155	25	7	17	89	6	94	18	2	2	439	60	273
10	24	24	898	227	137	48	12	55	23	8	18	23	155	155	23	8	18	94	6	83	18	2	2	436	41	229
11	24	24	347	243	159	55	11	51	25	7	15	22	132	132	25	7	15	104	10	77	22	2	2	519	70	230
12	24	24	165	287	212	52	6	60	26	4	18	22	152	152	26	4	18	103	7	85	21	2	2	497	49	245
13	24	24	19	235	132	50	7	56	24	5	15	16	111	111	24	5	15	95	10	52	19	3	3	467	68	158
14	24	24	176	294	183	56	6	67	27	4	17	13	172	172	27	4	17	99	4	77	21	1	1	509	28	244
15	24	24	168	319	229*	56	9	60	29	6	18	25	141	141	29	6	18	118	5	83	25	1	1	599	31	220
16	24	24	83	316	141	54	12	54	26	8	17	29	145	145	26	8	17	110	8	71	23	3	3	562	54	248
17	24	24	67	292	147	56	6	55	29	4	16	13	153	153	29	4	16	108	4	63	23	3	8	563	32	196
18	24	23	302	257	133	61	4	90	28	3	16	10	151	151	28	3	16	102	4	66	22	1	9	535	31	215
19	24	24	230	0	133	18	2	42	5	1	10	0	0	0	5	1	10	0	0	0	1	1	1	35	12	45
20	24	24	93	329	167	55	7	53	29	5	13	18	88	88	29	5	13	95	10	47	22	3	2	523	74	159
21	24	24	25	316	175	60	9	60	31	6	16	20	147	147	31	6	16	112	8	63	25	3	3	602	58	200
22	24	24	12	290	151	54	10	55	27	7	17	20	131	131	27	7	17	108	9	53	24	3	3	584	71	176
23	24	24	0	286	164	59	11	58	30	8	18	25	133	133	30	8	18	113	11	60	26	3	3	615	82	231
24	24	24	182	285	170	61	11	47	31	8	15	25	130	130	31	8	15	114	10	60	24	3	3	572	71	185
25	24	24	13	314	161	55	9	55	29	6	17	19	155	155	29	6	17	110	8	80	23	2	10	558	58	242
26	24	24	150	329	164	58	13	47	30	8	12	30	140	140	30	8	12	108	12	59	22	4	7	530	84	163
27	24	12	374	122	176	65	10	41	32	7	15	19	111	111	32	7	15	49	6	16	11	2	2	269	52	152
28	24	24	0	275	197	64	7	48	33	5	17	17	107	107	33	5	17	113	8	48	25	3	3	603	61	184
29	24	24	18	261	165	61	6	52	33	4	16	13	125	125	33	4	16	115	7	60	26	2	8	613	51	184
30	24	24	63	305	197	63	12	60	31	7	18	25	137	137	31	7	18	110	8	51	25	3	3	605	62	152
31	24	24	71	301	171	60	11	70	31	7	18	27	180	180	31	7	18	115	10	78	26	3	3	628	76	247

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
 COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT
 MONTHLY OPERATIONS SUMMARY
 SEPTEMBER 1995

Day	Moni- tor On	In Opera- tion	Nat Gas	Ref Comb tons	Max 15Mn Avg NOX	Maximum 1 Hour Average						24 Hour Average						Total								
						ppm			lbs per hr			ppm - Corr			lbs per hr			ppm - Corr			lbs per hr			lbs per day		
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO			
01	24	24	43	335	195	63	6	56	32	5	16	14	117	117	32	3	72	121	8	72	27	2	10	58	235	
02	24	24	719	222	174	58	11	55	31	8	17	27	130	130	31	8	79	105	11	57	20	3	7	76	162	
03	24	24	334	304	173	58	11	58	28	7	17	23	165	165	28	7	79	113	12	79	23	3	10	83	229	
04	24	24	0	276	145	57	8	50	30	6	15	20	115	115	30	6	53	117	12	74	25	3	7	61	165	
05	24	24	0	276	200	76	8	60	38	5	17	18	127	127	38	5	74	96	9	74	21	3	10	61	234	
06	24	24	327	275	158	53	7	61	27	5	18	16	183	183	27	5	83	96	7	83	20	2	10	48	238	
07	24	24	126	257	179	47	12	63	25	8	18	27	206	206	25	8	89	92	13	89	19	4	10	446	241	
08	24	24	37	270	149	55	9	57	30	5	15	17	127	127	30	5	64	100	8	64	22	2	3	57	201	
09	24	24	295	265	156	54	8	50	29	7	14	21	150	150	29	7	63	99	9	63	20	3	8	64	183	
10	24	24	138	322	176	56	9	53	29	6	15	21	153	153	29	6	72	119	10	72	24	3	9	71	195	
11	24	24	42	242	137	55	11	59	30	8	16	25	148	148	30	8	83	105	8	83	23	2	2	59	219	
12	24	24	28	284	154	56	4	55	28	4	15	12	159	159	28	4	63	100	5	63	21	2	2	38	181	
13	24	24	120	306	198	49	4	55	25	3	17	9	138	138	25	3	67	98	5	67	20	1	8	34	200	
14	24	24	419	246	146	57	11	66	27	7	16	23	197	197	27	7	82	89	6	82	18	2	3	43	180	
15	24	24	369	247	171	58	13	57	27	8	17	28	172	172	27	8	93	99	9	93	22	2	10	61	236	
16	24	24	291	279	150	55	8	60	28	6	16	21	150	150	28	6	96	108	8	96	17	3	3	54	185	
17	24	24	18	243	139	55	8	60	28	7	16	17	137	137	28	7	99	89	9	99	22	2	2	61	267	
18	24	24	213	266	177	61	10	79	31	8	16	24	210	210	31	8	96	110	9	96	22	2	10	61	238	
19	24	24	288	261	217	58	13	50	29	8	13	28	137	137	29	8	93	111	11	93	22	2	3	71	178	
20	24	24	1029	84	210	58	12	63	28	8	16	28	207	207	28	8	52	79	7	52	13	2	6	47	147	
21	24	24	916	0	91	42	2	23	15	1	3	4	14	14	15	1	3	21	79	7	52	4	0	2	38	147
22	24	24	406	164	170	65	12	43	30	8	15	25	98	98	30	8	35	70	8	35	15	2	5	60	123	
23	24	24	235	300	170	55	9	72	28	6	18	22	179	179	28	6	88	116	11	88	24	3	4	79	258	
24	24	24	122	316	151	60	10	51	38	7	14	24	148	148	38	7	81	121	12	81	26	4	10	84	239	
25	24	24	838	205	150	56	4	45	28	3	14	9	124	124	28	3	59	99	6	59	19	2	7	36	160	
26	24	24	73	283	183	55	4	61	28	3	17	11	148	148	28	3	87	113	5	87	23	1	11	35	257	
27	24	24	392	265	136	61	10	52	30	7	16	24	145	145	30	7	63	98	7	63	21	2	8	51	185	
28	24	24	27	250	152	58	13	54	29	8	17	25	132	132	29	8	56	106	8	56	22	2	3	66	158	
29	24	24	254	250	228*	61	7	40	32	5	12	28	186	186	32	5	40	133	11	40	25	3	3	60	126	
30	24	24	48	250	209	61	7	40	32	5	12	17	94	94	32	5	40	120	8	40	26	3	3	60	126	

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
 COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT
 MONTHLY OPERATIONS SUMMARY
 OCTOBER 1995

D a y	Moni- tor On	In Opera- tion hrs	Nat Gas SCF x 1000	Ref Comb tons	Max 15Mn Avg NOX	Maximum 1 Hour Average						24 Hour Average						Total					
						ppm			lbs per hr			ppm - Corr			lbs per hr			lbs per day			NOX	SOX	CO
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO			
01	24	24	0	230	173	55	7	37	138	18	105	113	8	51	23	2	6	545	50	142			
02	24	24	91	0	111	35	2	52	100	7	152	6	0	9	1	1	2	36	15	53			
03	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
04	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
05	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
06	24	24	0	0	0	48	30	34	0	0	0	0	0	0	0	0	0	1	1	1			
07	24	24	194	0	0	7	1	17	0	0	0	0	0	0	0	0	0	24	6	38			
08	24	24	480	206	159	58	4	93	116	8	98	71	4	39	17	1	6	419	32	161			
09	24	24	172	305	195	51	7	39	150	17	110	116	6	50	22	1	6	525	34	137			
10	24	24	683	193	153	49	10	56	135	29	176	98	8	73	18	2	8	430	49	182			
11	24	24	798	163	139	61	9	48	126	18	108	95	5	29	23	2	4	437	36	192			
12	24	24	0	257	141	64	9	37	132	17	75	103	6	33	23	1	5	561	47	108			
13	24	24	0	280	143	62	11	60	133	24	117	98	9	54	22	3	7	521	63	174			
14	24	24	250	240	158	68	16	49	138	30	99	106	12	45	23	3	6	544	81	134			
15	24	24	0	290	134	59	13	46	125	27	113	104	8	43	22	2	5	531	53	128			
16	24	24	9	270	134	60	9	53	120	19	133	96	7	48	20	2	6	478	41	139			
17	24	24	0	260	223	51	8	56	114	21	119	54	6	63	11	2	8	255	45	188			
18	24	24	0	310	97	42	4	44	84	8	97	58	6	51	13	3	7	302	46	158			
19	24	24	47	261	119	48	11	65	105	25	140	74	10	64	16	3	8	381	73	193			
20	24	24	39	243	132	47	12	88	113	27	201	71	11	76	14	3	8	329	66	190			
21	24	24	395	238	136	50	13	66	101	31	165	78	13	78	14	3	9	329	79	192			
22	24	24	191	245	126	38	14	68	95	33	189	62	12	96	10	3	5	241	67	216			
23	24	24	864	205	125	52	8	58	106	14	129	83	4	44	13	1	8	308	26	118			
24	24	24	30	300	150*	53	4	53	129	9	147	79	5	61	16	1	8	380	31	184			
25	24	24	137	290	164	46	12	61	168	25	135	72	7	61	14	2	7	334	43	172			
26	24	24	352	270	102	43	8	60	120	15	201	67	8	71	13	2	8	300	52	194			
27	24	24	36	265	145	48	6	56	111	17	136	80	7	74	14	2	9	344	48	214			
28	24	24	264	265	157	53	9	68	130	20	147	89	7	87	16	2	10	383	48	239			
29	24	24	64	271	145	56	6	66	125	16	156	91	7	75	17	2	9	407	41	206			
30	24	24	29	298	180	63	6	49	152	15	170	117	5	61	23	1	7	429	25	209			
31	24	24	66	298	180	63	6	49	152	15	170	117	4	61	23	1	7	543	25	168			

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT

MONTHLY OPERATIONS SUMMARY
NOVEMBER 1995

D a y	Moni- tor On hrs	In- Opera- tion hrs	Nat Gas SCF x 1000	Ref Comb tons	Max 15Mn Avg NOX	Maximum 1 Hour Average						24 Hour Average						Total					
						ppm			lbs per hr			ppm - Corr			lbs per hr			ppm			lbs per day		
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO
01	24	24	15	346	200	60	12	57	172	26	131	172	26	131	28	7	15	111	9	76	513	55	206
02	24	24	2	313	185	59	13	51	160	28	124	160	28	124	25	7	15	99	10	60	451	63	170
03	24	24	0	337	204	62	12	60	150	27	134	150	27	134	29	8	16	113	9	71	546	60	204
04	24	11	87	104	159	65	10	66	149	23	209	149	23	209	30	6	15	65	5	45	304	30	110
05	24	15	194	231	172	69	7	48	154	16	123	154	16	123	35	4	15	126	6	74	352	42	125
07	24	24	0	349	193	75	10	59	162	21	123	162	21	123	36	7	17	121	8	64	649	60	220
08	24	24	54	310	190	72	8	57	161	18	136	161	18	136	30	5	15	121	12	65	579	52	182
10	24	24	22	295	158	60	12	48	147	27	121	147	27	121	28	7	15	101	15	69	442	75	170
11	24	24	175	225	171	58	15	64	149	34	149	149	34	149	25	8	15	98	12	65	405	92	172
12	24	15	184	184	143	58	10	70	134	24	171	134	24	171	27	7	13	74	6	47	339	42	130
13	24	11	240	123	170	70	12	64	146	26	157	146	26	157	32	7	16	46	5	32	232	38	91
14	24	24	31	32	165	64	12	72	149	26	169	149	26	169	28	8	18	117	11	88	559	70	250
15	24	24	0	374	146	66	6	55	135	13	131	135	13	131	30	4	16	117	7	59	562	48	174
16	24	24	56	328	185	72	11	50	163	27	106	163	27	106	30	7	14	110	8	82	538	53	147
17	24	12	35	372	195	67	4	131	168	12	579*	168	12	579*	29	3	24*	77	3	0	305	26	189
18	24	0	0	187	0	18	3	16	0	0	0	0	0	0	1	1	4	0	0	30	4	10	25
19	24	11	275	0	130	51	6	52	110	14	130	110	14	130	23	1	4	50	3	30	257	27	122
20	24	24	0	323	138	60	9	65	123	19	163	123	19	163	27	5	17	92	6	58	458	44	173
21	24	24	238	293	135	54	9	66	121	17	157	121	17	157	25	5	18	90	9	85	423	62	235
22	24	24	35	328	141	51	10	77	106	23	203	106	23	203	24	6	19*	82	11	72	392	79	206
23	24	24	136	311	149	67	9	54	135	18	125	135	18	125	29	5	15	101	8	66	475	54	183
24	24	24	11	295	151	63	8	60	138	18	130	138	18	130	27	5	15	116	7	72	536	47	202
25	24	24	75	324	162	61	8	56	145	17	136	145	17	136	26	5	15	114	8	72	528	51	198
26	24	24	519	242	150	54	9	67	129	35	161	129	35	161	23	6	17	101	9	88	417	45	164
27	24	24	280	224	126	56	9	61	119	20	148	119	20	148	26	6	16	53	6	63	254	41	165
28	24	24	249	272	155	56	18	73	110	37	174	110	37	174	23	9	17	75	14	59	356	90	164
30	24	24	284	297	149	61	17	74	122	38	158	122	38	158	27	8	16	84	15	77	321	73	168

D a y	Moni- tor On	In Opera- tion	Nat Gas	Ref Comb	Max 15Mn Avg NOX	Maximum 1 Hour Average										24 Hour Average						Total			
						ppm			lbs per hr			ppm - Corr			lbs per hr			ppm - Corr			lbs per hr			lbs per day	
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX
01	24	24	139	281	152	66	7	60	134	13	158	28	4	16	105	6	74	21	2	9	514	41	209		
02	24	24	368	346	164	67	10	66	141	22	151	30	6	17	111	9	63	22	3	8	521	63	184		
03	24	24	35	372	146	67	49	70	135	102*	167	29	23*	16	101	30	63	21	2	8	497	176*	188		
04	24	24	32	365	140	63	11	61	127	20	141	28	5	16	106	9	68	22	3	8	529	59	200		
05	24	24	91	323	137	53	12	71	116	23	145	25	8	17	84	9	74	18	2	3	422	61	220		
06	24	24	0	291	139	62	5	63	120	13	145	28	4	16	103	4	76	21	1	2	509	29	224		
07	24	24	9	277	139	69	11	62	127	21	124	29	6	17	105	4	60	23	2	3	546	47	188		
08	24	24	68	303	153	70	9	64	144	18	136	33	6	17	125	7	76	27	1	2	647	59	230		
09	24	24	75	302	139	68	6	71	131	12	167	29	4	17	117	8	67	25	1	8	606	35	201		
10	24	24	6	337	153	70	11	55	138	18	120	31	6	14	123	9	55	26	3	1	620	65	169		
11	24	24	0	307	151	69	5	36	143	12	80	28	4	10	123	5	40	27	1	5	637	33	124		
12	24	24	14	337	171	61	4	58	150	9	143	31	2	15	124	5	75	24	1	1	566	31	203		
13	24	24	103	332	178	61	4	64	153	8	169	29	2	16	121	4	103	23	1	1	553	28	275		
14	24	24	460	301	180	77	5	67	142	13	181	34	3	17	129	4	107	24	2	2	571	27	283		
15	24	24	290	318	229*	69	6	75	168	12	157	31	4	19*	123	5	101	27	1	12	583	38	285		
16	24	24	148	337	171	69	8	65	149	16	166	31	5	17	119	7	97	24	2	8	626	46	281		
17	24	24	0	314	144	67	8	54	138	20	130	29	7	13	125	10	61	25	3	3	626	69	181		
18	24	24	441	314	173	63	10	83	146	23	203	31	3	17	119	11	114	23	3	3	518	62	274		
19	24	24	163	242	150	66	6	72	142	11	141	31	4	16	118	4	81	21	2	10	557	26	244		
20	24	24	73	305	142	58	7	72	124	15	142	27	4	18	103	6	87	21	1	10	502	40	239		
21	24	24	194	328	148	55	14	65	131	30	132	23	8	15	85	9	61	15	2	7	378	57	163		
22	24	24	0	277	137	55	12	65																	

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
 COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT
 MONTHLY OPERATIONS SUMMARY
 JANUARY 1996

D a y	Moni- tor On	In Opera- tion	Nat Gas	Ref Comb	Max 15Mn Avg NOX	Maximum 1 Hour Average										24 Hour Average						Total				
						ppm			ppm - Corr			lbs per hr			ppm			ppm - Corr			lbs per hr			lbs per day		
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO
01	24	0	157	0	187	78	12	72	154	25	188	37	8	17	130	10	90	27	3	11	659	71	265			
02	24	0	116	0	138	61	6	69	129	12	130	27	4	17	106	5	79	24	1	11	578	35	260			
03	24	0	211	0	151	64	9	62	128	18	126	33	6	16	94	5	76	22	2	10	519	39	252			
04	24	0	0	0	0	8	2	11	0	0	0	0	1	1	0	0	0	0	0	1	4	8	12			
05	24	0	89	0	130	30	2	64	32	0	10	7	1	8	1	0	1	20	4	2	14	6	50			
06	24	0	220	0	140	63	14	78	131	30	115	28	8	14	104	13	52	22	3	7	477	90	165			
07	24	0	0	0	142	67	13	56	133	26	119	29	7	15	110	12	55	22	4	7	531	79	162			
08	24	0	109	0	147	68	9	62	127	19	125	30	5	16	116	7	65	24	2	8	583	47	200			
09	24	0	100	0	133	61	7	56	125	13	117	29	4	15	109	7	60	24	2	8	571	49	187			
10	24	0	240	0	149	62	5	66	126	9	139	27	3	17	106	5	83	22	1	10	527	31	245			
11	24	0	25	0	142	66	4	65	128	7	124	29	2	17	112	4	79	24	1	10	583	30	252			
12	24	0	0	0	154	68	12	62	135	23	127	30	7	17	116	8	65	25	2	8	599	60	203			
13	24	0	7	0	170	68	6	72	147	14	170	31	4	16	129	8	72	27	2	9	554	54	214			
14	24	0	248	0	192	64	7	67	139	14	142	28	5	17	121	8	70	22	1	10	523	52	172			
15	24	0	158	0	112	3	68	178	213*	25	125	25	2	17	4	110	19	19	1	3	461	17	240			
16	24	0	109	0	106	0	3	93	63	12	123	7	1	14	3	0	5	1	0	3	19	10	60			
17	24	0	235	0	182	71	3	55	145	12	125	31	4	15	91	6	60	19	2	8	454	10	189			
18	24	0	0	0	154	73	13	48	146	25	112	33	8	13	124	9	67	28	3	9	668	68	214			
19	24	0	32	0	157	76	11	60	146	21	133	34	6	17	115	8	77	25	2	10	591	58	237			
20	24	0	39	0	144	74	10	56	133	22	131	30	7	14	116	12	62	25	4	8	591	84	189			
21	24	0	42	0	190	74	11	48	164	24	127	34	6	13	130	10	64	28	3	8	667	69	193			
22	24	0	102	0	167	66	7	58	146	17	138	30	5	16	125	7	77	26	2	9	619	51	227			
23	24	0	239	0	197	62	8	67	135	14	152	28	4	17	107	6	82	24	2	11	585	55	275			
24	24	0	225	0	148	57	7	63	138	12	131	27	4	16	116	7	82	22	2	10	526	42	238			
25	24	0	8	0	153	64	8	61	145	16	142	29	5	17	119	8	69	25	3	9	605	50	219			
26	24	0	0	0	158	72	15	60	133	29	142	32	8	16	119	10	64	26	3	8	616	62	199			
27	24	0	111	0	140	63	6	72	138	12	175	28	4	16	116	8	49	26	2	7	517	70	157			
28	24	0	0	0	138	60	12	66	128	25	174	30	7	16	109	10	72	22	3	8	517	50	194			
29	24	0	220	0	150	66	11	61	135	21	174	31	7	16	122	11	82	24	3	10	585	81	228			
30	24	0	2	0	159	69	11	61	147	21	135	30	3	16	121	5	70	27	1	7	643	62	158			
31	24	0	122	0	178	63	6	61	147	11	162	30	3	16	128	5	70	26	1	8	634	36	198			
																					16224	1556	6053			

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT
MONTHLY OPERATIONS SUMMARY
FEBRUARY 1996

Day	Moni- tor On hrs	In Opera- tion hrs	Nat Gas SCF x 1000	Ref Comb tons	Max 15Mn Avg NOX ppm	Maximum 1 Hour Average						24 Hour Average						Total			
						ppm			lbs per hr			ppm - Corr			lbs per hr			lbs per day			
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	
01	24	24	222	350	195	63	7	60	29	4	15	128	6	95	25	2	11	609	40	257	
02	24	24	435	177	203	62	5	65	30	3	17	124	6	88	25	10	10	606	39	246	
03	24	24	182	358	151	69	10	72	32	6	17	123	8	73	27	9	9	641	59	224	
04	24	24	573	173	185	60	13	67	27	8	17	113	4	57	18	1	6	430	26	148	
05	24	23	999	172	143	44	17	71	27	4	17	72	3	66	12	1	8	286	21	179	
06	24	0	0	0	0	3	1	11	1	0	22	0	0	0	0	0	0	11	6	8	
07	24	0	0	0	0	3	1	11	1	0	22	0	0	0	0	0	0	13	5	10	
08	24	0	0	0	0	2	1	11	1	1	10	0	0	0	1	0	0	19	9	4	
09	24	0	0	0	0	2	1	11	1	1	11	0	0	0	0	0	0	11	11	4	
10	24	0	0	0	0	2	1	11	1	1	11	0	0	0	0	0	0	11	8	6	
11	24	0	0	0	0	2	1	11	1	1	11	0	0	0	0	0	0	11	8	6	
12	24	0	0	0	98	28	12	21	17	10	5	27	0	20	2	0	1	40	4	17	
13	24	6	233	10	161	53	1	60	13	1	8	0	1	0	0	0	0	95	6	54	
14	24	0	556	0	0	3	1	46	0	0	7	0	0	0	0	0	0	3	1	0	
15	24	0	60	0	0	8	1	60	2	0	7	0	0	0	2	0	1	37	5	26	
16	24	0	305	0	82	22	1	70	3	0	16	62	6	46	14	2	8	333	45	189	
17	24	12	313	120	172	75	14	69	33	7	16	130	11	82	29	3	11	699	82	260	
18	24	24	0	295	176	77	15	72	34	10*	17	124	12	80	30	4	11	717	86	252	
19	24	24	33	277	176	81	17	72	34	3	18	124	5	94	26	2	11	658	48	276	
20	24	24	317	192	202	78	5	92	33	3	17	141	4	101	27	1	11	518	39	271	
21	24	24	888	136	182	75	8	67	28	5	17	116	6	99	23	1	11	549	30	266	
22	24	21	240	331	161	61	4	65	26	2	17	116	4	89	24	4	10	565	88	226	
23	24	24	180	403	142	67	19	69	27	11*	17	119	12	76	26	4	9	614	92	251	
24	24	24	10	336	150	67	12	69	29	20*	14	125	12	62	27	4	8	658	88	226	
25	24	24	315	350	152	73	28	50	32	12*	17	135	19	94	29	3	12	695	70	200	
26	24	24	282	350	183	71	18	61	33	6	17	117	6	98	24	2	12	579	42	280	
27	24	24	366	314	171	69	10	71	31	11*	17	107	13	89	22	4	11	531	95	263	
28	24	24	245	352	153	65	16	60	30	11*	17	107	13	89	22	4	11	531	95	263	
																			10564	1086	4518

*Effective 2/14/96 - SO₂ ppm and lbs/hr limits (maximum one-hour average) were eliminated (permit-to-operate (Revised) January 31, 1996).

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT
MONTHLY OPERATIONS SUMMARY
MARCH 1996

Day	Moni- tor On	In Opera- tion	Nat Gas SCF x 1000	Ref Comb tons	Max 15Mn Avg NOX	Maximum 1 Hour Average						24 Hour Average						Total					
						ppm			ppm - Corr			lbs per hr			ppm			ppm - Corr			lbs per hr		
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO
01	24	24	895	242	155	61	29	74	134	50	182	28	15*	17	108	14	69	484	94	171	484	94	171
02	24	24	1165	187	144	64	13	146	137	28	177	24	17	17	95	6	77	384	36	195	384	36	195
03	24	21	565	200	170	59	11	73	138	24	148	25	6	16	107	12	86	458	75	222	458	75	222
04	24	24	118	370	136	59	8	62	129	17	128	26	5	15	114	9	81	546	61	222	546	61	222
05	24	13	421	201	182	65	9	67	137	21	168	30	6*	18	72	5	60	316	33	148	316	33	148
06	24	6	449	63	155	64	30	67	137	70*	129	25	18*	13	28	8	21	149	52	74	149	52	74
07	24	24	431	273	166	60	25	64	133	54*	159	26	15*	17	110	12	86	518	81	241	518	81	241
08	24	8	159	200	197	58	8	62	157	17	171	29	5	16	34	4	27	164	30	94	164	30	94
09	24	19	355	277	184	70	11	70	150	24	121	29	7	15	105	10	64	488	67	200	488	67	200
10	24	24	224	368	194	62	12	63	146	26	154	27	17*	16	123	12	84	584	83	230	584	83	230
11	24	24	65	339	226*	63	27	69	136	60*	136	30	6	17	109	8	73	536	54	212	536	54	212
12	24	24	22	394	153	69	10	60	133	20	138	26	15*	16	98	6	81	489	44	237	489	44	237
13	24	24	208	375	157	62	26	69	135	39	166	27	10*	17	122	7	90	495	82	259	495	82	259
14	24	24	556	296	183	59	16	67	135	32	172	29	5	22*	111	105	572	48	282	572	48	282	
15	24	24	737	238	152	62	8	81	130	18	209	27	7	17	94	10	67	460	73	268	460	73	268
16	24	24	81	291	141	63	12	69	130	24	154	27	4	13	101	6	67	380	35	167	380	35	167
17	24	24	738	180	144	62	17	65	130	17	152	26	10*	23*	82	5	58	434	39	181	434	39	181
18	24	24	586	222	145	72	18	67	130	37	159*	25	4	15	103	6	67	434	39	181	434	39	181
19	24	24	387	316	205	67	6	87	162	14	224*	28	4	23*	82	5	58	352	32	229	352	32	229
20	24	24	21	336	77	36	3	45	165	7	100	14	2	10	43	3	88	204	21	162	204	21	162
21	24	24	167	325	92	32	13	70	69	28	169	12	6	17	42	7	100	128	32	178	128	32	178
22	24	24	194	331	156	62	10	63	138	24	160	28	8	16	88	7	88	403	44	232	403	44	232
23	24	24	236	270	147	67	14	72	137	25	171	28	6	16	110	9	63	540	65	182	540	65	182
24	24	24	0	334	134	60	10	60	129	22	141	26	10*	16	110	12	75	552	84	225	552	84	225
25	24	24	220	295	154	62	16	60	129	34	158	27	10*	12	110	12	70	491	81	181	491	81	181
26	24	24	371	288	149	66	17	53	133	36	146	27	10*	11	110	12	67	531	64	258	531	64	258
27	24	27	283	12	166	61	10	49	133	36	146	24	11*	13	120	20	22	185	24	173	185	24	173
28	24	24	0	366	140	63	19	51	133	36	106	27	11*	0	66	0	0	241	56	81	241	56	81
29	24	24	359	345	83	76	4	0	96	5	192	23	3	34*	50	17	15	476	50	84	476	50	84
30	24	24	10	343	141	63	17	142	96	20	162	22	3	38*	52	3	15	1240	1675	5621	1240	1675	5621
31	24	24	736	302	60	52	6	135	96	7	162	22	3	38*	52	3	15	1240	1675	5621	1240	1675	5621

3/11/96 - Due to failure of the NOxSOx CEM analyzer (NOx (15-min. avg.) - 225.8 ppm).

3/15/96 - Due to breakdown of the ash extractor (CO - 22.0 lbs/hr).

3/19/96 - Due to failure of the CO CEM analyzer (CO - 223.6 ppm/23.2 lbs/hr).

3/30/96 to 3/31/96 - Due to failure and subsequent removal (3/29/96) of the CO/CO₂/H₂O analyzer all readings are erroneous (CO - 34.3 lbs/hr (3/30); 37.5 lbs/hr (3/31)).

*Note - effective 2/14/96, the SO₂ maximum ppm and lbs/hr limits (one-hour averages) were eliminated pursuant to the revised permit-to-operate dated 1/31/96. All SO₂ maximum one-hour average data should be disregarded after the effective date.

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT
MONTHLY OPERATIONS SUMMARY
APRIL 1996

D a y	Moni- tor On	In Opera- tion	Nat Gas	Ref Comb	Max 15Mn Avg NOX	Maximum 1 Hour Average						24 Hour Average						Total			
						ppm			lbs per hr			ppm - Corr			lbs per hr			lbs per day			
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	
01	24	24	703	273	84	70	9	0	29	5	0	59	4	0	22	2	0	519	52	0	
02	24	24	964	202	80	63	11	0	26	8	0	50	3	0	17	2	0	410	41	0	
03	24	24	532	302	73	57	14	0	24	5	0	56	5	0	20	3	0	470	61	0	
04	24	24	352	317	104	83	22	0	35	12	0	69	8	0	24	4	0	574	93	0	
05	24	24	826	222	110	75	13	0	31	7	0	48	6	0	15	4	0	558	68	0	
06	24	10	295	55	69	51	7	0	22	4	0	10	1	0	4	1	0	101	21	0	
07	24	1	216	0	33	20	2	0	4	0	0	1	0	0	1	0	0	17	4	0	
08	24	13	637	184	90	70	18	0	29	10	0	39	4	0	14	2	0	336	54	0	
09	24	24	552	271	131	71	37	45	30	21	0	77	6	15	23	3	2	549	65	54	
10	24	24	168	350	164	77	11	66	32	6	10	126	8	82	26	2	10	635	59	239	
11	24	24	35	299	142	72	10	57	27	5	17	119	7	72	24	2	9	583	54	223	
12	24	24	308	265	159	68	9	68	27	7	18	109	7	85	20	2	9	476	49	224	
13	24	24	196	325	148	60	12	64	25	7	16	89	14	82	17	4	8	398	88	194	
14	24	24	0	310	189	65	9	113	27	7	14	99	11	76	18	3	6	439	69	133	
15	24	24	120	271	138	59	8	64	35	4	17	102	7	79	23	2	10	557	44	231	
16	24	24	19	324	135	62	16	64	26	4	15	111	8	91	20	2	11	529	46	263	
17	24	24	31	335	137	62	8	55	24	4	17	114	8	86	22	3	10	543	55	245	
18	24	24	107	304	136	57	17	72	28	9	15	114	12	99	19	2	11	457	80	256	
19	24	4	342	44	130	53	2	73	23	11	9	105	1	10	4	0	2	95	10	54	
20	24	24	0	347	122	56	9	54	29	10	14	119	8	69	21	8	8	506	63	199	
21	24	24	60	391	149	71	16	67	32	9	12	119	8	67	24	6	9	581	59	198	
22	24	24	0	390	160	74	10	67	32	9	12	126	12	75	26	3	9	623	46	224	
23	24	24	0	411	153	73	15	54	29	7	15	122	10	74	25	3	3	608	84	243	
24	24	24	0	340	177	83	28	74	32	9	17	126	13	94	25	4	9	619	72	243	
25	24	24	77	315	142	70	25	63	29	15	16	124	10	82	26	3	3	602	87	275	
26	24	24	0	335	177	67	11	62	29	6	16	117	13	78	23	3	4	552	67	223	
27	24	24	173	300	152	68	21	67	26	12	15	121	15	86	22	4	8	539	61	233	
28	24	24	130	155	144	66	36	62	27	20	15	87	12	46	15	3	5	547	98	198	
30	24	18	804	155	144	66	36	62	27	20	15	87	12	46	15	3	5	362	82	126	
																			14074	1782	4464

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT
MONTHLY OPERATIONS SUMMARY
MAY 1996

Day	Moni- tor On	In Opera- tion	Nat Gas SCF x 1000	Ref Comb tons	Max 15Mn Avg NOX	Maximum 1 Hour Average						24 Hour Average						Total		
						ppm			lbs per hr			ppm - Corr			lbs per hr			lbs per day		
						NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO	NOX	SOX	CO
01	24	24	86	315	149	73	12	62	39	7	16	119	14	75	24	4	9	574	91	218
02	24	24	47	331	151	72	15	63	31	8	16	116	13	90	24	4	11	564	85	259
03	24	24	65	315	184	75	21	71	31	12	17	127	12	80	26	3	10	630	82	238
04	24	24	0	299	169	74	17	61	28	10	16	120	12	87	24	3	11	575	80	254
05	24	24	88	345	196	77	15	58	31	9	16	133	11	70	27	3	8	642	78	202
06	24	24	21	365	174	79	15	66	32	9	16	133	11	77	27	3	9	659	75	218
07	24	24	0	310	161	73	17	58	30	9	14	126	10	75	25	3	9	593	66	214
08	24	24	9	330	159	69	17	61	29	10	16	120	10	89	24	3	11	565	67	256
09	24	24	120	325	166	71	11	64	29	5	16	123	10	86	24	3	10	587	67	247
10	24	24	27	322	194	69	13	69	29	7	17	119	9	86	24	2	11	574	57	236
11	24	24	84	300	153	67	9	53	27	5	14	117	8	77	23	3	9	555	52	226
12	24	24	97	309	151	74	8	58	30	5	16	125	8	85	25	2	10	593	52	246
13	24	24	63	332	183	64	13	68	28	8	16	110	8	94	21	2	11	512	57	266
14	24	24	47	330	164	62	13	67	25	7	17	106	12	104	20	3	12	472	77	276
15	24	24	40	317	148	59	10	65	24	6	16	99	12	100	19	3	11	449	74	263
16	24	24	96	310	146	60	18	64	25	10	16	111	12	90	22	3	10	517	77	251
17	24	24	43	320	153	65	10	69	29	6	17	115	11	92	23	3	11	553	74	264
18	24	24	575	302	177	70	10	64	30	6	17	126	10	88	24	3	12	534	65	247
19	24	24	311	293	157	66	15	70	28	9	17	117	10	101	22	3	12	534	64	278
20	24	24	828	146	162	63	9	79	26	5	17	97	7	101	17	2	11	403	46	264
21	24	24	0	0	0	5	2	3	0	0	0	0	0	0	0	0	0	0	0	0
22	24	24	35	0	2	8	18	34	1	1	7	77	9	51	16	0	0	10	9	7
23	24	24	345	198	202	78	18	71	28	4	15	109	5	68	22	1	8	375	63	158
24	24	24	0	266	158	68	15	69	29	9	18	103	11	80	20	3	10	520	36	199
25	24	24	0	328	178	60	15	52	25	9	13	115	10	96	22	3	11	491	76	234
26	24	24	125	288	181	65	10	92	29	6	15	124	10	96	22	3	11	526	67	270
27	24	24	66	350	150	66	8	58	27	5	15	113	15	88	22	4	10	577	94	265
28	24	24	258	296	163	68	23	64	28	13	16	113	15	88	22	4	10	521	94	242
29	24	24																		
30	24	24																		
31	24	24																		

14146 1805 6315

* The Commerce Refuse-to-Energy Facility underwent its annual maintenance outage from May 21-25, 1996.

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
COMMERCE REFUSE-TO-ENERGY FACILITY EMISSION REPORT

MONTHLY OPERATIONS SUMMARY
JUNE 1996

Day	Moni- tor On	In Opera- tion	Nat Gas SCF x 1000	Ref. Comb tons	Max 15Mn Avg NOx	Maximum 1 Hour Average						24 Hour Average						Total					
						ppm			lbs per hr			ppm - Corr			lbs per hr			ppm - Corr			lbs per hr		
						NOx	SOx	CO	NOx	SOx	CO	NOx	SOx	CO	NOx	SOx	CO	NOx	SOx	CO	NOx	SOx	CO
01	24	13	469	131	165	65	16	71	28	10	17	61	6	67	11	2	8	262	42	182	262	42	182
02	24	24	180	313	198	66	13	60	28	7	15	116	14	83	21	4	9	516	86	218	516	86	218
03	24	24	2	296	170	67	14	64	30	9	16	121	11	79	24	3	9	585	74	227	585	74	227
04	24	24	0	289	151	67	16	65	32	9	16	105	9	76	21	3	9	515	63	225	515	63	225
05	24	24	77	358	163	74	14	59	32	8	15	120	11	91	24	3	11	585	75	262	585	75	262
06	24	24	240	285	191	80	23	79	31	13	17	116	14	85	23	4	10	548	91	243	548	91	243
07	24	24	57	302	194	78	7	64	32	4	17	120	17	91	22	2	10	538	45	250	538	45	250
08	24	24	0	310	210	82	5	67	32	3	15	129	6	78	25	2	9	599	39	213	599	39	213
09	24	24	32	285	180	77	6	63	28	3	15	100	6	90	19	2	10	452	40	247	452	40	247
10	24	24	23	311	166	64	11	61	26	6	14	116	5	92	21	1	10	512	32	240	512	32	240
11	24	24	130	322	145	63	6	69	27	4	17	114	6	94	22	2	11	524	38	262	524	38	262
12	24	24	9	312	156	66	4	72	28	2	17	110	4	101	21	1	12	489	25	279	489	25	279
13	24	24	254	285	179	64	13	71	26	7	17	117	11	105	22	3	12	529	74	278	529	74	278
14	24	12	337	183	198	59	20	66	25	11	18	53	12	52	11	4	6	258	92	156	258	92	156
15	24	24	0	304	125	59	12	58	25	9	14	98	12	70	20	3	9	478	83	204	478	83	204
16	24	24	76	264	130	56	15	55	24	9	13	100	14	75	20	4	9	469	90	211	469	90	211
17	24	24	0	317	141	57	10	73	25	6	17	104	12	86	20	3	10	489	83	240	489	83	240
18	24	24	58	340	213	65	17	68	27	10	17	107	14	86	21	4	10	506	90	242	506	90	242
19	24	24	238	330	179	60	9	63	25	5	16	102	13	84	20	4	10	491	89	244	491	89	244
20	24	24	153	305	141	58	12	70	23	6	17	99	12	100	20	3	12	472	81	283	472	81	283
21	24	23	137	336	147	57	14	69	25	8	18	99	10	88	20	3	10	470	64	245	470	64	245
22	24	0	0	0	0	14	4	7	5	2	1	0	0	0	1	0	0	29	5	8	29	5	8
23	24	10	236	178	138	67	35	66	29	21	17	46	12	34	10	3	5	249	81	126	249	81	126
24	24	24	31	293	199	61	15	66	26	9	17	111	12	87	22	3	11	521	77	255	521	77	255
25	24	24	578	215	145	59	26	58	26	15	14	108	14	89	19	4	9	455	87	222	455	87	222
26	24	24	243	345	228*	63	15	71	25	9	16	114	14	109	21	4	12	495	90	277	495	90	277
27	24	24	274	285	163	64	13	72	28	8	17	113	14	91	22	4	10	524	87	249	524	87	249
28	24	24	13	247	147	65	16	58	29	10	15	111	13	75	22	4	9	538	87	224	538	87	224
29	24	24	592	223	159	69	14	63	29	8	17	121	14	65	21	4	8	499	92	180	499	92	180
30	03	24	0	257	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
																					1359	2002	6492

* The 15-minute NOx limit of 225 ppm was exceeded on June 16, but the excursion is within the accuracy of this instrument. The relative accuracy of the Commerce NOx CEMS was measured at 7.06% in a relative accuracy test audit (RATA) performed in December 1995.



SCEC

EMISSIONS TESTS ON ONE FLARE (FLARE NO. 3)

PREPARED FOR:

**COUNTY SANITATION DISTRICTS OF
LOS ANGELES COUNTY**

EQUIPMENT LOCATION:

**Mission Canyon Landfill
2501 N. Sepulveda Blvd.
Los Angeles, California 90049**

TEST DATES:

November 7, 1995

ISSUE DATE:

November 13, 1995

PARAMETERS MEASURED:

Flare Exhaust: NO_x, CO, Volume Flow Rates, Moisture Content

TESTED BY:

**SCEC
1582-1 N. Batavia
Orange, CA 92667**

Report No: 28386

Tested By:

Reviewed By:

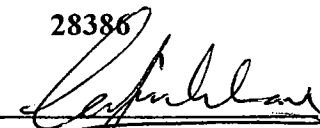
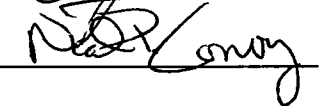



TABLE 1.1
Mission Canyon Landfill Flare No. 3
November 7, 1995
Test Result Overview

Parameter	Units	Results
O ₂	%	12.5
CO ₂	%	7.5
H ₂ O	%	6.39
Temperature	°F	1,249
Volume Flow	DSCFH DSCFM	237,439 3,958
NO _x		
Concentration	ppmv	8.33
Emission Rate as NO ₂	lb/hr	0.24
	lb/day	5.76
	ton/yr	1.05
CO		
Concentration	ppmv	2.38
Emission Rate	lb/hr	0.04
	lb/day	0.96
	ton/yr	0.18

Note: Results are based on the average of two runs.

4.0 - Summary of Results

The results of the test program are summarized in Table 4.1.

TABLE 4.1
Mission Canyon Landfill Flare No. 3
November 7, 1995
Emissions of NO_x and CO

Parameter	Units	Run 1	Run 2	Average
O ₂	%	13.08	11.87	12.48
CO ₂	%	7.0	7.9	7.5
H ₂ O	%	5.72	7.06	6.39
Velocity	ft/sec	5.51	5.76	5.64
Temperature	°F	1214	1284	1249
Volume Flow	DSCFM	3,978	3,937	3,958
NO _x				
Concentration	ppmv	8.395	8.255	8.325
Emission Rate as NO ₂	lb/hr	0.245	0.235	0.240
CO				
Concentration	ppmv	3.76	0.99	2.375
Emission Rate	lb/hr	0.065	0.015	0.040

To: Moon Chung

31K-103.10



South Coast
AIR QUALITY MANAGEMENT DISTRICT

9150 FLAIR DRIVE, EL MONTE, CA 91731 (818) 572-6200

SOURCE TEST REPORT

90-0060

CONDUCTED AT

Los Angeles County Sanitation District
Mission Canyon Landfill
2500 N. Sepulveda Blvd.
West Los Angeles, CA 90064

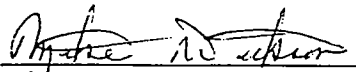
GASEOUS EMISSIONS FROM A LANDFILL CONTROLLED BY A GAS
COLLECTION SYSTEM/FLARES

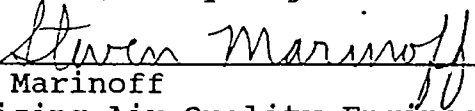
TESTED: March 29, 1990

ISSUED: NOV 01 1990

REPORTED BY: Michael Garibay
Assistant Air Quality Engineer

REVIEWED BY:


Michael D. Wickson
Senior Air Quality Engineer


Steven Marinoff
Supervising Air Quality Engineer

SOURCE TESTING AND MONITORING BRANCH
JOHN HIGUCHI, MANAGER

Marguerite Chung
11-15-90

1990 NOV 15 AM 10:10

17

C.W. CARRY

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
9150 Flair Drive, El Monte, California 91731

Test No. 90-0060

-10-

Date: 3-29-90

TABLE I

INLET GAS COMPOSITION

Inlet Dry Standard Gas Flow Rate

642 dscfm

Compound	Molecular Weight	Concentration (ppm)	Mass Rate (lb/hr)
Vinyl Chloride	62.5	*	-
Benzene	78.1	0.21	17 E- 4
Toluene	92.2	0.88	82 E- 4
Xylene	106.2	1.5	162 E- 4
Chloroform	119.4	0.0042	0.5 E- 4
Trichloroethylene	131.4	0.015	2.0 E- 4
1,1,1-Trichloroethane	133.4	0.0011	0.1 E- 4
Carbon Tetrachloride	153.8	0.00023	3.6 E- 6
Perchloroethylene	165.3	0.0089	1.5 E- 4
Hydrogen Sulfide	34.1	4.6	159 E- 4
Methyl Mercaptan	48.1	< 0.3	< 15 E- 4
Carbonyl Sulfide	60.1	< 0.1	< 6.1 E- 4
Dimethyl Sulfide	62.1	< 0.2	< 13 E- 4
Carbon Disulfide	76.1	< 0.3	< 23 E- 4
Methane	16.0	159000	259
TGNMOC as Hexane	86.2	35.2	0.3

Mass Rate = $1.583 \times 10^{-7} \times \text{MW} \times \text{Flow Rate} \times \text{Conc}$

1 ppm TGNMOC as hexane = 6 ppm TGNMOC as carbon dioxide

* Not analyzed due to interference

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
9150 Flair Drive, El Monte, California 91731

Test No. 90-0060

-11-

Date: 3-29-90

TABLE II

EXHAUST GAS COMPOSITION

Exhaust Dry Standard Flow Rate 4330 dscfm

Compound	Molecular Weight	Concentration (ppm)	Mass Rate (lb/hr)
Vinyl Chloride	62.5	*	-
Benzene	78.1	0.0082	44 E- 5
Toluene	92.2	0.0056	35 E- 5
Xylene	106.2	*	-
Chloroform	119.4	< 0.0004	< 3.3 E- 5
Trichloroethylene	131.4	< 0.0001	< 0.9 E- 5
1,1,1-Trichloroethane	133.4	0.0011	10 E- 5
Carbon Tetrachloride	153.8	0.00028	3.0 E- 5
Perchloroethylene	165.3	0.0012	14 E- 5
Hydrogen Sulfide	34.1	< 1	< 23 E- 3
Methyl Mercaptan	48.1	< 0.3	< 9.9 E- 3
Carbonyl Sulfide	60.1	< 0.1	< 4.1 E- 3
Dimethyl Sulfide	62.1	< 0.2	< 8.5 E- 3
Carbon Disulfide	76.1	< 0.3	< 1.6 E- 3
Methane	16.0	1630	18
TGNMOC as Hexane	86.2	12	0.7
Carbon Monoxide	28.0	505	9.7
Nitrogen Oxides	46.0	4	0.1

Mass Rate = $1.583 \times 10^{-7} \times \text{MW} \times \text{Flow Rate} \times \text{Conc.}$

1 ppm TGNMOC as hexane = 6 ppm TGNMOC as carbon dioxide

* Not analyzed due to interference

**EMISSIONS TESTS ON
FOUR FLARES AT PUENTE HILLS LANDFILL
FLARES No. 9, 10, 11, 12**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICT
Whittier, California**

Prepared By:

**Robert A. Finken
Craig H. Fry**

CARNOT

formerly the California Division of
ENERGY SYSTEMS ASSOCIATES

Tustin, California

JUNE 1990

CR 75000-2099

Flares 9, 10, 11, 12

5/7-11/90

TABLE 4-1
GENERAL RESULTS
FLARE NO. 9

Puente Hills

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	4.8	--	4.8	12.85	11.00	11.92
CO ₂ , (% Dry)	28.1	29.6	28.5	7.6	9.0	8.3
H ₂ O, (%)	7.3	6.3	6.8	10.7	11.2	11.0
Flow Rate (dscfm)	682	686	684	9,963	8,431	9,197
Temperature (°F)	117.0	--	117.0	1,693	1,782	1,738
NO _x :						
ppm	--	--	--	14.8	20.2	17.5
ppm @ 3% O ₂	--	--	--	32.9	36.5	34.7
lb/hr	--	--	--	1.07	1.24	1.15
CO:						
ppm	16.3	18.0	17.2	7.0	3.7	5.4
ppm @ 3% O ₂	--	--	--	15.6	6.7	11.2
lb/hr	--	--	--	0.31	0.14	0.22
HC:						
CH ₄ ppm	352,000	360,000	356,000	<1	2.07	<1.54
Total NMHC ppm as CH ₄	4,309	4,302	4,306	<1	<1	<1
Total NMHC as CH ₄ ppm @ 3% O ₂	4,791	4,783	4,787	<2.2	<1.8	<2.0
Total NMHC lb/hr as CH ₄	7.43	7.47	7.45	<0.03	<0.02	<0.03
Destruction Eff. %	--	--	--	--	--	>99.60
HCl:						
ppm	--	--	--	26.2	6.1	16.1
ppm @ 3% O ₂	--	--	--	58.3	11.0	34.7
lb/hr	--	--	--	1.49	0.29	0.89
Particulate:						
Organic Fraction grains/DSCF	--	--	--	0.0005	0.0003	0.0004
Inorganic Fraction grains/DSCF	--	--	--	0.0028	0.0044	0.0036
Total Particulate grains/DSCF	--	--	--	0.0034	0.0047	0.0041
Total lb/hr				0.29	0.34	0.32
Sulfur Compounds						
H ₂ S, (ppm)			29			
Methyl Mercaptan (ppm)			1.5			
Ethyl Mercaptan (ppm)			0.2			
Dimethyl Sulfide (ppm)			2.0			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.4			

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 9

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride lb/hr	7,100 6.52×10^{-2}	ND <0.2 2.47×10^{-5}	>99.96
Chloroform lb/hr	ND <200 2.58×10^{-3}	ND <0.2 3.47×10^{-5}	N/A
1,1,1 trichloroethane lb/hr	1,800 2.60×10^{-2}	ND <0.2 3.88×10^{-5}	>99.85
Carbon Tetrachloride lb/hr	ND <200 3.33×10^{-3}	ND <0.2 4.47×10^{-5}	N/A
1,1-dichloroethene lb/hr	ND <200 2.10×10^{-3}	ND <0.2 2.82×10^{-5}	N/A
Trichloroethylene lb/hr	1,700 2.42×10^{-2}	ND <0.2 3.82×10^{-5}	>99.84
Tetrachloroethylene lb/hr	3,600 6.46×10^{-2}	0.3 7.23×10^{-5}	99.89
Chlorobenzene lb/hr	ND <1,000 1.22×10^{-2}	ND <1 1.64×10^{-4}	N/A
Vinyl Chloride lb/hr	2,400 1.62×10^{-2}	ND <0.2 1.82×10^{-5}	>99.89
1,2-dichlorobenzene lb/hr	ND <200 3.18×10^{-3}	ND <1 2.14×10^{-4}	N/A
1,3-dichlorobenzene lb/hr	ND <200 3.18×10^{-3}	ND <0.4 8.55×10^{-5}	N/A
1,4-dichlorobenzene lb/hr	700 1.1×10^{-2}	ND <0.4 8.55×10^{-5}	>99.23
1,1-dichloroethane lb/hr	1,800 1.93×10^{-2}	ND <0.2 2.88×10^{-5}	>99.85

Continued

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 9

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane lb/hr	ND <200 2.14×10^{-3}	ND <0.2 2.88×10^{-5}	N/A
Benzene lb/hr	2,500 2.11×10^{-2}	0.8 9.09×10^{-5}	99.57
Toluene lb/hr	30,000 3.02×10^{-1}	3.1 4.20×10^{-4}	99.86
Acetonitrile lb/hr	ND <5,000 2.22×10^{-2}	ND <5 2.98×10^{-4}	N/A
Xylenes lb/hr	33,000 3.79×10^{-1}	ND <3 4.63×10^{-4}	>99.88
1,2-dibromoethane lb/hr	ND <400 8.13×10^{-3}	ND <2 5.46×10^{-4}	N/A
Benzyl Chlorides lb/hr	ND <400 5.48×10^{-3}	ND <1 1.84×10^{-4}	N/A

ND indicates that the species was not detected. Values in parenthesis indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

NOTE: all calculations use ppb and 60°F

TABLE 4-3
GENERAL RESULTS
FLARE NO. 10

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	4.8	—	4.8	14.45	15.42	14.94
CO ₂ , (% Dry)	31.7	—	31.7	5.82	5.08	5.45
H ₂ O, (%)	4.9	4.9	4.9	9.5	8.4	9.0
Flow Rate (dscfm)	739	739	739	12,707	10,574	11,641
Temperature (°F)	102	—	102	1,671	1,634	1,653
NO _x :						
ppm	—	—	—	13.4	10.9	12.2
ppm @ 3% O ₂	—	—	—	37.2	35.6	36.4
lb/hr	—	—	—	1.24	0.84	1.04
CO:						
ppm	24.5	19.4	22.0	12.1	6.2	9.2
ppm @ 3% O ₂	—	—	—	33.6	20.3	26.9
lb/hr	—	—	—	0.68	0.29	0.49
HC:						
CH ₄ ppm	385,500	339,500	362,500	<1	<1	<1
Total NMHC ppm as CH ₄	4,885	4,716	4,801	<1	<1	<1
Total NMHC as CH ₄ ppm @ 3% O ₂	5,431	5,243	5,337	<2.8	<3.3	<3.1
Total NMHC lb/hr as CH ₄	9.13	8.81	8.97	<0.03	<0.03	<0.03
Destruction Eff. %	—	—	—	—	—	>99.66
HCl:						
ppm	—	—	—	7.3	3.6	5.5
ppm @ 3% O ₂	—	—	—	20.3	11.8	16.1
lb/hr	—	—	—	0.53	0.22	0.38
Particulate:						
Organic Fraction grains/DSCF	—	—	—	0.0005	0.0006	0.0006
Inorganic Fraction grains/DSCF	—	—	—	0.0038	0.0030	0.0034
Total Particulate grains/DSCF	—	—	—	0.0043	0.0036	0.0040
Total lb/hr	—	—	—	0.46	0.33	0.40
Sulfur Compounds						
H ₂ S, (ppm)			25			
Methyl Mercaptan (ppm)			1.5			
Ethyl Mercaptan (ppm)			0.3			
Dimethyl Sulfide (ppm)			2.0			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.3			

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 10

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride lb/hr	4,700 4.32×10^{-2}	ND <0.2 2.47×10^{-5}	>99.94
Chloroform lb/hr	ND <200 2.58×10^{-3}	ND <0.2 3.47×10^{-5}	N/A
1,1,1 trichloroethane lb/hr	690 9.95×10^{-3}	0.7 1.36×10^{-4}	>98.64
Carbon Tetrachloride lb/hr	ND <200 3.33×10^{-3}	ND <0.2 4.47×10^{-5}	N/A
1,1-dichloroethene lb/hr	ND <200 2.10×10^{-3}	ND <0.2 2.82×10^{-5}	N/A
Trichloroethylene lb/hr	1,400 1.99×10^{-2}	0.4 7.64×10^{-5}	>99.62
Tetrachloroethylene lb/hr	2,100 3.77×10^{-2}	0.3 7.23×10^{-5}	99.81
Chlorobenzene lb/hr	ND <1,000 1.22×10^{-2}	ND <1 1.64×10^{-4}	N/A
Vinyl Chloride lb/hr	2,500 1.69×10^{-2}	ND <0.2 1.82×10^{-5}	>99.89
1,2-dichlorobenzene lb/hr	N/A 0.00	N/A 0.00	N/A
1,3-dichlorobenzene lb/hr	ND <200 3.18×10^{-3}	ND <0.4 8.55×10^{-5}	N/A
1,4-dichlorobenzene lb/hr	200 3.18×10^{-2}	ND <0.4 8.55×10^{-5}	>99.23
1,1-dichloroethane lb/hr	1,500 1.61×10^{-2}	ND <0.2 2.88×10^{-5}	>99.82

Continued

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 10

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane lb/hr	ND <200 2.14×10^{-3}	ND <0.2 2.88×10^{-5}	N/A
Benzene lb/hr	1,900 1.60×10^{-2}	ND <0.2 2.27×10^{-5}	99.86
Toluene lb/hr	23,000 2.32×10^{-1}	4.8 6.50×10^{-4}	99.72
Acetonitrile lb/hr	ND <5,000 2.22×10^{-2}	ND <5 2.98×10^{-4}	N/A
Xylenes lb/hr	14,200 1.63×10^{-1}	ND <3 4.63×10^{-4}	>99.72
1,2-dibromoethane lb/hr	ND <400 8.13×10^{-3}	ND <2 5.46×10^{-4}	N/A
Benzyl Chlorides lb/hr	ND <400 5.48×10^{-3}	ND <1 1.84×10^{-4}	N/A

ND indicates that the species was not detected. Values in parenthesis indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

NOTE: all calculations use ppb and 60°F

TABLE 4-5
GENERAL RESULTS
FLARE NO. 11

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	5.2	—	5.2	15.74	17.31	16.53
CO ₂ , (% Dry)	30.9	30.6	30.8	4.73	3.08	3.91
H ₂ O, (%)	7.5	5.8	6.7	9.9	9.5	9.7
Flow Rate (dscfm)	908	922	915	12,182	14,823	13,503
Temperature (°F)	113	—	113	1,738	1,780	1,759
NO _x :						
ppm	—	—	—	11.5	7.2	9.4
ppm @ 3% O ₂	—	—	—	39.9	35.9	37.9
lb/hr	—	—	—	1.02	0.78	0.90
CO:						
ppm	21.3	22.4	21.9	4.3	3.5	3.9
ppm @ 3% O ₂	—	—	—	14.9	17.5	16.2
lb/hr	—	—	—	0.23	0.23	0.23
HC:						
CH ₄ ppm	386,000	383,000	384,500	<1	<1	<1
Total NMHC ppm	4,490	4,512	4,501	<1	<1	<1
as CH ₄						
Total NMHC as	5,119	5,144	5,132	<3.5	<5.0	<4.3
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	10.31	10.52	10.42	<0.03	0.037	<0.03
Destruction Eff. %	—	—	—	—	—	>99.71
HCl:						
ppm	—	—	—	7.4	3.4	5.4
ppm @ 3% O ₂	—	—	—	25.7	17.0	21.4
lb/hr	—	—	—	0.51	0.29	0.40
Particulate:						
Organic Fraction grains/DSCF	—	—	—	0.0004	0.0005	0.0005
Inorganic Fraction grains/DSCF	—	—	—	0.0027	0.0034	0.0031
Total Particulate grains/DSCF	—	—	—	0.0031	0.0040	0.0036
Total lb/hr	—	—	—	0.32	0.50	0.41
Sulfur Compounds						
H ₂ S, (ppm)			25			
Methyl Mercaptan (ppm)			1.4			
Ethyl Mercaptan (ppm)			0.2			
Dimethyl Sulfide (ppm)			1.9			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.2			

TABLE 4-6
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 11

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride lb/hr	5,700 5.24×10^{-2}	0.6 7.41×10^{-5}	> 99.86
Chloroform lb/hr	ND <200 2.58×10^{-3}	ND <0.2 3.47×10^{-5}	N/A
1,1,1 trichloroethane lb/hr	1,100 1.59×10^{-3}	0.6 1.16×10^{-4}	> 99.27
Carbon Tetrachloride lb/hr	ND <200 3.33×10^{-3}	ND <0.2 4.47×10^{-5}	N/A
1,1-dichloroethene lb/hr	ND <200 2.10×10^{-3}	ND <0.2 2.82×10^{-5}	N/A
Trichloroethylene lb/hr	1,900 2.70×10^{-2}	0.2 3.82×10^{-5}	> 99.86
Tetrachloroethylene lb/hr	3,800 6.82×10^{-2}	0.5 1.21×10^{-5}	99.82
Chlorobenzene lb/hr	ND <1,000 1.22×10^{-2}	ND <1 1.64×10^{-4}	N/A
Vinyl Chloride lb/hr	2,600 1.76×10^{-2}	ND <0.2 1.82×10^{-5}	> 99.90
1,2-dichlorobenzene lb/hr	ND <200 3.18×10^{-3}	ND <1 2.14×10^{-4}	N/A
1,3-dichlorobenzene lb/hr	ND <200 3.18×10^{-3}	ND <0.4 8.55×10^{-5}	N/A
1,4-dichlorobenzene lb/hr	500 7.95×10^{-3}	ND <0.4 8.55×10^{-5}	> 98.92
1,1-dichloroethane lb/hr	1,800 1.93×10^{-2}	ND <0.2 2.88×10^{-5}	> 99.85

Continued

TABLE 4-6
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 11

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane lb/hr	ND <200 2.14×10^{-3}	ND <0.2 2.88×10^{-5}	N/A
Benzene lb/hr	2,800 2.37×10^{-2}	1.8 2.04×10^{-4}	99.14
Toluene lb/hr	33,000 3.32×10^{-1}	4.7 6.37×10^{-4}	99.81
Acetonitrile lb/hr	ND <5,000 2.22×10^{-2}	ND <5 2.98×10^{-4}	N/A
Xylenes lb/hr	33,000 3.79×10^{-1}	5.4 8.34×10^{-4}	>99.78
1,2-dibromoethane lb/hr	ND <400 8.13×10^{-3}	ND <2 5.46×10^{-4}	N/A
Benzyl Chlorides lb/hr	ND <400 5.48×10^{-3}	ND <1 1.84×10^{-4}	N/A

ND indicates that the species was not detected. Values in parenthesis indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

NOTE: all calculations use ppb and 60°F

TABLE 4-7
GENERAL RESULTS
FLARE NO. 12

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	4.5	—	4.5	14.81	16.07	15.44
CO ₂ , (% Dry)	30.7	30.9	30.8	5.26	4.14	4.70
H ₂ O, (%)	6.7	6.2	6.5	9.9	9.0	9.5
Flow Rate (dscfm)	838	841	840	11,728	11,413	11,571
Temperature (°F)	117	—	117	1,698	1,674	1,686
NO _x :						
ppm	—	—	—	11.6	9.2	10.4
ppm @ 3% O ₂	—	—	—	34.1	34.1	34.1
lb/hr	—	—	—	0.21	0.23	0.22
CO:						
ppm	21.9	22.0	22.0	4.1	4.6	4.4
ppm @ 3% O ₂	—	—	—	12.1	17.0	14.6
lb/hr	—	—	—	0.21	0.23	0.22
HC:						
CH ₄ ppm	385,000	386,000	385,500	<1	<1	<1
Total NMHC ppm	4,082	3,872	3,977	<1	<1	<1
as CH ₄						
Total NMHC as	4,455	4,226	4,341	<2.9	<3.7	<3.3
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	8.65	8.24	8.45	<0.03	<0.03	<0.03
Destruction Eff. %	—	—	—	—	—	>99.65
HCl:						
ppm	—	—	—	8.0	5.0	6.5
ppm @ 3% O ₂	—	—	—	23.5	18.5	21.0
lb/hr	—	—	—	0.53	0.32	0.43
Particulate:						
Organic Fraction grains/DSCF	—	—	—	0.0005	0.0006	0.0006
Inorganic Fraction grains/DSCF	—	—	—	0.0029	0.0031	0.0030
Total Particulate grains/DSCF	—	—	—	0.0034	0.0038	0.0036
Total lb/hr	—	—	—	0.34	0.37	0.36
Sulfur Compounds						
H ₂ S, (ppm)			14			
Methyl Mercaptan (ppm)			1.1			
Ethyl Mercaptan (ppm)			0.2			
Dimethyl Sulfide (ppm)			2.0			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.2			

TABLE 4-8
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 12

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride lb/hr	7,800 7.16×10^{-2}	0.6 7.41×10^{-5}	99.90
Chloroform lb/hr	ND <200 2.58×10^{-3}	ND <0.2 3.47×10^{-5}	N/A
1,1,1 trichloroethane lb/hr	1,100 1.59×10^{-3}	1.1 2.13×10^{-4}	98.66
Carbon Tetrachloride lb/hr	ND <200 3.33×10^{-3}	ND <0.2 4.47×10^{-5}	N/A
1,1-dichloroethene lb/hr	ND <200 2.10×10^{-3}	ND <0.2 2.82×10^{-5}	N/A
Trichloroethylene lb/hr	1,900 2.70×10^{-2}	ND <0.2 3.82×10^{-5}	>99.86
Tetrachloroethylene lb/hr	3,800 6.82×10^{-2}	0.5 1.21×10^{-5}	99.82
Chlorobenzene lb/hr	ND <1,000 1.22×10^{-2}	ND <1 1.64×10^{-4}	N/A
Vinyl Chloride lb/hr	2,600 1.76×10^{-2}	ND <0.2 1.82×10^{-5}	>99.90
1,2-dichlorobenzene lb/hr	ND <200 3.18×10^{-3}	ND <1 2.14×10^{-4}	N/A
1,3-dichlorobenzene lb/hr	ND <200 3.18×10^{-3}	ND <0.4 8.55×10^{-5}	N/A
1,4-dichlorobenzene lb/hr	500 7.95×10^{-3}	ND <0.4 8.55×10^{-5}	>98.92
1,1-dichloroethane lb/hr	1,800 1.93×10^{-2}	ND <0.2 2.88×10^{-5}	>99.85

Continued

TABLE 4-8
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 12

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane lb/hr	ND <200 2.14×10^{-3}	ND <0.2 2.88×10^{-5}	N/A
Benzene lb/hr	2,800 2.37×10^{-2}	1.2 1.36×10^{-4}	99.42
Toluene lb/hr	33,000 3.32×10^{-1}	3.2 4.33×10^{-4}	99.87
Acetonitrile lb/hr	ND <5,000 2.22×10^{-2}	ND <5 2.98×10^{-4}	N/A
Xylenes lb/hr	33,000 3.79×10^{-1}	5.4 8.34×10^{-4}	>99.78
1,2-dibromoethane lb/hr	ND <400 8.13×10^{-3}	ND <2 5.46×10^{-4}	N/A
Benzyl Chlorides lb/hr	ND <400 5.48×10^{-3}	ND <1 1.84×10^{-4}	N/A

ND indicates that the species was not detected. Values in parenthesis indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

NOTE: all calculations use ppb and 60°F

**EMISSIONS TESTS ON FOUR FLARES
AT PUENTE HILLS LANDFILL - JULY, 1990**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

AUGUST 1990

CR 78000-2162R

Flares: 13, 14, 15, 16

7/90

TABLE 4-1
GENERAL RESULTS
FLARE NO. 13

Puente Hills

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)			4.8	12.7	12.2	12.5
CO ₂ , (% Dry)			32.8	7.4	7.7	7.6
H ₂ O, (%)	7.7	7.2	7.5	10.8	11.0	10.9
Flow Rate (dscfm)	741	756	749	9,323	8,305	8,814
Temperature (°F)	138	138	138	1,671	1,667	1,669
NO _x :						
ppm	—	—	—	17.4	16.0	16.7
ppm @ 3% O ₂	—	—	—	37.5	32.5	35.0
lb/hr	—	—	—	1.18	0.97	1.07
CO:						
ppm	17.0	16.1	16.6	4.5	4.2	4.4
ppm @ 3% O ₂	—	—	—	9.8	8.6	9.2
lb/hr	—	—	—	0.19	0.15	0.17
HC:						
CH ₄ ppm	419,000	422,000	421,000	<2	<2	<2
Total NMHC ppm as CH ₄	4,955	4,808	4,882	<1	<1	<1
Total NMHC as CH ₄ ppm @ 3% O ₂	6,719	6,282	6,501	<2.2	<2.1	<2.1
Total NMHC lb/hr as CH ₄	9.29	9.19	9.24	<0.02	<0.02	<0.02
Destruction Eff. %						>99.78
Particulate:						
Organic Fraction grains/DSCF	—	—	—	0.0004	0.0000	0.0002
Inorganic Fraction grains/DSCF	—	—	—	0.0042	0.0045	0.0044
Total Particulate grains/DSCF	—	—	—	0.0046	0.0045	0.0046
Total lb/hr	—	—	—	0.37	0.32	0.35
Sulfur Compounds						
H ₂ S, (ppm)			18			
Methyl Mercaptan (ppm)			1.3			
Ethyl Mercaptan (ppm)			0.3			
Dimethyl Sulfide (ppm)			1.7			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.2			

Inlet hydrocarbon results were corrected to 32.8% CO₂ from trace hydrocarbon sample results. Low CO₂ (23%) results of the total hydrocarbons indicated a possible leak in sampling.

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 13

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	5,700 5.73×10^{-2}	ND <0.2 2.37×10^{-5}	>99.96
Chloroform, ppb lb/hr	ND <200 2.83×10^{-3}	ND <0.2 3.33×10^{-5}	N/A
1,1,1 trichloroethane, ppb lb/hr	700 1.11×10^{-2}	ND <0.2 3.72×10^{-5}	>99.66
Carbon Tetrachloride, ppb lb/hr	ND <200 3.64×10^{-3}	ND <0.2 4.29×10^{-5}	N/A
1,1-dichloroethene, ppb lb/hr	300 3.44×10^{-3}	ND <0.4 5.40×10^{-5}	>98.43
Trichloroethylene, ppb lb/hr	1,500 2.33×10^{-2}	ND <0.2 3.66×10^{-5}	>99.84
Tetrachloroethylene, ppb lb/hr	2,600 5.11×10^{-2}	ND <0.2 4.62×10^{-5}	>99.91
Chlorobenzene, ppb lb/hr	ND <400 5.33×10^{-3}	ND <0.4 6.27×10^{-5}	N/A
Vinyl Chloride, ppb lb/hr	3,100 2.29×10^{-2}	ND <0.2 1.74×10^{-5}	>99.92
1,2-dichlorobenzene, ppb lb/hr	ND <400 6.96×10^{-3}	ND <0.2 4.10×10^{-5}	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <400 6.96×10^{-3}	ND <0.2 4.10×10^{-5}	N/A
1,4-dichlorobenzene, ppb lb/hr	ND <400 6.96×10^{-3}	ND <0.2 4.10×10^{-5}	N/A
1,1-dichloroethane, ppb lb/hr	1,800 2.11×10^{-2}	ND <0.2 2.76×10^{-5}	>99.87

Continued

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 13

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 2.34×10^{-3}	ND <0.2 2.76×10^{-5}	N/A
Benzene, ppb lb/hr	2,300 2.13×10^{-2}	1.3 1.42×10^{-4}	99.33
Toluene, ppb lb/hr	27,000 2.98×10^{-1}	4.6 5.97×10^{-4}	99.80
Acetonitrile, ppb lb/hr	ND <5,000 2.43×10^{-2}	ND <5 2.86×10^{-4}	N/A
Xylenes, ppb lb/hr	17,300 2.18×10^{-1}	2.9 4.29×10^{-4}	99.80
1,2-dibromoethane, ppb lb/hr	ND <1,000 2.22×10^{-2}	ND <1 2.62×10^{-4}	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 3.00×10^{-2}	ND <2 3.53×10^{-4}	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

Corresponding lb/hr value of non-detect species is also less than (<) the calculated amount shown on table.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
GENERAL RESULTS
FLARE NO. 14

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)			3.9	13.1	13.1	13.1
CO ₂ , (% Dry)			32.7	6.3	7.1	6.7
H ₂ O, (%)	6.2	8.8	7.5	11.1	8.1	9.6
Flow Rate (dscfm)	782	766	774	9,426	9,769	9,598
Temperature (°F)	148	148	148	1,702	1,683	1,693
NO _x :						
ppm	--	--	--	15.5	15.7	15.6
ppm @ 3% O ₂	--	--	--	35.8	35.6	35.7
lb/hr	--	--	--	1.06	1.12	1.09
CO:						
ppm	20.1	22.0	21.1	4.4	6.3	5.4
ppm @ 3% O ₂	--	--	--	9.9	14.5	12.2
lb/hr	--	--	--	0.18	0.27	0.22
HC:						
CH ₄ ppm	429,000	431,000	430,000	<1	<1	<1
Total NMHC ppm	4,523	4,277	4,400	12.7	6.1	9.4
as CH ₄						
Total NMHC as	4,762	4,503	4,633	29.1	14.0	21.6
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	8.95	8.29	8.62	0.30	0.15	0.23
Destruction Eff. %						97.33
Particulate:						
Organic Fraction grains/DSCF				0.0002	0.0006	0.0004
Inorganic Fraction grains/DSCF				0.0077	0.0040	0.0059
Total Particulate grains/DSCF				0.0079	0.0046	0.0063
Total lb/hr				0.64	0.39	0.52
Sulfur Compounds						
H ₂ S, (ppm)			31			
Methyl Mercaptan (ppm)			1.5			
Ethyl Mercaptan (ppm)			0.3			
Dimethyl Sulfide (ppm)			1.7			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.3			

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 14

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	5,800 5.76×10^{-2}	ND <0.2 2.85×10^{-5}	>99.96
Chloroform, ppb lb/hr	ND <200 2.79×10^{-3}	ND <0.2 3.62×10^{-5}	N/A
1,1,1 trichloroethane, ppb lb/hr	700 1.09×10^{-2}	0.5 1.01×10^{-4}	99.07
Carbon Tetrachloride, ppb lb/hr	ND <200 3.59×10^{-3}	ND <0.2 4.67×10^{-5}	N/A
1,1-dichloroethene, ppb lb/hr	ND <400 4.53×10^{-3}	ND <0.4 5.88×10^{-5}	N/A
Trichloroethylene, ppb lb/hr	1,900 2.92×10^{-2}	ND <0.2 3.99×10^{-5}	>99.86
Tetrachloroethylene, ppb lb/hr	3,900 7.56×10^{-2}	0.3 7.55×10^{-5}	99.90
Chlorobenzene, ppb lb/hr	500 6.58×10^{-3}	ND <0.4 6.83×10^{-5}	>98.96
Vinyl Chloride, ppb lb/hr	1,300 9.49×10^{-3}	ND <0.2 1.90×10^{-5}	>99.80
1,2-dichlorobenzene, ppb lb/hr	ND <200 3.44×10^{-3}	ND <0.2 4.46×10^{-5}	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <200 3.44×10^{-3}	ND <0.2 4.46×10^{-5}	N/A
1,4-dichlorobenzene, ppb lb/hr	ND <200 3.44×10^{-3}	ND <0.2 4.46×10^{-5}	N/A
1,1-dichloroethane, ppb lb/hr	1,700 1.97×10^{-2}	ND <0.2 3.00×10^{-5}	>99.85

Continued

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 14

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 2.31×10^{-3}	ND <0.2 3.00×10^{-5}	N/A
Benzene, ppb lb/hr	2,600 2.37×10^{-2}	1.1 1.30×10^{-4}	99.45
Toluene, ppb lb/hr	51,000 5.55×10^{-1}	19 2.69×10^{-3}	99.52
Acetonitrile, ppb lb/hr	ND <5,000 2.40×10^{-2}	8 4.98×10^{-4}	<97.92
Xylenes, ppb lb/hr	25,000 3.10×10^{-1}	5.9 9.51×10^{-4}	99.69
1,2-dibromoethane, ppb lb/hr	ND <1,000 2.20×10^{-2}	ND <1 2.85×10^{-4}	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 2.96×10^{-2}	ND <2 3.84×10^{-4}	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

Corresponding lb/hr value of non-detect species is also less than (<) the calculated amount shown on table.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-5
GENERAL RESULTS
FLARE NO. 15

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	—	—	4.2	12.5	12.6	12.6
CO ₂ , (% Dry)	—	—	32.6	7.1	7.2	7.2
H ₂ O, (%)	7.5	7.7	7.6	10.5	11.2	10.9
Flow Rate (dscfm)	755	753	754	10,927	10,637	10,782
Temperature (°F)	132	132	132	1,617	1,697	1,657
NO _x :						
ppm	—	—	—	14.2	15.1	14.7
ppm @ 3% O ₂	—	—	—	30.1	33.6	31.9
lb/hr	—	—	—	1.13	1.17	1.15
CO:						
ppm	22.2	18.5	20.4	2.4	2.8	2.6
ppm @ 3% O ₂	—	—	—	5.1	6.0	5.6
lb/hr	—	—	—	0.12	0.13	0.13
HC:						
CH ₄ ppm	392,000	386,000	389,000	<1	5.5	<3.3
Total NMHC ppm	4,375	3,977	4,176	5.5	4.6	5.1
as CH ₄						
Total NMHC as	4,689	4,263	4,476	11.7	9.9	10.8
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	8.36	7.58	7.97	0.15	0.12	0.14
Destruction Eff. %						98.24
Particulate:						
Organic Fraction grains/DSCF				0.0000	0.0000	0.0000
Inorganic Fraction grains/DSCF				0.0039	0.0054	0.0047
Total Particulate grains/DSCF				0.0039	0.0054	0.0047
Total lb/hr				0.37	0.49	0.43
Sulfur Compounds						
H ₂ S, (ppm)			25			
Methyl Mercaptan (ppm)			1.5			
Ethyl Mercaptan (ppm)			0.3			
Dimethyl Sulfide (ppm)			1.9			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.3			

TABLE 4-6
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 15

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	5,200 5.27×10^{-2}	ND <0.2 2.90×10^{-5}	>99.95
Chloroform, ppb lb/hr	ND <200 2.85×10^{-3}	ND <0.2 4.07×10^{-5}	N/A
1,1,1 trichloroethane, ppb lb/hr	600 9.54×10^{-3}	ND <0.2 4.55×10^{-5}	>99.52
Carbon Tetrachloride, ppb lb/hr	ND <200 3.67×10^{-3}	ND <0.2 5.24×10^{-5}	N/A
1,1-dichloroethene, ppb lb/hr	ND <400 4.62×10^{-3}	ND <0.4 6.61×10^{-5}	N/A
Trichloroethylene, ppb lb/hr	1,400 2.19×10^{-2}	ND <0.2 4.48×10^{-5}	>99.80
Tetrachloroethylene, ppb lb/hr	2,000 3.95×10^{-2}	ND <0.2 5.65×10^{-5}	>99.86
Chlorobenzene, ppb lb/hr	ND <400 5.37×10^{-2}	ND <0.4 7.68×10^{-5}	N/A
Vinyl Chloride, ppb lb/hr	1,800 1.34×10^{-2}	ND <0.2 2.13×10^{-5}	>99.84
1,2-dichlorobenzene, ppb lb/hr	ND <200 3.50×10^{-3}	ND <0.2 5.01×10^{-5}	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <200 3.50×10^{-3}	ND <0.2 5.01×10^{-5}	N/A
1,4-dichlorobenzene, ppb lb/hr	ND <200 3.50×10^{-3}	ND <0.2 5.01×10^{-5}	N/A
1,1-dichloroethane, ppb lb/hr	1,500 1.77×10^{-2}	ND <0.2 3.37×10^{-5}	>99.81

Continued

TABLE 4-6
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 15

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 2.36×10^{-3}	ND <0.2 3.37×10^{-5}	N/A
Benzene, ppb lb/hr	2,200 2.05×10^{-2}	0.9 1.20×10^{-4}	99.42
Toluene, ppb lb/hr	35,000 3.89×10^{-1}	3.9 6.19×10^{-4}	99.84
Acetonitrile, ppb lb/hr	ND <5,000 2.45×10^{-2}	ND <33 2.31×10^{-3}	>90.56
Xylenes, ppb lb/hr	17,500 2.21×10^{-1}	1.9 3.44×10^{-4}	99.84
1,2-dibromoethane, ppb lb/hr	ND <1,000 2.24×10^{-2}	ND <2 3.20×10^{-4}	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 3.02×10^{-2}	ND <2 4.32×10^{-4}	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

Corresponding lb/hr value of non-detect species is also less than (<) the calculated amount shown on table.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-7
GENERAL RESULTS
FLARE NO. 16

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)			6.7	11.9	13.1	12.5
CO ₂ , (% Dry)			29.3	8.2	7.1	7.7
H ₂ O, (%)	7.6	8.5	8.1	9.9	7.8	8.9
Flow Rate (dscfm)	717	712	715	9,195	8,761	8,978
Temperature (°F)	139	139	139	1,650	1,740	1,695
NO _x :						
ppm	—	—	—	20.0	16.8	18.4
ppm @ 3% O ₂	—	—	—	39.4	38.1	38.8
lb/hr	—	—	—	1.34	1.07	1.21
CO:						
ppm	21.2	17.5	19.4	6.2	2.9	4.6
ppm @ 3% O ₂	—	—	—	12.2	6.6	9.4
lb/hr	—	—	—	0.25	0.11	0.18
HC:						
CH ₄ ppm	419,000	348,000	383,500	<0.5	<0.5	<0.5
Total NMHC ppm	5,089	4,219	4,654	8.5	6.9	7.7
as CH ₄						
Total NMHC as	6,415	5,318	5,867	16.9	15.8	16.4
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	9.23	7.60	8.41	0.20	0.15	0.18
Destruction Eff. %						97.91
Particulate:						
Organic Fraction grains/DSCF	—	—	—	0.0013	0.0004	0.0009
Inorganic Fraction grains/DSCF	—	—	—	0.0073	0.0040	0.0057
Total Particulate grains/DSCF	—	—	—	0.0086	0.0044	0.0065
Total lb/hr	—	—	—	0.67	0.33	0.50
Sulfur Compounds						
H ₂ S, (ppm)			25			
Methyl Mercaptan (ppm)			1.2			
Ethyl Mercaptan (ppm)			0.3			
Dimethyl Sulfide (ppm)			1.6			
Carbonyl Sulfide (ppm)			0.1			
Carbon Disulfide (ppm)			0.2			

TABLE 4-8
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 16

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	3,300 3.17×10^{-2}	ND <0.2 2.41×10^{-5}	>99.92
Chloroform, ppb lb/hr	ND <200 2.70×10^{-3}	ND <0.2 3.39×10^{-5}	N/A
1,1,1 trichloroethane, ppb lb/hr	400 6.03×10^{-3}	ND <0.2 3.79×10^{-5}	>99.37
Carbon Tetrachloride, ppb lb/hr	ND <200 3.48×10^{-3}	ND <0.2 4.37×10^{-5}	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 2.19×10^{-3}	ND <0.4 5.50×10^{-5}	N/A
Trichloroethylene, ppb lb/hr	1,100 1.63×10^{-2}	ND <0.2 3.73×10^{-5}	>99.77
Tetrachloroethylene, ppb lb/hr	2,300 4.31×10^{-2}	ND <0.2 4.71×10^{-5}	>99.89
Chlorobenzene, ppb lb/hr	ND <400 5.09×10^{-3}	ND <0.4 6.39×10^{-5}	N/A
Vinyl Chloride, ppb lb/hr	1,500 1.06×10^{-2}	ND <0.2 1.77×10^{-5}	>99.83
1,2-dichlorobenzene, ppb lb/hr	ND <400 6.65×10^{-3}	ND <0.2 4.17×10^{-5}	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <400 6.65×10^{-3}	ND <0.2 4.17×10^{-5}	N/A
1,4-dichlorobenzene, ppb lb/hr	ND <400 6.65×10^{-3}	ND <0.2 4.17×10^{-5}	N/A
1,1-dichloroethane, ppb lb/hr	1,000 1.12×10^{-2}	ND <0.2 2.81×10^{-5}	>99.75

Continued

TABLE 4-8
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 16

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 2.24×10^{-3}	ND <0.2 2.81×10^{-5}	N/A
Benzene, ppb lb/hr	1,400 1.24×10^{-2}	1.2 1.33×10^{-4}	98.92
Toluene, ppb lb/hr	24,000 2.53×10^{-1}	3.1 4.10×10^{-4}	99.84
Acetonitrile, ppb lb/hr	ND <5,000 2.32×10^{-2}	8 4.66×10^{-4}	<97.99
Xylenes, ppb lb/hr	17,400 2.09×10^{-1}	3.4 3.62×10^{-4}	99.83
1,2-dibromoethane, ppb lb/hr	ND <1,000 2.12×10^{-2}	ND <1 2.67×10^{-4}	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 2.86×10^{-2}	ND <2 3.59×10^{-4}	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

Corresponding lb/hr value of non-detect species is also less than (<) the calculated amount shown on table.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-9
TRACE ORGANICS SPECIES RESULTS
AMBIENT AIR

	ppb
Methylene Chloride	2.4
Chloroform	ND <0.2
1,1,1 trichloroethane	3.6
Carbon Tetrachloride	0.4
1,1-dichloroethene	ND <0.2
Trichloroethylene	0.2
Tetrachloroethylene	1.1
Chlorobenzene	ND <0.4
Vinyl Chloride	ND <0.4
1,2-dichlorobenzene	ND <0.4
1,3-dichlorobenzene	ND <0.4
1,4-dichlorobenzene	ND <0.4
1,1-dichloroethane	ND <0.2
1,2-dichloroethane	ND <0.2
Benzene	2.5
Toluene	6.8
Acetonitrile	ND <5.0
Xylenes	<7.4
1,2-dibromoethane	ND <1.0
Benzyl Chloride	ND <2.0

ND indicates that the species was not detected. Values indicate the detection limit for these species.

**EMISSIONS TESTS ON FOUR FLARES
PUENTE HILLS LANDFILL - OCTOBER 1990**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

JANUARY 1991

CR 76200-2245

TABLE 4-1
GENERAL RESULTS
FLARE NO. 2

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	4.5		4.5	12.7	12.7	12.7
CO ₂ , (% Dry)	31.2		31.2	7.3	7.2	7.3
H ₂ O, (%)	5.6	8.0	6.8	9.8	9.9	9.9
Flow Rate (dscfm)	821	839	830	9,921	10,577	10,249
Temperature (°F)	150	153	152	1,702	1,693	1,698
NO _x :						
ppm				18.4	18.1	18.3
ppm @ 3% O ₂				40.2	39.5	39.9
lb/hr				1.33	1.39	1.36
CO:						
ppm				4.1	5.2	4.7
ppm @ 3% O ₂				9.0	11.4	10.2
lb/hr				0.18	0.24	0.21
HC:						
CH ₄ ppm	422,000	412,000	417,000	7.0	10.2	8.6
Total NMHC ppm	5,913	5,397	5,655	<1	1.7	<1.4
as CH ₄	6,464	5,891	6,172	<2.2	3.7	<3.0
Total NMHC as						
CH ₄ ppm @ 3% O ₂	12.28	11.45	11.87	<0.03	0.05	<0.04
Total NMHC lb/hr as CH ₄				>99.76	99.56	>99.66
Destruction Eff. %						
Particulate:						
Organic Fraction grains/DSCF				0.0006	0.0007	0.0007
Inorganic Fraction grains/DSCF				0.0060	0.0033	0.0047
Total Particulate grains/DSCF				0.0066	0.0040	0.0053
Total lb/hr				0.56	0.37	0.47
Sulfur Compounds						
H ₂ S, (ppm)			32			
Methyl Mercaptan (ppm)			1.6			
Ethyl Mercaptan (ppm)			0.3			
Dimethyl Sulfide (ppm)			2.4			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.4			

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 2

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	9,000 1.00×10^{-1}	ND <0.4 $<5.51 \times 10^{-5}$	>99.95
Chloroform, ppb lb/hr	ND <400 6.27×10^{-3}	ND <0.4 $<7.74 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	690 1.21×10^{-2}	ND <0.4 $<8.65 \times 10^{-5}$	>99.28
Carbon Tetrachloride, ppb lb/hr	ND <400 $<8.08 \times 10^{-3}$	ND <0.4 $<9.97 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <2,000 $<2.54 \times 10^{-2}$	ND <2 $<3.14 \times 10^{-4}$	N/A
Trichloroethylene, ppb lb/hr	1,800 3.10×10^{-2}	ND <0.4 $<8.52 \times 10^{-5}$	>99.73
Tetrachloroethylene, ppb lb/hr	3,200 6.96×10^{-2}	1.6 4.30×10^{-4}	99.38
Chlorobenzene, ppb lb/hr	ND <1,000 $<1.48 \times 10^{-2}$	ND <1 $<1.82 \times 10^{-4}$	N/A
Vinyl Chloride, ppb lb/hr	1,100 9.02×10^{-3}	ND <0.4 $<4.05 \times 10^{-5}$	>99.55
1,2-dichlorobenzene, ppb lb/hr	ND <1,000 $<1.93 \times 10^{-2}$	ND <1 $<2.38 \times 10^{-4}$	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <1,000 $<1.93 \times 10^{-2}$	ND <1 $<2.38 \times 10^{-4}$	N/A
1,4-dichlorobenzene, ppb lb/hr	ND <1,000 $<1.93 \times 10^{-2}$	ND <1 $<2.38 \times 10^{-4}$	N/A
1,1-dichloroethane, ppb lb/hr	2,300 2.99×10^{-2}	ND <1 $<1.60 \times 10^{-4}$	>99.46

Continued

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 2

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <400 $<5.19 \times 10^{-3}$	ND <0.4 $<6.41 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	4,200 4.31×10^{-2}	1.3 1.65×10^{-4}	99.62
Toluene, ppb lb/hr	44,000 5.32×10^{-1}	3.5 5.23×10^{-4}	99.90
Acetonitrile, ppb lb/hr	ND <2,000 $<1.08 \times 10^{-2}$	ND <2 $<1.33 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	29,000 4.04×10^{-1}	2.5 4.30×10^{-4}	99.89
1,2-dibromoethane, ppb lb/hr	ND <2,000 $<4.93 \times 10^{-2}$	ND <2 $<6.09 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <5,000 $<8.31 \times 10^{-2}$	ND <5 $<1.03 \times 10^{-3}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
GENERAL RESULTS
FLARE NO. 3

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	5.7	5.45	5.7	13.1	12.0	12.6
CO ₂ , (% Dry)	29.8	28.49	29.8	6.8	8.1	7.5
H ₂ O, (%)	4.4	4.4	4.4	9.0	10.6	9.8
Flow Rate (dscfm)	776	776	776	9,957	10,210	10,084
Temperature (°F)	120	126	123	1,598	1,715	1,657
NO _x :						
ppm				15.4	18.8	17.1
ppm @ 3% O ₂				35.3	37.8	36.6
lb/hr				1.12	1.40	1.25
CO:						
ppm				4.3	5.2	4.8
ppm @ 3% O ₂				9.9	10.5	10.2
lb/hr				0.19	0.24	0.21
HC:						
CH ₄ ppm	406,000	388,811	397,405	<1	<1	<1
Total NMHC ppm						
as CH ₄	5,724	6,397	6,061	<1	<1	<1
Total NMHC as CH ₄ ppm @ 3% O ₂	6,740	7,533	7,138	<2.3	<2.0	<2.2
Total NMHC lb/hr as CH ₄	11.24	12.56	11.90	<0.03	<0.03	<0.03
Destruction Eff. %				>99.73	>99.76	>99.75
Particulate:						
Organic Fraction grains/DSCF				0.0000	0.0001	0.0001
Inorganic Fraction grains/DSCF				0.0035	0.0040	0.0038
Total Particulate grains/DSCF				0.0035	0.0041	0.0039
Total lb/hr				0.30	0.36	0.33
Sulfur Compounds						
H ₂ S, (ppm)			34			
Methyl Mercaptan (ppm)			1.5			
Ethyl Mercaptan (ppm)			0.2			
Dimethyl Sulfide (ppm)			2.1			
Carbonyl Sulfide (ppm)			0.3			
Carbon Disulfide (ppm)			0.3			

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 3

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	5,700 5.94×10^{-2}	ND <0.4 $<5.42 \times 10^{-5}$	>99.91
Chloroform, ppb lb/hr	ND <100 $<1.46 \times 10^{-3}$	ND <0.4 $<7.61 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	700 1.15×10^{-2}	ND <0.4 $<8.51 \times 10^{-5}$	>99.26
Carbon Tetrachloride, ppb lb/hr	ND <100 $<1.89 \times 10^{-3}$	ND <0.4 $<9.81 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	200 2.38×10^{-3}	ND <2 $<3.09 \times 10^{-4}$	>87.01
Trichloroethylene, ppb lb/hr	1,400 2.26×10^{-2}	ND <0.4 $<8.38 \times 10^{-5}$	>99.63
Tetrachloroethylene, ppb lb/hr	2,500 5.09×10^{-2}	0.9 2.38×10^{-4}	99.53
Chlorobenzene, ppb lb/hr	ND <400 $<5.52 \times 10^{-3}$	ND <1 $<1.79 \times 10^{-4}$	N/A
Vinyl Chloride, ppb lb/hr	1,800 1.38×10^{-2}	ND <0.4 $<3.99 \times 10^{-5}$	>99.71
1,2-dichlorobenzene, ppb lb/hr	ND <1,000 $<1.80 \times 10^{-2}$	ND <1 $<2.34 \times 10^{-4}$	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <1,000 $<1.80 \times 10^{-2}$	ND <1 $<2.34 \times 10^{-4}$	N/A
1,4-dichlorobenzene, ppb lb/hr	ND <1,000 $<1.80 \times 10^{-2}$	ND <1 $<2.34 \times 10^{-4}$	N/A
1,1-dichloroethane, ppb lb/hr	2,000 2.43×10^{-2}	ND <1 $<1.58 \times 10^{-4}$	>99.35

Continued

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 3

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <100 $<1.21 \times 10^{-3}$	ND <0.4 $<6.31 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	3,700 3.55×10^{-2}	1.4 1.74×10^{-4}	99.51
Toluene, ppb lb/hr	29,000 3.28×10^{-1}	3.8 5.58×10^{-4}	99.83
Acetonitrile, ppb lb/hr	ND <5,000 $<2.52 \times 10^{-2}$	ND <2 $<1.31 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	15,800 2.06×10^{-1}	3.6 6.09×10^{-4}	99.70
1,2-dibromoethane, ppb lb/hr	ND <1,000 $<2.30 \times 10^{-2}$	ND <2 $<5.99 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 $<3.11 \times 10^{-2}$	ND <5 $<1.01 \times 10^{-3}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-5
GENERAL RESULTS
FLARE NO. 4

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	4.5		4.5	14.6	15.1	14.9
CO ₂ , (% Dry)	31.4		31.4	5.7	5.1	5.4
H ₂ O, (%)	6.5	7.9	7.2	7.9	5.5	6.7
Flow Rate (dscfm)	856	824	840	11,316	12,518	11,917
Temperature (°F)	150	151	151	1,635	1,566	1,601
NO _x :						
ppm				14.1	11.6	12.9
ppm @ 3% O ₂				40.1	35.8	38.0
lb/hr				1.16	1.06	1.12
CO:						
ppm				7.7	4.2	6.0
ppm @ 3% O ₂				21.9	13.0	17.5
lb/hr				0.39	0.23	0.32
HC:						
CH ₄ ppm	318,000	345,000	332,000	11.3	8.8	10.1
Total NMHC ppm						
as CH ₄	4,152	4,839	4,496	<1	<1	<1
Total NMHC as						
CH ₄ ppm @ 3% O ₂	4,532	5,282	4,907	<2.8	<3.1	<3.0
Total NMHC lb/hr as CH ₄	8.99	10.09	9.55	<0.03	<0.03	<0.03
Destruction Eff. %				>99.67	>99.70	>99.69
Particulate:						
Organic Fraction grains/DSCF				0.0007	0.0005	0.0006
Inorganic Fraction grains/DSCF				0.0035	0.0023	0.0029
Total Particulate grains/DSCF				0.0042	0.0028	0.0035
Total lb/hr				0.41	0.30	0.36
Sulfur Compounds						
H ₂ S, (ppm)			32			
Methyl Mercaptan (ppm)			1.6			
Ethyl Mercaptan (ppm)			0.3			
Dimethyl Sulfide (ppm)			2.3			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.4			

TABLE 4-6
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 4

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	6,800 7.67×10^{-2}	1.4 2.24×10^{-4}	99.71
Chloroform, ppb lb/hr	ND < 100 $< 1.59 \times 10^{-3}$	ND < 0.4 $< 9.00 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	800 1.42×10^{-2}	0.7 1.76×10^{-4}	98.76
Carbon Tetrachloride, ppb lb/hr	ND < 100 $< 2.04 \times 10^{-3}$	ND < 0.4 $< 1.16 \times 10^{-4}$	N/A
1,1-dichloroethene, ppb lb/hr	100 1.29×10^{-3}	ND < 2 $< 3.65 \times 10^{-4}$	> 71.63
Trichloroethylene, ppb lb/hr	1,700 2.97×10^{-2}	ND < 0.4 $< 9.90 \times 10^{-5}$	> 99.67
Tetrachloroethylene, ppb lb/hr	3,100 6.83×10^{-2}	10 3.12×10^{-3}	95.42
Chlorobenzene, ppb lb/hr	ND < 400 $< 5.98 \times 10^{-3}$	ND < 1 $< 2.12 \times 10^{-4}$	N/A
Vinyl Chloride, ppb lb/hr	1,700 1.41×10^{-2}	ND < 0.4 $< 4.71 \times 10^{-5}$	> 99.67
1,2-dichlorobenzene, ppb lb/hr	ND < 1,000 $< 1.95 \times 10^{-2}$	ND < 1 $< 2.77 \times 10^{-4}$	N/A
1,3-dichlorobenzene, ppb lb/hr	ND < 1,000 $< 1.95 \times 10^{-2}$	ND < 1 $< 2.77 \times 10^{-4}$	N/A
1,4-dichlorobenzene, ppb lb/hr	ND < 1,000 $< 1.95 \times 10^{-2}$	ND < 1 $< 2.77 \times 10^{-4}$	N/A
1,1-dichloroethane, ppb lb/hr	2,300 3.02×10^{-2}	ND < 1 $< 1.86 \times 10^{-4}$	> 99.38

Continued

TABLE 4-6
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 4

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <100 $<1.31 \times 10^{-3}$	ND <0.4 $<7.46 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	3,200 3.32×10^{-2}	2.8 4.12×10^{-4}	98.76
Toluene, ppb lb/hr	35,000 4.28×10^{-1}	10 1.74×10^{-3}	99.59
Acetonitrile, ppb lb/hr	ND <5,000 $<2.73 \times 10^{-2}$	ND <2 $<1.55 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	19,900 2.81×10^{-1}	9.6 1.92×10^{-3}	99.32
1,2-dibromoethane, ppb lb/hr	ND <1,000 $<2.50 \times 10^{-2}$	ND <2 $<7.08 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 $<3.36 \times 10^{-2}$	ND <5 $<1.19 \times 10^{-3}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-7
GENERAL RESULTS
FLARE NO. 24

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	5.4		5.4	11.9	12.1	12.0
CO ₂ , (% Dry)	31.0		31.0	7.9	7.9	7.9
H ₂ O, (%)	6.2	8.4	7.3	8.7	8.5	8.6
Flow Rate (dscfm)	613	571	592	9,520	11,080	10,300
Temperature (°F)	119	128	124	1,562	1,566	1,564
NO _x :						
ppm						
ppm @ 3% O ₂				18.0	17.4	17.7
lb/hr				35.8	35.4	35.6
				1.25	1.40	1.32
CO:						
ppm						
ppm @ 3% O ₂				3.3	0.9	2.1
lb/hr				6.6	1.8	4.2
				0.14	0.04	0.09
HC:						
CH ₄ ppm	408,000	398,000	403,000	<1	<1	<1
Total NMHC ppm						
as CH ₄	6,873	5,437	6,155	<1	<1	<1
Total NMHC as						
CH ₄ ppm @ 3% O ₂	7,937	6,279	7,108	<2.0	<2.0	<2.0
Total NMHC lb/hr as CH ₄	10.66	7.85	9.22	<0.02	<0.03	<0.03
Destruction Eff. %				>99.81	>99.62	>99.68
Particulate:						
Organic Fraction grains/DSCF				0.0004	0.0000	0.0002
Inorganic Fraction grains/DSCF				0.0026	0.0029	0.0028
Total Particulate grains/DSCF				0.0030	0.0029	0.0030
Total lb/hr				0.25	0.28	0.27
Sulfur Compounds						
H ₂ S, (ppm)			29			
Methyl Mercaptan (ppm)			1.6			
Ethyl Mercaptan (ppm)			0.3			
Dimethyl Sulfide (ppm)			2.1			
Carbonyl Sulfide (ppm)			0.3			
Carbon Disulfide (ppm)			0.3			

TABLE 4-8
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 24

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	6,300 5.01×10^{-2}	1.1 1.52×10^{-4}	99.70
Chloroform, ppb lb/hr	ND <400 $<4.47 \times 10^{-3}$	ND <0.4 $<7.78 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	700 8.74×10^{-3}	8.4 1.82×10^{-3}	79.12
Carbon Tetrachloride, ppb lb/hr	ND <400 $<5.76 \times 10^{-3}$	ND <0.4 $<1.00 \times 10^{-4}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <2,000 $<1.81 \times 10^{-2}$	ND <2 $<3.16 \times 10^{-4}$	N/A
Trichloroethylene, ppb lb/hr	1,400 1.72×10^{-2}	ND <0.4 $<8.56 \times 10^{-5}$	>99.50
Tetrachloroethylene, ppb lb/hr	2,400 3.73×10^{-2}	7 1.89×10^{-3}	94.93
Chlorobenzene, ppb lb/hr	ND <1,000 $<1.05 \times 10^{-2}$	ND <1 $<1.83 \times 10^{-4}$	N/A
Vinyl Chloride, ppb lb/hr	1,200 7.02×10^{-3}	ND <0.4 $<4.07 \times 10^{-5}$	>99.42
1,2-dichlorobenzene, ppb lb/hr	ND <1,000 $<1.38 \times 10^{-2}$	ND <1 $<2.39 \times 10^{-4}$	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <1,000 $<1.38 \times 10^{-2}$	ND <1 $<2.39 \times 10^{-4}$	N/A
1,4-dichlorobenzene, ppb lb/hr	ND <1,000 $<1.38 \times 10^{-2}$	ND <1 $<2.39 \times 10^{-4}$	N/A
1,1-dichloroethane, ppb lb/hr	2,200 2.04×10^{-2}	ND <1 $<1.61 \times 10^{-4}$	>99.21

Continued

TABLE 4-8
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 24

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <400 $<3.70 \times 10^{-3}$	ND <0.4 $<6.45 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	4,100 3.00×10^{-2}	5.5 7.00×10^{-4}	97.67
Toluene, ppb lb/hr	38,000 3.28×10^{-1}	13 1.95×10^{-3}	99.41
Acetonitrile, ppb lb/hr	ND <2,000 $<7.68 \times 10^{-3}$	ND <2 $<1.34 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	19,500 1.94×10^{-1}	6.6 1.14×10^{-3}	99.41
1,2-dibromoethane, ppb lb/hr	ND <2,000 $<3.52 \times 10^{-2}$	ND <2 $<6.12 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <5,000 $<5.92 \times 10^{-2}$	ND <5 $<1.03 \times 10^{-3}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-9
TRACE ORGANICS SPECIES RESULTS
AMBIENT AIR AT THE PUENTE HILLS LANDFILL FLARE STATION

	ppb
Methylene Chloride	1.5
Chloroform	0.2
1,1,1 trichloroethane	4.3
Carbon Tetrachloride	0.2
1,1-dichloroethene	ND <0.1
Trichloroethylene	0.2
Tetrachloroethylene	0.9
Chlorobenzene	ND <0.4
Vinyl Chloride	ND <0.2
1,2-dichlorobenzene	ND <1.0
1,3-dichlorobenzene	ND <1.0
1,4-dichlorobenzene	ND <1.0
1,1-dichloroethane	ND <0.1
1,2-dichloroethane	ND <0.1
Benzene	2.2
Toluene	5.4
Acetonitrile	ND <5.0
Xylenes	4.7
1,2-dibromoethane	ND <1.0
Benzyl Chloride	ND <2.0

ND indicates that the species was not detected. Values indicate the detection limit for these species.

**EMISSIONS TESTS ON FOUR FLARES
(FLARES No. 5, 7, 17 & 19)
AT PUENTE HILLS LANDFILL - MAY 1991**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

JULY 1991

CR 15300-2468

CARNOT

TABLE 4-1
GENERAL RESULTS
FLARE NO. 5

5/91

Puente Hills

Parameter	Fuel Gas			Exhaust Gas		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	3.6		3.6	13.2	12.0	12.6
CO ₂ , % dry	33.0		33.0	6.8	8.6	7.7
N ₂ , % dry	19.1		19.1	80.0	79.4	79.7
H ₂ O, %	7.7	9.0	8.4	9.1	10.3	9.7
Flow Rate dscfm	715	686	701	11,767	11,143	11,455
Temperature °F	121	125	123	1,608	1,719	1,664
NO _x :						
ppm				12.6	19.9	16.3
ppm @ 3% O ₂				29.3	40.0	34.7
lb/hr				1.08	1.61	1.35
CO:						
ppm				6.0	8.0	7.0
ppm @ 3% O ₂				13.9	16.1	15.0
lb/hr				0.31	0.39	0.35
HC:						
CH ₄ ppm	432,000	432,000	432,000	ND <1	ND <1	ND <1
Total NMHC ppm	7,560	6,310	6,935	3.7	4.58	4.14
as CH ₄				8.60	9.21	8.91
Total NMHC as						
CH ₄ ppm @ 3% O ₂				0.11	0.13	0.12
Total NMHC lb/hr as CH ₄	13.67	10.95	12.31	99.19	98.82	99.01
Destruction Eff. %						
Particulate:						
Organic Fraction grains/DSCF				0.0000	0.0000	0.0000
Inorganic Fraction grains/DSCF				0.0042	0.0039	0.0041
Total Particulate grains/DSCF				0.0042	0.0039	0.0041
Total lb/hr				0.42	0.37	0.40
Sulfur Compounds:						
H ₂ S, ppm	37		37			
Methyl Mercaptan ppm	1.6		1.6			
Ethyl Mercaptan ppm	ND <0.4		ND <0.4			
Dimethyl Sulfide ppm	2		2			
Carbonyl Sulfide ppm	ND <0.5		ND <0.5			
Carbon Disulfide ppm	ND <0.5		ND <0.5			

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 5

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	7,200 6.78×10^{-2}	ND <0.1 ✓ $<1.54 \times 10^{-5}$	>99.98
Chloroform, ppb lb/hr	ND <100 $<1.32 \times 10^{-3}$	ND <0.1 $<2.16 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	800 1.18×10^{-2}	ND <0.1 ✓ $<2.42 \times 10^{-5}$	>99.80
Carbon Tetrachloride, ppb lb/hr	ND <100 $<1.71 \times 10^{-3}$	ND <0.1 ✓ $<2.79 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <100 $<1.07 \times 10^{-3}$	ND <0.1 ✓ $<1.76 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	1,200 1.75×10^{-2}	ND <0.1 ✓ $<2.38 \times 10^{-5}$	>99.86
Tetrachloroethylene, ppb lb/hr	2,300 4.23×10^{-2}	ND <0.1 ✓ $<3.00 \times 10^{-5}$	>99.93
Chlorobenzene, ppb lb/hr	300 3.74×10^{-3}	ND <0.1 ✓ $<2.04 \times 10^{-5}$	>99.46
Vinyl Chloride, ppb lb/hr	1,100 7.62×10^{-3}	ND <0.2 $<2.26 \times 10^{-5}$	>99.70
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<3.26 \times 10^{-3}$	ND <0.2 ✓ $<5.32 \times 10^{-5}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	700 1.14×10^{-2}	ND <0.2 $<5.32 \times 10^{-5}$	>99.53
1,1-dichloroethane, ppb lb/hr	1,900 2.08×10^{-2}	ND <0.1 ✓ $<1.79 \times 10^{-5}$	>99.91

Continued

TABLE 4-2 (cont)
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 5

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND < 100 < 1.10×10^{-3}	ND < 0.1 < 1.79×10^{-5}	N/A
Benzene, ppb lb/hr	2,900 2.51×10^{-2}	ND < 0.2 ✓ < 2.83×10^{-5}	> 99.89
Toluene, ppb lb/hr	48,000 4.90×10^{-1}	0.8 ✓ 1.33×10^{-4}	99.97
Acetonitrile, ppb lb/hr	ND < 2,000 < 9.10×10^{-3}	ND < 2.0 < 1.49×10^{-4}	N/A
Xylenes, ppb lb/hr	34,000 4.00×10^{-1}	ND < 0.6 ✓ < 1.15×10^{-4}	> 99.97
1,2-dibromoethane, ppb lb/hr	ND < 200 < 4.16×10^{-3}	ND < 0.2 < 6.80×10^{-5}	N/A
Benzyl Chloride, ppb lb/hr	ND < 1,000 < 1.40×10^{-2}	ND < 1.0 ✓ < 2.29×10^{-4}	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
GENERAL RESULTS
FLARE NO. 7

Parameter	Fuel Gas			Exhaust Gas		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	4.5		4.5	12.6	12.7	12.7
CO ₂ , % dry	36.0		36.0	7.6	7.9	7.8
N ₂ , % dry	22.6		22.6	79.8	79.4	79.6
H ₂ O, %	5.9	7.3	6.6	9.5	9.5	9.5
Flow Rate dscfm	964	908	936	9,939	9,865	9,902
Temperature °F	125	130	128	1,670	1,670	1,670
NO _x :						
ppm				15.2	14.8	15.0
ppm @ 3% O ₂				32.2	32.3	32.5
lb/hr				1.10	1.06	1.08
CO:						
ppm				9.4	4.4	6.9
ppm @ 3% O ₂				20.3	9.6	14.9
lb/hr				0.41	0.19	0.30
HC:						
CH ₄ ppm	422,000	422,000	422,000	ND <1	ND <1	ND <1
Total NMHC ppm as CH ₄	6,100	7,380	6,740	3.71	4.47	4.09
Total NMHC as CH ₄ ppm @ 3% O ₂				8.00	9.76	8.88
Total NMHC lb/hr as CH ₄	14.88	16.95	15.91	0.09	0.11	0.10
Destruction Eff. %				99.37	99.34	99.36
Particulate:						
Organic Fraction grains/DSCF				0.0000	0.0000	0.0000
Inorganic Fraction grains/DSCF				0.0048	0.0067	0.0058
Total Particulate grains/DSCF				0.0048	0.0067	0.0058
Total lb/hr				0.41	0.56	0.49
Sulfur Compounds:						
H ₂ S, ppm	20		20			
Methyl Mercaptan ppm	1.4		1.4			
Ethyl Mercaptan ppm	ND <0.4		ND <0.4			
Dimethyl Sulfide ppm	1.9		1.9			
Carbonyl Sulfide ppm	ND <0.5		ND <0.5			
Carbon Disulfide ppm	ND <0.4		ND <0.4			

TABLE 4-4
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 7

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	5,900 7.42×10^{-2}	ND <0.1/ $<1.33 \times 10^{-5}$	>99.98
Chloroform, ppb lb/hr	ND <100 $<1.77 \times 10^{-3}$	ND <0.1/ $<1.87 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	600 1.18×10^{-2}	ND <0.1/ $<2.09 \times 10^{-5}$	>99.82
Carbon Tetrachloride, ppb lb/hr	ND <100 $<2.28 \times 10^{-3}$	ND <0.1/ $<2.41 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <100 $<1.43 \times 10^{-3}$	ND <0.1/ $<1.52 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	800 1.56×10^{-2}	ND <0.1/ $<2.06 \times 10^{-5}$	>99.87
Tetrachloroethylene, ppb lb/hr	1,200 2.95×10^{-2}	ND <0.1/ $<2.60 \times 10^{-5}$	>99.91
Chlorobenzene, ppb lb/hr	100 1.67×10^{-3}	ND <0.1/ $<1.76 \times 10^{-5}$	>98.94
Vinyl Chloride, ppb lb/hr	900 8.32×10^{-3}	ND <0.2 $<1.96 \times 10^{-5}$	>99.76
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<4.35 \times 10^{-3}$	ND <0.2/ $<4.60 \times 10^{-5}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	ND <200 $<4.35 \times 10^{-3}$	ND <0.2 $<4.60 \times 10^{-5}$	N/A
1,1-dichloroethane, ppb lb/hr	1,500 2.20×10^{-2}	ND <0.1 $<1.55 \times 10^{-5}$	>99.93

Continued

TABLE 4-4 (cont)
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 7

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <100 $<1.46 \times 10^{-3}$	ND <0.1 ✓ $<1.55 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	2,900 3.35×10^{-2}	ND <0.2 ✓ $<2.45 \times 10^{-5}$	>99.93
Toluene, ppb lb/hr	35,000 4.77×10^{-1}	1.5 ✓ 2.16×10^{-4}	99.95
Acetonitrile, ppb lb/hr	ND <2,000 $<1.21 \times 10^{-2}$	2.0 1.29×10^{-4}	<98.94
Xylenes, ppb lb/hr	13,500 2.12×10^{-1}	4.3 7.15×10^{-4}	99.66
1,2-dibromoethane, ppb lb/hr	ND <200 $<5.56 \times 10^{-3}$	ND <0.2 $<5.88 \times 10^{-5}$	N/A
Benzyl Chloride, ppb lb/hr	ND <1,000 $<1.87 \times 10^{-2}$	ND <1 ✓ $<1.98 \times 10^{-4}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-5
GENERAL RESULTS
FLARE NO. 17

Parameter	Fuel Gas			Exhaust Gas		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	5.3		5.3	13.5	12.0	12.8
CO ₂ , % dry	30.5		30.5	6.6	12.7	9.7
N ₂ , % dry	25.5		25.5	79.9	75.3	77.6
H ₂ O, %	8.2	7.0	7.6	8.3	8.7	8.5
Flow Rate dscfm	1,000	1,049	1,025	11,376	10,515	10,946
Temperature °F	103	121	112	1,563	1,723	1,643
NO _x :						
ppm				14.8	18.8	16.8
ppm @ 3% O ₂				35.8	37.8	36.8
lb/hr				1.22	1.44	1.33
CO:						
ppm				7.5	17.6	12.6
ppm @ 3% O ₂				18.1	35.4	26.8
lb/hr				0.38	0.82	0.60
HC:						
CH ₄ ppm	414,000	418,000	416,000	ND < 1	39.5	< 19.8
Total NMHC ppm	5,020	4,950	4,985	13.1	7.07	10.09
as CH ₄						
Total NMHC as				31.69	14.22	22.95
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	12.70	13.14	12.92	0.38	0.19	0.28
Destruction Eff. %				97.03	98.57	97.80
Particulate:						
Organic Fraction grains/DSCF				0.0000	0.0000	0.0000
Inorganic Fraction grains/DSCF				0.0058	0.0045	0.0052
Total Particulate grains/DSCF				0.0058	0.0045	0.0052
Total lb/hr				0.56	0.41	0.49
Sulfur Compounds:						
H ₂ S, ppm	37		37			
Methyl Mercaptan ppm	1.5		1.5			
Ethyl Mercaptan ppm	ND < 0.4		ND < 0.4			
Dimethyl Sulfide ppm	1.8		1.8			
Carbonyl Sulfide ppm	ND < 0.5		ND < 0.5			
Carbon Disulfide ppm	ND < 0.4		ND < 0.4			

TABLE 4-6
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 17

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	5,500 7.57×10^{-2}	ND < 0.1 $< 1.47 \times 10^{-5}$	> 99.98
Chloroform, ppb lb/hr	ND < 100 $< 1.93 \times 10^{-3}$	ND < 0.1 ✓ $< 2.07 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	600 1.30×10^{-2}	ND < 0.1 ✓ $< 2.31 \times 10^{-5}$	> 99.82
Carbon Tetrachloride, ppb lb/hr	ND < 100 $< 2.49 \times 10^{-3}$	ND < 0.1 ✓ $< 2.66 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND < 100 $< 1.57 \times 10^{-3}$	ND < 0.1 ✓ $< 1.68 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	1,100 2.34×10^{-2}	0.4 ✓ 9.10×10^{-5}	99.61
Tetrachloroethylene, ppb lb/hr	2,000 5.38×10^{-2}	ND < 0.1 ✓ $< 2.87 \times 10^{-5}$	> 99.95
Chlorobenzene, ppb lb/hr	200 3.65×10^{-3}	ND < 0.1 ✓ $< 1.95 \times 10^{-5}$	> 99.47
Vinyl Chloride, ppb lb/hr	900 9.12×10^{-3}	ND < 0.2 ✓ $< 2.16 \times 10^{-5}$	> 99.76
1,2-dichlorobenzene, ppb lb/hr	ND < 200 $< 4.76 \times 10^{-3}$	ND < 0.2 ✓ $< 5.09 \times 10^{-5}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	ND < 200 $< 4.76 \times 10^{-3}$	ND < 0.2 $< 5.09 \times 10^{-5}$	N/A
1,1-dichloroethane, ppb lb/hr	1,400 2.25×10^{-2}	ND < 0.1 $< 1.71 \times 10^{-5}$	> 99.92

Continued

TABLE 4-6 (cont)
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 17

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <100 $<1.60 \times 10^{-3}$	ND <0.1 $<1.71 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	3,500 4.43×10^{-2}	0.3 ✓ 4.06×10^{-5}	99.91
Toluene, ppb lb/hr	52,000 7.76×10^{-1}	2.3 ✓ 3.67×10^{-4}	99.95
Acetonitrile, ppb lb/hr	ND <2,000 $<1.33 \times 10^{-2}$	13 9.24×10^{-4}	<93.06
Xylenes, ppb lb/hr	22,800 3.92×10^{-1}	ND <0.6 $<1.10 \times 10^{-4}$	>99.97
1,2-dibromoethane, ppb lb/hr	ND <200 $<6.09 \times 10^{-3}$	ND <0.2 $<6.50 \times 10^{-5}$	N/A
Benzyl Chloride, ppb lb/hr	ND <1,000 $<2.05 \times 10^{-2}$	ND <1.0 ✓ $<2.19 \times 10^{-4}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-7
GENERAL RESULTS
FLARE NO. 19

Parameter	Fuel Gas			Exhaust Gas		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	5.1		5.1	11.9	12.3	12.1
CO ₂ , % dry	31.6		31.6	8.4	8.0	8.2
N ₂ , % dry	24.9		24.9	79.7	79.7	79.7
H ₂ O, %	6.0	4.7	5.4	9.9	9.5	9.7
Flow Rate dscfm	1,097	1,094	1,096	8,662	7,045	7,854
Temperature °F	110	102	106	1,727	1,705	1,716
NO _x :						
ppm						
ppm @ 3% O ₂				17.9	17.2	17.6
lb/hr				35.6	35.8	35.7
				1.13	0.88	1.00
CO:						
ppm						
ppm @ 3% O ₂				6.9	6.9	6.9
lb/hr				13.7	14.4	14.0
				0.26	0.22	0.24
HC:						
CH ₄ ppm	382,000	382,000	382,000	92	ND <1	<46
Total NMHC ppm	4,110	4,650	4,380	4.23	5.47	4.85
as CH ₄						
Total NMHC as						
CH ₄ ppm @ 3% O ₂				8.41	11.39	9.90
Total NMHC lb/hr as CH ₄	11.41	12.87	12.14	0.09	0.10	0.095
Destruction Eff. %				99.19	99.24	99.21
Particulate:						
Organic Fraction grains/DSCF						
Inorganic Fraction grains/DSCF				0.0000	0.0000	0.0000
Total Particulate grains/DSCF				0.0032	0.0087	0.0060
Total lb/hr				0.0032	0.0087	0.0060
				0.24	0.53	0.39
Sulfur Compounds:						
H ₂ S, ppm	37		37			
Methyl Mercaptan ppm	1.5		1.5			
Ethyl Mercaptan ppm	ND <0.4		ND <0.4			
Dimethyl Sulfide ppm	1.8		1.8			
Carbonyl Sulfide ppm	ND <0.5		ND <0.5			
Carbon Disulfide ppm	ND <0.4		ND <0.4			

TABLE 4-8
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 19

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	4,800 7.06×10^{-2}	ND <0.1 ✓ $<1.05 \times 10^{-5}$	>99.99
Chloroform, ppb lb/hr	ND <100 $<2.07 \times 10^{-3}$	ND <0.1 ✓ $<1.48 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	500 1.16×10^{-2}	ND <0.1 ✓ $<1.66 \times 10^{-5}$	>99.86
Carbon Tetrachloride, ppb lb/hr	ND <100 $<2.67 \times 10^{-3}$	ND <0.1 ✓ $<1.91 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <100 $<1.68 \times 10^{-3}$	ND <0.1 ✓ $<1.20 \times 10^{-5}$	>99.28
Trichloroethylene, ppb lb/hr	900 2.05×10^{-2}	ND <0.1 ✓ $<1.63 \times 10^{-5}$	>99.92
Tetrachloroethylene, ppb lb/hr	1,300 3.74×10^{-2}	ND <0.1 ✓ $<2.06 \times 10^{-5}$	>99.94
Chlorobenzene, ppb lb/hr	100 1.95×10^{-3}	ND <0.1 ✓ $<1.40 \times 10^{-5}$	>99.28
Vinyl Chloride, ppb lb/hr	900 9.75×10^{-3}	ND <0.2 $<1.55 \times 10^{-5}$	>99.84
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<5.09 \times 10^{-3}$	ND <0.2 ✓ $<3.65 \times 10^{-5}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	ND <200 $<5.09 \times 10^{-3}$	ND <0.2 $<3.65 \times 10^{-5}$	N/A
1,1-dichloroethane, ppb lb/hr	1,200 2.06×10^{-2}	ND <0.1 $<1.23 \times 10^{-5}$	>99.94

Continued

TABLE 4-8 (cont)
TRACE ORGANICS SPECIES RESULTS
FLARE NO. 19

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <100 $<1.71 \times 10^{-3}$	ND <0.1 ✓ $<1.23 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	3,000 4.06×10^{-2}	ND <0.2 ✓ $<1.94 \times 10^{-5}$	>99.95
Toluene, ppb lb/hr	39,000 6.23×10^{-1}	1.3 ✓ 1.49×10^{-4}	99.98
Acetonitrile, ppb lb/hr	ND <2,000 $<1.42 \times 10^{-2}$	6.9 3.52×10^{-4}	<97.53
Xylenes, ppb lb/hr	17,200 3.16×10^{-1}	ND <0.6 ✓ $<7.91 \times 10^{-5}$	>99.98
1,2-dibromoethane, ppb lb/hr	ND <200 $<6.51 \times 10^{-3}$	ND <0.2 $<4.67 \times 10^{-5}$	N/A
Benzyl Chloride, ppb lb/hr	ND <1,000 $<2.19 \times 10^{-2}$	ND <1.0 ✓ $<1.57 \times 10^{-4}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-9
TRACE ORGANICS SPECIES RESULTS
AMBIENT AIR AT THE PUENTE HILLS LANDFILL FLARE STATION

Grab Sample 9:00	5/8/91
Methylene Chloride, ppb	1.5
Chloroform, ppb	ND <0.1
1,1,1 trichloroethane, ppb	2.3
Carbon Tetrachloride, ppb	0.2
1,1-dichloroethene, ppb	ND <0.1
Trichloroethylene, ppb	0.2
Tetrachloroethylene, ppb	0.4
Chlorobenzene, ppb	ND <0.1
Vinyl Chloride, ppb	ND <0.2
1,2-dichlorobenzene, ppb	ND <0.2
1,3 + 1,4-dichlorobenzene, ppb	0.2
1,1-dichloroethane, ppb	ND <0.1
1,2-dichloroethane, ppb	ND <0.1
Benzene, ppb	2.5
Toluene, ppb	6.1
Acetonitrile, ppb	ND <2.0
Xylenes, ppb	3.4
1,2-dibromoethane, ppb	ND <0.2
Benzyl Chloride, ppb	ND <1.0

ND indicates that the species was not detected. Values indicate the detection limit for these species.

TABLE 4-10
TRACE ORGANICS SPECIES RESULTS
AMBIENT AIR AT THE PUENTE HILLS LANDFILL FLARE STATION

Composite Sample From 9:45 5/9/91 to 9:45 5/10/91

Methylene Chloride, ppb	0.3
Chloroform, ppb	ND <0.1
1,1,1 trichloroethane, ppb	0.5
Carbon Tetrachloride, ppb	ND <0.1
1,1-dichloroethene, ppb	ND <0.1
Trichloroethylene, ppb	ND <0.1
Tetrachloroethylene, ppb	ND <0.1
Chlorobenzene, ppb	ND <0.1
Vinyl Chloride, ppb	ND <0.2
1,2-dichlorobenzene, ppb	ND <0.2
1,3 + 1,4-dichlorobenzene, ppb	ND <0.2
1,1-dichloroethane, ppb	ND <0.1
1,2-dichloroethane, ppb	ND <0.1
Benzene, ppb	0.6
Toluene, ppb	1.6
Acetonitrile, ppb	ND <2.0
Xylenes, ppb	<0.8
1,2-dibromoethane, ppb	ND <0.2
Benzyl Chloride, ppb	ND <1.0

ND indicates that the species was not detected. Values indicate the detection limit for these species.

**EMISSIONS TESTS ON FOUR FLARES
(FLARES NO. 6, 18, 20, and 22)
AT PUENTE HILLS LANDFILL - DECEMBER 1991**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

JANUARY 1992

CR 35500-2747

CARNOT

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL FLARE NO. 20, TEST 2

Test Date 12/16/91			
Species	Inlet Test 2 Landfill Gas	Exhaust Test 2	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	2,800 3.92×10^{-2}	ND <0.2 $<2.59 \times 10^{-5}$	>99.93
Chloroform, ppb lb/hr	ND <200 $<3.94 \times 10^{-3}$	ND <0.2 $<3.64 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	400 8.80×10^{-3}	ND <0.2 $<4.07 \times 10^{-5}$	>99.54
Carbon Tetrachloride, ppb lb/hr	ND <200 $<5.07 \times 10^{-3}$	ND <0.2 $<4.70 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 $<3.20 \times 10^{-3}$	ND <0.2 $<2.96 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	1,400 3.03×10^{-2}	ND <0.2 $<4.01 \times 10^{-5}$	>99.87
Tetrachloroethylene, ppb lb/hr	2,200 6.02×10^{-2}	ND <0.2 $<5.06 \times 10^{-5}$	>99.92
Chlorobenzene, ppb lb/hr	ND <400 $<7.42 \times 10^{-3}$	ND <0.2 $<3.44 \times 10^{-5}$	N/A
Vinyl Chloride, ppb lb/hr	1,700 1.75×10^{-2}	ND <0.2 $<1.91 \times 10^{-5}$	>99.89
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<4.85 \times 10^{-3}$	ND <0.2 $<4.49 \times 10^{-5}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	<700 $<1.70 \times 10^{-2}$	ND <0.4 $<8.98 \times 10^{-5}$	N/A
1,1-dichloroethane, ppb lb/hr	1,500 2.45×10^{-2}	ND <0.2 $<3.02 \times 10^{-5}$	>99.88

Continued

TABLE 4-9 (cont)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL FLARE NO. 20, TEST 2

Test Date 12/16/91			
Species	Inlet Test 2 Landfill Gas	Exhaust Test 2	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 $<3.26 \times 10^{-3}$	ND <0.2 $<3.02 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	5,700 7.34×10^{-2}	ND <0.4 $<4.77 \times 10^{-5}$	99.94
Toluene, ppb lb/hr	35,000 5.32×10^{-1}	2.7 3.80×10^{-4}	99.94
Acetonitrile, ppb lb/hr	ND <5,000 $<3.38 \times 10^{-2}$	ND <5.0 $<3.13 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	20,600 3.61×10^{-1}	ND <0.6 $<9.72 \times 10^{-5}$	>99.97
1,2-dibromoethane, ppb lb/hr	ND <2,000 $<6.20 \times 10^{-2}$	ND <0.4 $<1.15 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 $<4.17 \times 10^{-2}$	ND <0.4 $<7.73 \times 10^{-5}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-10
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE NO.22

Test Date 12/17/91

Parameter	Fuel Gas			Exhaust Gas		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	4.3	--	4.3	12.14	12.29	12.22
CO ₂ , % dry	30.6	--	30.6	7.69	7.58	7.64
N ₂ , % dry	24.9	--	24.9	80.2	80.1	80.2
H ₂ O, %	3.9	4.9	4.4	8.8	9.8	9.3
Flow Rate dscfm	816	841	829	9,435	9,795	9,615
Temperature °F				1,619	1,675	1,647
NO _x :						
ppm	--	--	--	16.3	16.2	16.3
ppm @ 3% O ₂	--	--	--	33.3	33.8	33.5
lb/hr	--	--	--	1.12	1.16	1.14
CO:						
ppm	--	--	--	2.1	1.9	2.0
ppm @ 3% O ₂	--	--	--	4.3	4.0	4.2
lb/hr	--	--	--	0.09	0.08	0.09
HC:						
CH ₄ ppm	386,000	392,000	389,000	ND <1	ND <1	ND <1
Total NMHC ppm as CH ₄	3,420	3,260	3,340	2.14	3.14	2.64
Total NMHC as CH ₄ ppm @ 3% O ₂	--	--	--	4.37	6.53	5.45
Total NMHC lb/hr as CH ₄	7.06	6.94	7.00	0.051	0.078	0.064
Destruction Eff. %	--	--	--	99.28	98.88	99.08
Particulate:						
Organic Fraction grains/DSCF				0.0000	0.0003	0.0002
Inorganic Fraction grains/DSCF				0.0048	0.0062	0.0055
Total Particulate grains/DSCF	--	--	--	0.0048	0.0065	0.0057
gr/dscfm @ 12% CO ₂				0.0076	0.0103	0.0090
Total lb/hr	--	--	--	0.39	0.55	0.47
Sulfur Compounds:						
H ₂ S, ppm	43	--	43			
Methyl Mercaptan ppm	1.0	--	1.0			
Ethyl Mercaptan ppm	ND <0.4	--	ND <0.4			
Dimethyl Sulfide ppm	2.0	--	2.0			
Carbonyl Sulfide ppm	ND <0.3	--	ND <0.3			
Carbon Disulfide ppm	0.6	--	0.6			
Total Sulfur, ppm	<47.9	--	<47.9			

TABLE 4-11
EXHAUST TRACE ORGANIC SPECIES RESULTS
PUENTE HILLS LANDFILL FLARE NO. 22

Test Date 12/17/91

Species	Exhaust Test 1	Exhaust Test 2	Average
Methylene Chloride, ppb lb/hr	ND <0.2 <2.53 x 10 ⁻⁵	ND <0.2 <2.53 x 10 ⁻⁵	ND <0.2 <2.53 x 10 ⁻⁵
Chloroform, ppb lb/hr	ND <0.2 <3.56 x 10 ⁻⁵	ND <0.2 <3.56 x 10 ⁻⁵	ND <0.2 <3.56 x 10 ⁻⁵
1,1,1 trichloroethane, ppb lb/hr	ND <0.2 <3.98 x 10 ⁻⁵	ND <0.2 <3.98 x 10 ⁻⁵	ND <0.2 <3.98 x 10 ⁻⁵
Carbon Tetrachloride, ppb lb/hr	ND <0.2 <4.59 x 10 ⁻⁵	ND <0.2 <4.59 x 10 ⁻⁵	ND <0.2 <4.59 x 10 ⁻⁵
1,1-dichloroethene, ppb lb/hr	ND <0.2 <2.89 x 10 ⁻⁵	ND <0.2 <2.89 x 10 ⁻⁵	ND <0.2 <2.89 x 10 ⁻⁵
Trichloroethylene, ppb lb/hr	ND <0.2 <3.92 x 10 ⁻⁵	ND <0.2 <3.92 x 10 ⁻⁵	ND <0.2 <3.92 x 10 ⁻⁵
Tetrachloroethylene, ppb lb/hr	ND <0.2 <4.95 x 10 ⁻⁵	ND <0.2 <4.95 x 10 ⁻⁵	ND <0.2 <4.95 x 10 ⁻⁵
Chlorobenzene, ppb lb/hr	ND <0.2 <3.36 x 10 ⁻⁵	ND <0.2 <3.36 x 10 ⁻⁵	ND <0.2 <3.36 x 10 ⁻⁵
Vinyl Chloride, ppb lb/hr	ND <0.2 <1.86 x 10 ⁻⁵	ND <0.2 <1.86 x 10 ⁻⁵	ND <0.2 <1.86 x 10 ⁻⁵
1,2-dichlorobenzene, ppb lb/hr	ND <0.2 <4.39 x 10 ⁻⁵	ND <0.2 <4.39 x 10 ⁻⁵	ND <0.2 <4.39 x 10 ⁻⁵
1,3 + 1,4-dichlorobenzene lb/hr	ND <0.4 <8.77 x 10 ⁻⁵	ND <0.4 <8.77 x 10 ⁻⁵	ND <0.4 <8.77 x 10 ⁻⁵
1,1-dichloroethane, ppb lb/hr	ND <0.2 <2.95 x 10 ⁻⁵	ND <0.2 <2.95 x 10 ⁻⁵	ND <0.2 <2.95 x 10 ⁻⁵

Continued

TABLE 4-11 (cont)
EXHAUST TRACE ORGANIC SPECIES RESULTS
PUENTE HILLS LANDFILL FLARE NO. 22

Test Date 12/17/91			
Species	Exhaust Test 1	Exhaust Test 2	Average
1,2-dichloroethane, ppb lb/hr	ND <0.2 <2.95 x 10 ⁻⁵	ND <0.2 <2.95 x 10 ⁻⁵	ND <0.2 <2.95 x 10 ⁻⁵
Benzene, ppb lb/hr	ND <0.4 <4.66 x 10 ⁻⁵	ND <0.4 <4.66 x 10 ⁻⁵	ND <0.4 <4.66 x 10 ⁻⁵
Toluene, ppb lb/hr	2.5 3.44 x 10 ⁻⁴	1.8 2.47 x 10 ⁻⁴	2.15 2.95 x 10 ⁻⁴
Acetonitrile, ppb lb/hr	ND <5 <3.06 x 10 ⁻⁴	ND <5 <3.06 x 10 ⁻⁴	ND <5 <3.06 x 10 ⁻⁴
Xylenes, ppb lb/hr	ND <0.6 <9.50 x 10 ⁻⁵	ND <0.6 <9.50 x 10 ⁻⁵	ND <0.6 <9.50 x 10 ⁻⁵
1,2-dibromoethane, ppb lb/hr	ND <0.4 <1.12 x 10 ⁻⁴	ND <0.4 <1.12 x 10 ⁻⁴	ND <0.4 <1.12 x 10 ⁻⁴
Benzyl Chloride, ppb lb/hr	ND <0.4 <7.55 x 10 ⁻⁵	ND <0.4 <7.55 x 10 ⁻⁵	ND <0.4 <7.55 x 10 ⁻⁵

ND indicates that the species was not detected. Values indicate the detection limit for these species.

TABLE 4-12
EXHAUST TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL FLARE NO. 6

Test Date 12/17/91			
Species	Inlet Landfill Gas	Average Exhaust Results	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	2,900 3.18×10^{-2}	ND <0.2 $<2.53 \times 10^{-5}$	>99.92
Chloroform, ppb lb/hr	ND <200 $<3.08 \times 10^{-3}$	ND <0.2 $<3.56 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	400 6.88×10^{-3}	ND <0.2 $<3.98 \times 10^{-5}$	>99.42
Carbon Tetrachloride, ppb lb/hr	ND <200 $<3.97 \times 10^{-3}$	ND <0.2 $<4.59 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 $<2.50 \times 10^{-3}$	ND <0.2 $<2.89 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	1,300 2.20×10^{-2}	ND <0.2 $<3.92 \times 10^{-5}$	>99.82
Tetrachloroethylene, ppb lb/hr	2,000 4.28×10^{-2}	ND <0.2 $<4.95 \times 10^{-5}$	>99.88
Chlorobenzene, ppb lb/hr	ND <400 $<5.81 \times 10^{-3}$	ND <0.2 $<3.36 \times 10^{-5}$	N/A
Vinyl Chloride, ppb lb/hr	1,600 1.29×10^{-2}	ND <0.2 $<1.86 \times 10^{-5}$	>99.86
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<3.79 \times 10^{-3}$	ND <0.2 $<4.39 \times 10^{-5}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	<800 $<1.52 \times 10^{-2}$	ND <0.4 $<8.77 \times 10^{-5}$	N/A
1,1-dichloroethane, ppb lb/hr	1,500 1.92×10^{-2}	ND <0.2 $<2.95 \times 10^{-5}$	>99.85

Continued

TABLE 4-12 (cont)
EXHAUST TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL FLARE NO. 6

Test Date 12/17/91			
Species	Inlet Landfill Gas	Average Exhaust Results	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	200 2.55×10^{-3}	ND <0.2 $<2.95 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	5,800 5.84×10^{-2}	ND <0.4 $<4.66 \times 10^{-5}$	>99.92
Toluene, ppb lb/hr	34,000 4.04×10^{-1}	2.15 2.95×10^{-4}	99.93
Acetonitrile, ppb lb/hr	ND <5,000 $<2.65 \times 10^{-2}$	ND <5.0 $<3.06 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	21,400 2.93×10^{-1}	ND <0.6 $<9.50 \times 10^{-5}$	>99.97
1,2-dibromoethane, ppb lb/hr	ND <2,000 $<4.85 \times 10^{-2}$	ND <0.4 $<1.12 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 $<3.27 \times 10^{-2}$	ND <0.4 $<7.55 \times 10^{-5}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSIONS TESTS ON FOUR FLARES
(FLARE NOS. 11, 13, 17 AND 19)
AT PUENTE HILLS LANDFILL - MAY 1992**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

JULY 1992

TABLE 4-1
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE No.11

Test Date 5/14/92						
Parameter	First Run	Fuel Gas Second Run	Average	First Run	Exhaust Gas Second Run	Average
O ₂ , % dry	4.3	4.1	4.2	11.93	12.31	12.12
CO ₂ , % dry	30.8	31.5	31.2	8.42	8.12	8.27
N ₂ , % dry	23.4	23.0	23.2	79.7	79.6	79.6
H ₂ O, %	5.6	7.6	6.6	10.3	10.6	10.5
Flow Rate, dscfm	975	932	954	9502	9633	9568
Temperature, °F				1494	1504	1499
NO _x :						
ppm						
ppm @ 3% O ₂				16.5	16.1	16.3
lb/hr (as NO ₂)				32.9	33.5	33.2
				1.14	1.13	1.13
CO:						
ppm						
ppm @ 3% O ₂				2.1	1.7	1.9
lb/hr				4.2	3.5	3.9
				0.088	0.072	0.080
HC:						
CH ₄ ppm	400000	408000	404000	ND <1	ND <1	ND <1
Tot NMHC ppm (as CH ₄)	3870	4130	4000	2.8	3.5	3.15
Tot NMHC (as CH ₄) @3% O ₂	—	—	—	5.59	7.29	6.44
NMHC lb/hr (as CH ₄)	9.54	9.74	9.64	0.067	0.085	0.076
Destruction Eff. %	—	—	—	99.29	99.12	99.21
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0019	0.0017	0.0018
Total Particulate gr/dscf				0.0019	0.0017	0.0018
gr/dscf @12% CO ₂				0.0028	0.0025	0.0027
lb/hr				0.16	0.14	0.15
Sulfur Compounds:						
H ₂ S, ppm	47	46	46.5			
Methyl Mercaptan, ppm	1.0	1.1	1.1			
Ethyl Mercaptan, ppm	ND <1.9	ND <1.9	ND <1.9			
Dimethyl Sulfide, ppm	2.7	2.7	2.7			
Carbonyl Sulfide, ppm	ND <0.8	ND <0.8	ND <0.8			
Carbon Disulfide, ppm	ND <1.1	ND <1.1	ND <1.1			
Total Sulfur, ppm	<55.6	<54.7	<55.2			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 11, TEST NO. 1

Test Date 5/11/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
methylene chloride: lb/hr	5800 ppb 7.59×10^{-2}	ND <1.0 ppb $<1.28 \times 10^{-4}$	>99.83
chloroform: lb/hr	ND <1000 ppb $<1.84 \times 10^{-2}$	ND <1.0 ppb $<1.79 \times 10^{-4}$	N/A
1,1,1 trichloroethane: lb/hr	ND <1000 ppb $<2.06 \times 10^{-2}$	ND <1.0 ppb $<2.00 \times 10^{-4}$	N/A
carbon tetrachloride: lb/hr	ND <400 ppb $<9.49 \times 10^{-3}$	ND <0.4 ppb $<9.24 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND <1000 ppb $<1.49 \times 10^{-2}$	ND <1.0 ppb $<1.46 \times 10^{-4}$	N/A
trichloroethylene: lb/hr	ND <1000 ppb $<2.03 \times 10^{-2}$	ND <1.0 ppb $<1.97 \times 10^{-4}$	N/A
tetrachloroethylene: lb/hr	1700 ppb 4.35×10^{-2}	ND <0.2 ppb $<4.98 \times 10^{-5}$	>99.89
chlorobenzene: lb/hr	ND <1000 ppb $<1.74 \times 10^{-2}$	ND <1.0 ppb $<1.69 \times 10^{-4}$	N/A
vinyl chloride: lb/hr	700 ppb 6.74×10^{-3}	ND <0.4 ppb $<3.76 \times 10^{-5}$	>99.44
1,2-dichlorobenzene: lb/hr	ND <1000 ppb $<2.27 \times 10^{-2}$	ND <1.0 ppb $<2.21 \times 10^{-4}$	N/A
1,3+1,4-dichlorobenzene: lb/hr	800 ppb 1.81×10^{-2}	ND <0.4 ppb $<8.83 \times 10^{-5}$	>99.51
1,1-dichloroethane: lb/hr	1800 ppb 2.75×10^{-2}	ND <1.0 ppb $<1.49 \times 10^{-4}$	>99.46
1,2-dichloroethane: lb/hr	ND <1000 ppb $<1.53 \times 10^{-2}$	ND <1.0 ppb $<1.49 \times 10^{-4}$	N/A
benzene: lb/hr	6400 ppb 7.71×10^{-2}	ND <0.4 ppb $<4.69 \times 10^{-5}$	>99.94
toluene: lb/hr	36000 ppb 5.11×10^{-1}	ND <1.0 ppb $<1.38 \times 10^{-4}$	>99.97

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 11, TEST NO. 1

Test Date 5/11/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
acetonitrile: lb/hr	ND < 2000 ppb < 1.27×10^{-2}	ND < 2.0 ppb < 1.23×10^{-4}	N/A
xylene: lb/hr	31000 ppb 5.07×10^{-1}	ND < 0.8 ppb < 1.28×10^{-4}	> 99.97
1,2-dibromoethane: lb/hr	ND < 2000 ppb < 5.79×10^{-2}	ND < 2.0 ppb < 5.64×10^{-4}	N/A
benzyl chloride: lb/hr	ND < 5000 ppb < 9.76×10^{-2}	ND < 5.0 ppb < 9.51×10^{-4}	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.
 NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 11, TEST NO. 2

Test Date 5/14/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
methylene chloride: lb/hr	5900 ppb 7.73×10^{-2}	ND < 1.0 ppb $< 1.28 \times 10^{-4}$	> 99.83
chloroform: lb/hr	ND < 1000 ppb $< 1.84 \times 10^{-2}$	ND < 1.0 ppb $< 1.79 \times 10^{-4}$	N/A
1,1,1 trichloroethane: lb/hr	ND < 1000 ppb $< 2.06 \times 10^{-2}$	ND < 1.0 ppb $< 2.00 \times 10^{-4}$	N/A
carbon tetrachloride: lb/hr	ND < 400 ppb $< 9.49 \times 10^{-3}$	ND < 0.4 ppb $< 9.24 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 1000 ppb $< 1.49 \times 10^{-2}$	ND < 1.0 ppb $< 1.46 \times 10^{-4}$	N/A
trichloroethylene: lb/hr	ND < 1000 ppb $< 2.03 \times 10^{-2}$	ND < 1.0 ppb $< 1.97 \times 10^{-4}$	N/A
tetrachloroethylene: lb/hr	1600 ppb 4.09×10^{-2}	ND < 0.2 ppb $< 4.98 \times 10^{-5}$	> 99.88
chlorobenzene: lb/hr	ND < 1000 ppb $< 1.74 \times 10^{-2}$	ND < 1.0 ppb $< 1.69 \times 10^{-4}$	N/A
vinyl chloride: lb/hr	700 ppb 6.74×10^{-3}	ND < 0.4 ppb $< 3.76 \times 10^{-5}$	> 99.44
1,2-dichlorobenzene: lb/hr	ND < 1000 ppb $< 2.27 \times 10^{-2}$	ND < 1.0 ppb $< 2.21 \times 10^{-4}$	N/A
1,3+1,4-dichlorobenzene: lb/hr	700 ppb 1.59×10^{-2}	ND < 0.4 ppb $< 8.83 \times 10^{-5}$	> 99.44
1,1-dichloroethane: lb/hr	1900 ppb 2.90×10^{-2}	ND < 1.0 ppb $< 1.49 \times 10^{-4}$	> 99.49
1,2-dichloroethane: lb/hr	ND < 1000 ppb $< 1.53 \times 10^{-2}$	ND < 1.0 ppb $< 1.49 \times 10^{-4}$	N/A
benzene: lb/hr	6400 ppb 7.71×10^{-2}	ND < 0.4 ppb $< 4.69 \times 10^{-5}$	> 99.94
toluene: lb/hr	34000 ppb 4.83×10^{-1}	ND < 1.0 ppb $< 1.38 \times 10^{-4}$	> 99.97

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 11, TEST NO. 2

Test Date 5/14/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
acetonitrile: lb/hr	ND <2000 ppb $<1.27 \times 10^{-2}$	ND <2.0 ppb $<1.23 \times 10^{-4}$	N/A
xylenes: lb/hr	27000 ppb 4.42×10^{-1}	ND <0.8 ppb $<1.28 \times 10^{-4}$	>99.97
1,2-dibromoethane: lb/hr	ND <2000 ppb $<5.79 \times 10^{-2}$	ND <2.0 ppb $<5.64 \times 10^{-4}$	N/A
benzyl chloride: lb/hr	ND <5000 ppb $<9.76 \times 10^{-2}$	ND <5.0 ppb $<9.51 \times 10^{-4}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.
 NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-4
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE No.13

Test Date 5/13/92						
Parameter	First Run	Fuel Gas Second Run	Average	First Run	Exhaust Gas Second Run	Average
O ₂ , % dry	4.1	3.8	4.0	12.81	13.20	13.01
CO ₂ , % dry	31.9	32.3	32.1	7.52	7.22	7.37
N ₂ , % dry	23.0	22.1	22.6	79.7	79.6	79.6
H ₂ O, %	7.5	8.5	8.0	10.1	10.4	10.3
Flow Rate, dscfm	819	812	816	9801	10639	10220
Temperature, °F				1543	1611	1577
NO _x :						
ppm				13.0	14.4	13.7
ppm @ 3% O ₂				28.8	33.5	31.1
lb/hr (as NO ₂)				0.93	1.11	1.02
CO:						
ppm				2.7	2.0	2.4
ppm @ 3% O ₂				6.0	4.6	5.3
lb/hr				0.117	0.094	0.106
HC:						
CH ₄ ppm	409000	416000	412500	ND <1	ND <1	ND <1
Tot NMHC ppm (as CH ₄)	3780	3990	3885	4.56	2.41	3.49
Tot NMHC (as CH ₄) @3% O ₂	-	-	-	10.09	5.60	7.85
NMHC lb/hr (as CH ₄)	7.83	8.20	8.01	0.113	0.065	0.089
Destruction Eff. %	-	-	-	98.56	99.21	98.88
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0035	0.0016	0.0026
Total Particulate gr/dscf				0.0035	0.0016	0.0026
gr/dscf @12% CO ₂				0.0056	0.0027	0.0042
lb/hr				0.30	0.15	0.22
Sulfur Compounds:						
H ₂ S, ppm	45	44	44.5			
Methyl Mercaptan, ppm	1.1	1.1	1.1			
Ethyl Mercaptan, ppm	ND <1.9	ND <1.9	ND <1.9			
Dimethyl Sulfide, ppm	2.7	2.7	2.7			
Carbonyl Sulfide, ppm	ND <0.8	ND <0.8	ND <0.8			
Carbon Disulfide, ppm	ND <1.1	ND <1.1	ND <1.1			
Total Sulfur, ppm	<53.7	<52.7	<53.2			

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 13, TEST NO. 1

Test Date 5/13/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
methylene chloride: lb/hr	5900 ppb 6.49×10^{-2}	ND < 1.0 ppb $< 1.32 \times 10^{-4}$	> 99.80
chloroform: lb/hr	ND < 1000 ppb $< 1.55 \times 10^{-2}$	ND < 1.0 ppb $< 1.85 \times 10^{-4}$	N/A
1,1,1 trichloroethane: lb/hr	ND < 1000 ppb $< 1.73 \times 10^{-2}$	ND < 1.0 ppb $< 2.07 \times 10^{-4}$	N/A
carbon tetrachloride: lb/hr	ND < 400 ppb $< 7.97 \times 10^{-3}$	ND < 0.4 ppb $< 9.54 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 1000 ppb $< 1.26 \times 10^{-2}$	ND < 1.0 ppb $< 1.50 \times 10^{-4}$	N/A
trichloroethylene: lb/hr	ND < 1000 ppb $< 1.70 \times 10^{-2}$	ND < 1.0 ppb $< 2.04 \times 10^{-4}$	N/A
tetrachloroethylene: lb/hr	1600 ppb 3.44×10^{-2}	ND < 0.2 ppb $< 5.14 \times 10^{-5}$	> 99.85
chlorobenzene: lb/hr	ND < 1000 ppb $< 1.46 \times 10^{-2}$	ND < 1.0 ppb $< 1.74 \times 10^{-4}$	N/A
vinyl chloride: lb/hr	800 ppb 6.47×10^{-3}	ND < 0.4 ppb $< 3.87 \times 10^{-5}$	> 99.40
1,2-dichlorobenzene: lb/hr	ND < 1000 ppb $< 1.90 \times 10^{-2}$	ND < 1.0 ppb $< 2.28 \times 10^{-4}$	N/A
1,3 + 1,4-dichlorobenzene: lb/hr	ND < 400 ppb $< 7.61 \times 10^{-3}$	ND < 0.4 ppb $< 9.11 \times 10^{-5}$	N/A
1,1-dichloroethane: lb/hr	1900 ppb 2.43×10^{-2}	ND < 1.0 ppb $< 1.53 \times 10^{-4}$	> 99.37
1,2-dichloroethane: lb/hr	ND < 1000 ppb $< 1.28 \times 10^{-2}$	ND < 1.0 ppb $< 1.53 \times 10^{-4}$	N/A
benzene: lb/hr	6700 ppb 6.78×10^{-2}	ND < 0.4 ppb $< 4.84 \times 10^{-5}$	> 99.93
toluene: lb/hr	37000 ppb 4.41×10^{-1}	1.5 ppb 2.14×10^{-4}	99.95

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 13, TEST NO. 1

Test Date 5/13/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
acetonitrile: lb/hr	ND <2000 ppb $<1.06 \times 10^{-2}$	ND <2.0 ppb $<1.27 \times 10^{-4}$	N/A
xylenes: lb/hr	26000 ppb 3.57×10^{-1}	<0.9 ppb $<1.48 \times 10^{-4}$	> 99.96
1,2-dibromoethane: lb/hr	ND <2000 ppb $<4.87 \times 10^{-2}$	ND <2.0 ppb $<5.82 \times 10^{-4}$	N/A
benzyl chloride: lb/hr	ND <5000 ppb $<8.20 \times 10^{-2}$	ND <5.0 ppb $<9.81 \times 10^{-4}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.
 NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 13, TEST NO. 2

Test Date 5/13/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
methylene chloride: lb/hr	5700 ppb 6.27×10^{-2}	ND < 1.0 ppb $< 1.32 \times 10^{-4}$	> 99.79
chloroform: lb/hr	ND < 1000 ppb $< 1.55 \times 10^{-2}$	ND < 1.0 ppb $< 1.85 \times 10^{-4}$	N/A
1,1,1 trichloroethane: lb/hr	ND < 1000 ppb $< 1.73 \times 10^{-2}$	ND < 1.0 ppb $< 2.07 \times 10^{-4}$	N/A
carbon tetrachloride: lb/hr	ND < 400 ppb $< 7.97 \times 10^{-3}$	ND < 0.4 ppb $< 9.54 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 1000 ppb $< 1.26 \times 10^{-2}$	ND < 1.0 ppb $< 1.50 \times 10^{-4}$	N/A
trichloroethylene: lb/hr	ND < 1000 ppb $< 1.70 \times 10^{-2}$	ND < 1.0 ppb $< 2.04 \times 10^{-4}$	N/A
tetrachloroethylene: lb/hr	1600 ppb 3.44×10^{-2}	ND < 0.2 ppb $< 5.14 \times 10^{-5}$	> 99.85
chlorobenzene: lb/hr	ND < 1000 ppb $< 1.46 \times 10^{-2}$	ND < 1.0 ppb $< 1.74 \times 10^{-4}$	N/A
vinyl chloride: lb/hr	700 ppb 5.67×10^{-3}	ND < 0.4 ppb $< 3.87 \times 10^{-5}$	> 99.32
1,2-dichlorobenzene: lb/hr	ND < 1000 ppb $< 1.90 \times 10^{-2}$	ND < 1.0 ppb $< 2.28 \times 10^{-4}$	N/A
1,3 + 1,4-dichlorobenzene: lb/hr	ND < 400 ppb $< 7.61 \times 10^{-3}$	ND < 0.4 ppb $< 9.11 \times 10^{-5}$	N/A
1,1-dichloroethane: lb/hr	1800 ppb 2.31×10^{-2}	ND < 1.0 ppb $< 1.53 \times 10^{-4}$	99.34
1,2-dichloroethane: lb/hr	ND < 1000 ppb $< 1.28 \times 10^{-2}$	ND < 1.0 ppb $< 1.53 \times 10^{-4}$	N/A
benzene: lb/hr	6500 ppb 6.57×10^{-2}	0.7 ppb 8.47×10^{-5}	99.87
toluene: lb/hr	35000 ppb 4.18×10^{-1}	1.3 ppb 1.86×10^{-4}	99.96

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 13, TEST NO. 2

Test Date 5/13/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
acetonitrile: lb/hr	ND < 2000 ppb $< 1.06 \times 10^{-2}$	ND < 2.0 ppb $< 1.27 \times 10^{-4}$	N/A
xylene: lb/hr	28000 ppb 3.85×10^{-1}	ND < 0.8 ppb $< 1.32 \times 10^{-4}$	> 99.97
1,2-dibromoethane: lb/hr	ND < 2000 ppb $< 4.87 \times 10^{-2}$	ND < 2.0 ppb $< 5.82 \times 10^{-4}$	N/A
benzyl chloride: lb/hr	ND < 5000 ppb $< 8.20 \times 10^{-2}$	ND < 5.0 ppb $< 9.81 \times 10^{-4}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.
 NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-7
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE No.17

Test Date 5/12/92						
Parameter	First Run	Fuel Gas Second Run	Average	First Run	Exhaust Gas Second Run	Average
O ₂ , % dry	5.2	3.9	4.6	12.45	13.10	12.78
CO ₂ , % dry	30.0	32.3	31.2	7.53	7.23	7.38
N ₂ , % dry	27.2	22.9	25.1	80.0	79.7	79.8
H ₂ O, %	5.6	8.2	6.9	9.8	9.8	9.8
Flow Rate, dscfm	953	982	968	10673	9688	10181
Temperature, °F				1572	1575	1574
NO _x :						
ppm						
ppm @ 3% O ₂				14.5	14.8	14.7
lb/hr (as NO ₂)				30.7	34.0	32.3
				1.13	1.04	1.08
CO:						
ppm						
ppm @ 3% O ₂				1.9	2.0	2.0
lb/hr				4.0	4.6	4.3
				0.090	0.086	0.088
HC:						
CH ₄ ppm	382000	390000	386000	ND <1	1.05	<1.03
Tot NMHC ppm (as CH ₄)	4520	5360	4940	5.87	6.24	6.06
Tot NMHC (as CH ₄) @3% O ₂	—	—	—	12.43	14.32	13.38
NMHC lb/hr (as CH ₄)	10.25	13.31	11.78	0.158	0.153	0.156
Destruction Eff. %	—	—	—	98.55	98.85	98.70
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0028	0.0019	0.0024
Total Particulate gr/dscf				0.0028	0.0019	0.0024
gr/dscf @12% CO ₂				0.0044	0.0031	0.0038
lb/hr				0.25	0.16	0.20
Sulfur Compounds:						
H ₂ S, ppm	44	45	42			
Methyl Mercaptan, ppm	1.1	1.1	1.1			
Ethyl Mercaptan, ppm	ND <1.9	ND <1.9	0.4			
Dimethyl Sulfide, ppm	2.6	2.6	2.3			
Carbonyl Sulfide, ppm	ND <0.8	ND <0.8	ND <0.3			
Carbon Disulfide, ppm	ND <1.1	ND <1.1	ND <1.1			
Total Sulfur, ppm	<52.6	<53.6	<53.1			

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 17, TEST NO. 1

Test Date 5/12/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
methylene chloride: lb/hr	5700 ppb 7.29×10^{-2}	ND < 1.0 ppb $< 1.43 \times 10^{-4}$	> 99.80
chloroform: lb/hr	ND < 1000 ppb $< 1.80 \times 10^{-2}$	ND < 1.0 ppb $< 2.01 \times 10^{-4}$	N/A
1,1,1 trichloroethane: lb/hr	ND < 1000 ppb $< 2.01 \times 10^{-2}$	ND < 1.0 ppb $< 2.25 \times 10^{-4}$	N/A
carbon tetrachloride: lb/hr	ND < 400 ppb $< 9.27 \times 10^{-3}$	ND < 0.4 ppb $< 1.04 \times 10^{-4}$	N/A
1,1-dichloroethene: lb/hr	ND < 1000 ppb $< 1.46 \times 10^{-2}$	ND < 1.0 ppb $< 1.64 \times 10^{-4}$	N/A
trichloroethylene: lb/hr	ND < 1000 ppb $< 1.98 \times 10^{-2}$	34.0 ppb 7.54×10^{-3}	N/A
tetrachloroethylene: lb/hr	1500 ppb 3.75×10^{-2}	ND < 0.2 ppb $< 5.60 \times 10^{-5}$	> 99.85
chlorobenzene: lb/hr	ND < 1000 ppb $< 1.70 \times 10^{-2}$	ND < 1.0 ppb $< 1.90 \times 10^{-4}$	N/A
vinyl chloride: lb/hr	700 ppb 6.59×10^{-3}	ND < 0.4 ppb $< 4.22 \times 10^{-5}$	> 99.36
1,2-dichlorobenzene: lb/hr	ND < 1000 ppb $< 2.22 \times 10^{-2}$	ND < 1.0 ppb $< 2.48 \times 10^{-4}$	N/A
1,3 + 1,4-dichlorobenzene: lb/hr	ND < 400 ppb $< 8.86 \times 10^{-3}$	ND < 0.4 ppb $< 9.92 \times 10^{-5}$	N/A
1,1-dichloroethane: lb/hr	1800 ppb 2.68×10^{-2}	ND < 1.0 ppb $< 1.67 \times 10^{-4}$	> 99.38
1,2-dichloroethane: lb/hr	ND < 1000 ppb $< 1.49 \times 10^{-2}$	ND < 1.0 ppb $< 1.67 \times 10^{-4}$	N/A
benzene: lb/hr	6800 ppb 8.00×10^{-2}	ND < 0.4 ppb $< 5.27 \times 10^{-5}$	> 99.93
toluene: lb/hr	36000 ppb 5.00×10^{-1}	1.9 ppb 2.95×10^{-4}	99.94

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 17, TEST NO. 1

Test Date 5/12/92

Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
acetonitrile: lb/hr	ND < 2000 ppb $< 1.24 \times 10^{-2}$	ND < 2.0 ppb $< 1.39 \times 10^{-4}$	N/A
xlenes: lb/hr	32000 ppb 5.12×10^{-1}	ND < 0.8 ppb $< 1.43 \times 10^{-4}$	> 99.97
1,2-dibromoethane: lb/hr	ND < 2000 ppb $< 5.66 \times 10^{-2}$	ND < 2.0 ppb $< 6.34 \times 10^{-4}$	N/A
benzyl chloride: lb/hr	ND < 5000 ppb $< 9.54 \times 10^{-2}$	ND < 5.0 ppb $< 1.07 \times 10^{-3}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.
 NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUEENTE HILLS LANDFILL, FLARE NO. 17, TEST NO. 2

Test Date 5/12/92	5/12/92		
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
methylene chloride: lb/hr	6100 ppb 7.81×10^{-2}	ND < 1.0 ppb $< 1.43 \times 10^{-4}$	99.82
chloroform: lb/hr	ND < 1000 ppb $< 1.80 \times 10^{-2}$	ND < 1.0 ppb $< 2.01 \times 10^{-4}$	> 98.88
1,1,1 trichloroethane: lb/hr	ND < 1000 ppb $< 2.01 \times 10^{-2}$	ND < 1.0 ppb $< 2.25 \times 10^{-4}$	N/A
carbon tetrachloride: lb/hr	ND < 400 ppb $< 9.27 \times 10^{-3}$	ND < 0.4 ppb $< 1.04 \times 10^{-4}$	N/A
1,1-dichloroethene: lb/hr	ND < 1000 ppb $< 1.46 \times 10^{-2}$	ND < 1.0 ppb $< 1.64 \times 10^{-4}$	N/A
trichloroethylene: lb/hr	ND < 1000 ppb $< 1.98 \times 10^{-2}$	1.0 ppb 2.22×10^{-4}	N/A
tetrachloroethylene: lb/hr	1700 ppb 4.25×10^{-2}	ND < 0.2 ppb $< 5.60 \times 10^{-5}$	> 99.87
chlorobenzene: lb/hr	ND < 1000 ppb $< 1.70 \times 10^{-2}$	ND < 1.0 ppb $< 1.90 \times 10^{-4}$	N/A
vinyl chloride: lb/hr	700 ppb 6.59×10^{-3}	ND < 0.4 ppb $< 4.22 \times 10^{-5}$	> 99.36
1,2-dichlorobenzene: lb/hr	ND < 1000 ppb $< 2.22 \times 10^{-2}$	ND < 1.0 ppb $< 2.48 \times 10^{-4}$	N/A
1,3+1,4-dichlorobenzene: lb/hr	500 ppb 1.11×10^{-2}	ND < 0.4 ppb $< 9.92 \times 10^{-5}$	> 99.10
1,1-dichloroethane: lb/hr	2000 ppb 2.98×10^{-2}	ND < 1.0 ppb $< 1.67 \times 10^{-4}$	> 99.44
1,2-dichloroethane: lb/hr	ND < 1000 ppb $< 1.49 \times 10^{-2}$	ND < 1.0 ppb $< 1.67 \times 10^{-4}$	N/A
benzene: lb/hr	6900 ppb 8.12×10^{-2}	ND < 0.4 ppb $< 5.27 \times 10^{-5}$	> 99.94
toluene: lb/hr	38000 ppb 5.27×10^{-1}	ND < 1.0 ppb $< 1.55 \times 10^{-4}$	> 99.97

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 17, TEST NO. 2

acetonitrile: lb/hr	ND <2000 ppb $<1.24 \times 10^{-2}$	ND <2.0 ppb $<1.39 \times 10^{-4}$	N/A
xylenes: lb/hr	32000 ppb 5.12×10^{-1}	ND <0.8 ppb $<1.43 \times 10^{-4}$	>99.97
1,2-dibromoethane: lb/hr	ND <2000 ppb $<5.66 \times 10^{-2}$	ND <2.0 ppb $<6.34 \times 10^{-4}$	N/A
benzyl chloride: lb/hr	ND <5000 ppb $<9.54 \times 10^{-2}$	ND <5.0 ppb $<1.07 \times 10^{-3}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-10
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE No.19

Test Date: 5/11/92						
Parameter	First Run	Fuel Gas Second Run	Average	First Run	Exhaust Gas Second Run	Average
O ₂ , % dry	4.3	4.4	4.3	11.05	11.14	11.10
CO ₂ , % dry	31.3	31.4	31.4	9.07	8.95	9.01
N ₂ , % dry	24.2	24.5	24.4	79.9	79.9	79.9
H ₂ O, %	5.3	5.3	5.3	11.5	10.9	11.2
Flow Rate, dscfm	895	996	946	10314	9645	9980
Temperature, °F				1709	1708	1709
NO _x :						
ppm				17.1	17.2	17.2
ppm @ 3% O ₂				31.1	31.5	31.3
lb/hr (as NO ₂)				1.28	1.21	1.24
CO:						
ppm				1.9	1.9	1.9
ppm @ 3% O ₂				3.5	3.5	3.5
lb/hr				0.087	0.081	0.084
HC:						
CH ₄ ppm	370000	386000	378000	ND <1	ND <1	ND <1
Tot NMHC ppm (as CH ₄)	4800	4790	4795	4.91	6.1	5.51
Tot NMHC (as CH ₄) @3% O ₂	—	—	—	8.92	11.19	10.06
NMHC lb/hr (as CH ₄)	10.87	12.07	11.47	0.128	0.149	0.138
Destruction Eff. %	—	—	—	98.82	98.77	98.79
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0008	0.0039	0.0024
Total Particulate gr/dscf				0.0008	0.0039	0.0024
gr/dscf @12% CO ₂				0.0011	0.0052	0.0032
lb/hr				0.07	0.32	0.20
Sulfur Compounds:						
H ₂ S, ppm	45	46	46			
Methyl Mercaptan, ppm	1.0	1.1	1.1			
Ethyl Mercaptan, ppm	ND <1.9	ND <1.9	ND <1.9			
Dimethyl Sulfide, ppm	2.5	2.6	2.6			
Carbonyl Sulfide, ppm	ND <0.8	ND <0.8	ND <0.8			
Carbon Disulfide, ppm	ND <1.1	ND <1.1	ND <1.1			
Total Sulfur, ppm	<53.4	<54.6	<54.0			

TABLE 4-11
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUEENTE HILLS LANDFILL, FLARE NO. 19, TEST NO. 1

Test Date 5/11/92

Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
methylene chloride: lb/hr	5600 ppb 6.73×10^{-2}	ND < 1.0 ppb < 1.39×10^{-4}	> 99.79
chloroform: lb/hr	ND < 1000 ppb < 1.69×10^{-2}	ND < 1.0 ppb < 1.95×10^{-4}	N/A
1,1,1 trichloroethane: lb/hr	ND < 1000 ppb < 1.89×10^{-2}	ND < 1.0 ppb < 2.18×10^{-4}	N/A
carbon tetrachloride: lb/hr	ND < 400 ppb < 8.71×10^{-3}	ND < 0.4 ppb < 1.00×10^{-4}	N/A
1,1-dichloroethene: lb/hr	ND < 000 ppb < 1.37×10^{-2}	ND < 1.0 ppb < 1.58×10^{-4}	N/A
trichloroethylene: lb/hr	ND < 1000 ppb < 1.86×10^{-2}	ND < 1.0 ppb < 2.14×10^{-4}	N/A
tetrachloroethylene: lb/hr	1700 ppb 3.99×10^{-2}	ND < 0.2 ppb < 5.41×10^{-5}	> 99.86
chlorobenzene: lb/hr	ND < 1000 ppb < 1.59×10^{-2}	ND < 1.0 ppb < 1.84×10^{-4}	N/A
vinyl chloride: lb/hr	700 ppb 6.19×10^{-3}	ND < 0.4 ppb < 4.08×10^{-5}	> 99.34
1,2-dichlorobenzene: lb/hr	ND < 1000 ppb < 2.08×10^{-2}	ND < 1.0 ppb < 2.40×10^{-4}	N/A
1,3+1,4-dichlorobenzene: lb/hr	800 ppb 1.66×10^{-2}	ND < 0.4 ppb < 9.59×10^{-5}	> 99.42
1,1-dichloroethane: lb/hr	1800 ppb 2.52×10^{-2}	ND < 1.0 ppb < 1.61×10^{-4}	> 99.36
1,2-dichloroethane: lb/hr	ND < 1000 ppb < 1.40×10^{-2}	ND < 1.0 ppb < 1.61×10^{-4}	N/A
benzene: lb/hr	6600 ppb 7.29×10^{-2}	0.5 ppb 6.37×10^{-5}	99.91
toluene: lb/hr	38000 ppb 4.95×10^{-1}	1.5 ppb 2.25×10^{-4}	99.95

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TABLE 4-11
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 19, TEST NO. 1

Test Date 5/11/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
acetonitrile: lb/hr	ND <2000 ppb $<1.16 \times 10^{-2}$	ND <2.0 ppb $<1.34 \times 10^{-4}$	N/A
xylenes: lb/hr	33000 ppb 4.96×10^{-1}	ND <0.8 ppb $<1.39 \times 10^{-4}$	>99.97
1,2-dibromoethane: lb/hr	ND <2000 ppb $<5.32 \times 10^{-2}$	ND <2.0 ppb $<6.13 \times 10^{-4}$	N/A
benzyl chloride: lb/hr	ND <5000 ppb $<8.96 \times 10^{-2}$	ND <5.0 ppb $<1.03 \times 10^{-3}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.
 NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-12
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUEENTE HILLS LANDFILL, FLARE NO. 19, TEST NO. 2

Test Date 5/14/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
methylene chloride: lb/hr	6100 ppb 7.33×10^{-2}	ND < 1.0 ppb $< 1.39 \times 10^{-4}$	> 99.81
chloroform: lb/hr	ND < 1000 ppb $< 1.69 \times 10^{-2}$	ND < 1.0 ppb $< 1.95 \times 10^{-4}$	N/A
1,1,1 trichloroethane: lb/hr	ND < 1000 ppb $< 1.89 \times 10^{-2}$	ND < 1.0 ppb $< 2.18 \times 10^{-4}$	N/A
carbon tetrachloride: lb/hr	ND < 400 ppb $< 8.71 \times 10^{-3}$	ND < 0.4 ppb $< 1.00 \times 10^{-4}$	N/A
1,1-dichloroethene: lb/hr	ND < 1000 ppb $< 1.37 \times 10^{-2}$	ND < 1.0 ppb $< 1.58 \times 10^{-4}$	N/A
trichloroethylene: lb/hr	ND < 1000 ppb $< 1.86 \times 10^{-2}$	ND < 1.0 ppb $< 2.14 \times 10^{-4}$	N/A
tetrachloroethylene: lb/hr	1700 ppb 3.99×10^{-2}	ND < 0.2 ppb $< 5.41 \times 10^{-5}$	> 99.86
chlorobenzene: lb/hr	ND < 1000 ppb $< 1.59 \times 10^{-2}$	ND < 1.0 ppb $< 1.84 \times 10^{-4}$	N/A
vinyl chloride: lb/hr	700 ppb 6.19×10^{-3}	ND < 0.4 ppb $< 4.08 \times 10^{-5}$	> 99.34
1,2-dichlorobenzene: lb/hr	ND < 1000 ppb $< 2.08 \times 10^{-2}$	ND < 1.0 ppb $< 2.40 \times 10^{-4}$	N/A
1,3+1,4-dichlorobenzene: lb/hr	800 ppb 1.66×10^{-2}	ND < 0.4 ppb $< 9.59 \times 10^{-5}$	> 99.42
1,1-dichloroethane: lb/hr	1800 ppb 2.52×10^{-2}	ND < 1.0 ppb $< 1.61 \times 10^{-4}$	> 99.36
1,2-dichloroethane: lb/hr	ND < 1000 ppb $< 1.40 \times 10^{-2}$	ND < 1.0 ppb $< 1.61 \times 10^{-4}$	N/A
benzene: lb/hr	6800 ppb 7.52×10^{-2}	ND < 0.4 ppb $< 5.09 \times 10^{-5}$	> 99.93
toluene: lb/hr	39000 ppb 5.08×10^{-1}	1.2 ppb 1.80×10^{-4}	99.96

TABLE 4-12
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 19, TEST NO. 2

Test Date 5/14/92			
Species	Inlet Landfill Gas	Exhaust Results	Destruction Efficiency, %
acetonitrile: lb/hr	ND <2000 ppb <1.16 x 10 ⁻²	ND <2.0 ppb <1.34 x 10 ⁻⁴	N/A
xlenes: lb/hr	33000 ppb 4.96 x 10 ⁻¹	ND <0.8 ppb <1.39 x 10 ⁻⁴	>99.97
1,2-dibromoethane: lb/hr	ND <2000 ppb <5.32 x 10 ⁻²	ND <2.0 ppb <6.13 x 10 ⁻⁴	N/A
benzyl chloride: lb/hr	ND <5000 ppb <8.96 x 10 ⁻²	ND <5.0 ppb <1.03 x 10 ⁻³	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.
 NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSIONS TESTS ON FOUR FLARES
(FLARE NOS. 18, 20, 22 AND 24)
AT PUENTE HILLS LANDFILL
OCTOBER 1992**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

JANUARY 1993

DRAFT

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CARNOT

TABLE 4-1
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 18
NOVEMBER 3, 1992

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.21	4.05	4.13	12.43	11.85	12.14
CO ₂ , % dry	31.9	31.6	31.8	7.66	8.15	7.91
N ₂ , % dry	24.3	23.7	24.0	79.9	80.0	80.0
H ₂ O, %	5.5	6.7	6.1	9.2	9.7	9.5
Flow Rate, dscfm	971	967	969	10171	10099	10135
Temperature, °F				1558	1631	1595
NO _x :						
ppm				15.5	17.3	16.4
ppm @ 3 % O ₂				32.8	34.2	33.5
lb/hr (as NO ₂)				1.15	1.27	1.21
CO:						
ppm				2.7	2.0	2.4
ppm @ 3 % O ₂				5.7	4.0	4.8
lb/hr				0.122	0.089	0.105
HC:						
CH ₄ , ppm	412000	438000	425000	ND < 1	ND < 1	ND < 1
TGNMO ppm	3440	3260	3350	1.38	2.92	2.15
TGNMO ppm @ 3 % O ₂	--	--	--	2.85	6.17	4.51
TGNMO lb/hr (as CH ₄)	8.45	7.97	8.21	0.04	0.07	0.06
Destruction Eff. %	--	--	--	99.58	99.06	99.32
Particulate:						
Organic Fraction gr/dscf				0.0001	0.0001	0.0001
Inorganic Fraction gr/dscf				0.0032	0.0035	0.0034
Total Particulate gr/dscf				0.0033	0.0036	0.0035
gr/dscf @ 3 % O ₂				0.0068	0.0076	0.0072
gr/dscf @ 12 % CO ₂				0.0051	0.0053	0.0052
lb/hr				0.29	0.31	0.30
Sulfur Compounds:						
H ₂ S, ppm	53	48	51			
Methyl Mercaptan, ppm	0.9	1.0	1.0			
Ethyl Mercaptan, ppm	*	*	*			
Dimethyl Sulfide, ppm	2.2*	2.1*	2.2*			
Carbonyl Sulfide, ppm	ND < 0.3	ND < 0.3	ND < 0.3			
Carbon Disulfide, ppm	ND < 0.4	ND < 0.4	ND < 0.4			
Dimethyl Disulfide, ppm	ND < 0.9	ND < 0.9	ND < 0.9			
Total Sulfur Compounds, ppm	< 59.0	< 54.0	< 56.5			

* Interference

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TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 18, TEST NO. 1
NOVEMBER 3, 1992

Flow rate, Inlet dscfm	971		
Flow rate, Exhaust dscfm	10171		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	4800 ppb 6.26×10^{-2}	ND < 0.2 ppb $< 2.73 \times 10^{-5}$	> 99.96
Chloroform: lb/hr	ND < 200 ppb $< 3.67 \times 10^{-3}$	ND < 0.2 ppb $< 3.84 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 8.19×10^{-3}	ND < 0.2 ppb $< 4.29 \times 10^{-5}$	> 99.48
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 4.72 \times 10^{-3}$	ND < 0.2 ppb $< 4.95 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 2.98 \times 10^{-3}$	ND < 0.2 ppb $< 3.12 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1200 ppb 2.42×10^{-2}	ND < 0.2 ppb $< 4.23 \times 10^{-5}$	> 99.83
Tetrachloroethylene: lb/hr	2000 ppb 5.09×10^{-2}	ND < 0.2 ppb $< 5.33 \times 10^{-5}$	> 99.90
Chlorobenzene: lb/hr	ND < 400 ppb $< 6.91 \times 10^{-3}$	ND < 0.4 ppb $< 7.24 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	2000 ppb 1.92×10^{-2}	ND < 0.4 ppb $< 4.02 \times 10^{-5}$	> 99.79
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 4.51 \times 10^{-3}$	ND < 0.2 ppb $< 4.73 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	ND < 200 ppb $< 4.51 \times 10^{-3}$	ND < 0.2 ppb $< 4.73 \times 10^{-5}$	N/A

(continued)

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 18, TEST NO. 1
NOVEMBER 3, 1992

Flow rate, Inlet dscfm	971		
Flow rate, Exhaust dscfm	10171		
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1500 ppb 2.28×10^{-2}	ND < 0.2 ppb $< 3.18 \times 10^{-5}$	> 99.86
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 3.04 \times 10^{-3}$	ND < 0.2 ppb $< 3.18 \times 10^{-5}$	N/A
Benzene: lb/hr	4100 ppb 4.92×10^{-2}	0.4 ppb 5.02×10^{-5}	99.90
Toluene: lb/hr	31000 ppb 4.38×10^{-1}	6.1 ppb 9.04×10^{-4}	99.79
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.26 \times 10^{-2}$	ND < 2.0 ppb $< 1.32 \times 10^{-4}$	N/A
m-xylenes: lb/hr	13000 ppb 2.12×10^{-1}	0.5 ppb 8.54×10^{-5}	99.96
o+p xylenes: lb/hr	10000 ppb 1.63×10^{-1} ppb	0.6 ppb 1.02×10^{-4}	99.94
1,2-dibromoethane: lb/hr	ND < 7000 ppb 2.02×10^{-1}	ND < 7.0 ppb $< 2.11 \times 10^{-3}$	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 9.72 \times 10^{-2}$	ND < 5.0 ppb $< 1.02 \times 10^{-3}$	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 18, TEST NO. 2
NOVEMBER 3, 1992

Flow rate, Inlet dscfm	967		
Flow rate, Exhaust dscfm	10099		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	5000 ppb 6.49×10^{-2}	ND < 0.2 ppb $< 2.71 \times 10^{-5}$	> 99.96
Chloroform: lb/hr	ND < 200 ppb $< 3.65 \times 10^{-3}$	ND < 0.2 ppb $< 3.81 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 8.16×10^{-3}	ND < 0.2 ppb $< 4.26 \times 10^{-5}$	> 99.48
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 4.70 \times 10^{-3}$	ND < 0.2 ppb $< 4.91 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 2.96 \times 10^{-3}$	ND < 0.2 ppb $< 3.10 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1300 ppb 2.61×10^{-2}	ND < 0.2 ppb $< 4.20 \times 10^{-5}$	> 99.84
Tetrachloroethylene: lb/hr	2300 ppb 5.83×10^{-2}	ND < 0.2 ppb $< 5.30 \times 10^{-5}$	> 99.91
Chlorobenzene: lb/hr	ND < 400 ppb $< 6.88 \times 10^{-3}$	ND < 0.4 ppb $< 7.19 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	1900 ppb 1.82×10^{-2}	ND < 0.4 ppb $< 3.99 \times 10^{-5}$	> 99.78
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 4.50 \times 10^{-3}$	ND < 0.2 ppb $< 4.69 \times 10^{-5}$	N/A
o+p ichlorobenzene: lb/hr	300 ppb 6.74×10^{-3}	ND < 0.2 ppb $< 4.69 \times 10^{-5}$	> 99.30

(continued)

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 18, TEST NO. 2
NOVEMBER 3, 1992

Flow rate, Inlet dscfm	967		
Flow rate, Exhaust dscfm	10099		
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1600 ppb 2.42×10^{-2}	ND < 0.2 ppb $< 3.16 \times 10^{-5}$	> 99.87
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 3.03 \times 10^{-3}$	ND < 0.2 ppb $< 3.16 \times 10^{-5}$	N/A
Benzene: lb/hr	4100 ppb 4.90×10^{-2}	0.2 ppb 2.49×10^{-5}	99.95
Toluene: lb/hr	32000 ppb 4.51×10^{-1}	1.3 ppb 1.91×10^{-4}	99.96
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.26 \times 10^{-2}$	ND < 2.0 ppb $< 1.31 \times 10^{-4}$	N/A
m-xylenes: lb/hr	15000 ppb 2.43×10^{-1}	0.2 ppb 3.39×10^{-5}	99.99
o+p xylenes: lb/hr	11000 ppb 1.79×10^{-1} ppb	0.3 ppb 5.09×10^{-5}	99.97
1,2-dibromoethane: lb/hr	ND < 7000 ppb 2.01×10^{-1}	ND < 7.0 ppb $< 2.10 \times 10^{-3}$	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 9.68 \times 10^{-2}$	ND < 5.0 ppb $< 1.01 \times 10^{-3}$	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-4
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 20
NOVEMBER 2, 1992

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.06	3.51	3.78	12.24	12.22	12.23
CO ₂ , % dry	31.8	32.3	32.1	7.85	7.78	7.82
N ₂ , % dry	23.8	21.6	22.7	79.9	80.0	80.0
H ₂ O, %	6.1	7.3	6.7	8.9	9.2	9.1
Flow Rate, dscfm	817	809	813	9075	9967	9521
Temperature, °F				1631	1657	1644
NO _x :						
ppm						
ppm @ 3% O ₂				17.0	16.8	16.9
lb/hr (as NO ₂)				35.1	34.6	34.9
				1.12	1.22	1.17
CO:						
ppm						
ppm @ 3% O ₂				2.8	5.0	3.9
lb/hr				5.8	10.3	8.0
				0.112	0.221	0.167
HC:						
CH ₄ ppm	429000	443000	436000	ND<1	ND<1	ND<1
TGNMO ppm	3200	3480	3340	ND<1	1.81	<2.15
TGNMO ppm @ 3% O ₂	--	--	--	<2.07	3.73	<4.51
TGNMO lb/hr (as CH ₄)	6.61	7.12	6.87	<0.02	0.05	<0.06
Destruction Eff. %	--	--	--	>99.65	99.36	>99.32
Particulate:						
Organic Fraction gr/dscf				0.0002	0.0002	0.0002
Inorganic Fraction gr/dscf				0.0039	0.0022	0.0031
Total Particulate gr/dscf				0.0041	0.0024	0.0033
gr/dscf @ 3% O ₂				0.0085	0.0049	0.0067
gr/dscf @ 12% CO ₂				0.0062	0.0037	0.0050
lb/hr				0.32	0.21	0.27
Sulfur Compounds:						
H ₂ S, ppm	51	44	48			
Methyl Mercaptan, ppm	0.9	0.9	0.9			
Ethyl Mercaptan, ppm	*	*	*			
Dimethyl Sulfide, ppm	2.2*	2.3*	2.3*			
Carbonyl Sulfide, ppm	ND<0.3	ND<0.3	ND<0.3			
Carbon Disulfide, ppm	ND<0.4	ND<0.4	ND<0.4			
Dimethyl Disulfide, ppm	ND<0.9	ND<0.9	ND<0.9			
Total Sulfur Compounds, ppm	<57.0	<50.1	<53.6			

* Interference

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 20, TEST NO. 1
NOVEMBER 2, 1992

Flow rate, Inlet dscfm 817			
Flow rate, Exhaust dscfm 9075			
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	4500 ppb 4.94×10^{-2}	ND < 0.2 ppb $< 2.44 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 3.08 \times 10^{-3}$	ND < 0.2 ppb $< 3.43 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	500 ppb 8.62×10^{-3}	ND < 0.2 ppb $< 3.83 \times 10^{-5}$	> 99.56
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 3.97 \times 10^{-3}$	ND < 0.2 ppb $< 4.41 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 2.50 \times 10^{-3}$	ND < 0.2 ppb $< 2.78 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1400 ppb 2.38×10^{-2}	ND < 0.2 ppb $< 3.77 \times 10^{-5}$	> 99.84
Tetrachloroethylene: lb/hr	2400 ppb 5.14×10^{-2}	ND < 0.2 ppb $< 4.76 \times 10^{-5}$	> 99.91
Chlorobenzene: lb/hr	ND < 400 ppb $< 5.82 \times 10^{-3}$	ND < 0.4 ppb $< 6.46 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	1400 ppb 1.13×10^{-2}	ND < 0.4 ppb $< 3.59 \times 10^{-5}$	> 99.68
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 3.80 \times 10^{-3}$	ND < 0.2 ppb $< 4.22 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	ND < 300 ppb $< 5.70 \times 10^{-3}$	ND < 0.2 ppb $< 4.22 \times 10^{-5}$	> 99.26

(continued)

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 20, TEST NO. 1
NOVEMBER 2, 1992

Flow rate, Inlet dscfm 817			
Flow rate, Exhaust dscfm 9075			
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1700 ppb 2.17×10^{-2}	ND < 0.2 ppb $< 2.84 \times 10^{-5}$	> 99.87
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 2.56 \times 10^{-3}$	ND < 0.2 ppb $< 2.84 \times 10^{-5}$	N/A
Benzene: lb/hr	4000 ppb 4.04×10^{-2}	0.2 ppb 2.24×10^{-5}	99.94
Toluene: lb/hr	32000 ppb 3.81×10^{-1}	2.6 ppb 3.44×10^{-4}	99.91
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.06 \times 10^{-2}$	ND < 2.0 ppb $< 1.18 \times 10^{-4}$	N/A
m-xylenes: lb/hr	15000 ppb 2.06×10^{-1}	0.2 ppb 3.05×10^{-5}	99.99
o+p xylenes: lb/hr	11000 ppb 1.51×10^{-1} ppb	0.3 ppb 4.57×10^{-5}	99.97
1,2-dibromoethane: lb/hr	ND < 7000 ppb 1.70×10^{-1}	ND < 7.0 ppb $< 1.89 \times 10^{-3}$	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 8.18 \times 10^{-2}$	ND < 5.0 ppb $< 9.08 \times 10^{-4}$	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 20, TEST NO. 2
NOVEMBER 2, 1992

Flow rate, Inlet dscfm 809			
Flow rate, Exhaust dscfm 9967			
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	5000 ppb 5.43×10^{-2}	ND < 0.2 ppb $< 2.68 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 3.05 \times 10^{-3}$	ND < 0.2 ppb $< 3.76 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	500 ppb 8.53×10^{-3}	ND < 0.2 ppb $< 4.20 \times 10^{-5}$	> 99.51
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 3.94 \times 10^{-3}$	ND < 0.2 ppb $< 4.85 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 2.48 \times 10^{-3}$	ND < 0.2 ppb $< 3.06 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1400 ppb 2.35×10^{-2}	ND < 0.2 ppb $< 4.14 \times 10^{-5}$	> 99.82
Tetrachloroethylene: lb/hr	2300 ppb 4.88×10^{-2}	ND < 0.2 ppb $< 5.23 \times 10^{-5}$	> 99.89
Chlorobenzene: lb/hr	ND < 400 ppb $< 5.76 \times 10^{-3}$	ND < 0.4 ppb $< 7.09 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	600 ppb 4.80×10^{-3}	ND < 0.4 ppb $< 3.94 \times 10^{-5}$	> 99.18
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 3.76 \times 10^{-3}$	ND < 0.2 ppb $< 4.63 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	ND < 200 ppb $< 3.76 \times 10^{-3}$	ND < 0.2 ppb $< 4.63 \times 10^{-5}$	N/A

(continued)

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 20, TEST NO. 2
NOVEMBER 2, 1992

Flow rate, Inlet dscfm 809
Flow rate, Exhaust dscfm 9967

Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1700 ppb 2.15×10^{-2}	ND < 0.2 ppb $< 3.12 \times 10^{-5}$	> 99.86
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 2.53 \times 10^{-3}$	ND < 0.2 ppb $< 3.12 \times 10^{-5}$	N/A
Benzene: lb/hr	3900 ppb 3.90×10^{-2}	0.4 ppb 4.92×10^{-5}	99.87
Toluene: lb/hr	31000 ppb 3.65×10^{-1}	3.8 ppb 5.52×10^{-4}	99.85
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.05 \times 10^{-2}$	ND < 2.0 ppb $< 1.29 \times 10^{-4}$	N/A
m-xylenes: lb/hr	13000 ppb 1.77×10^{-1}	0.4 ppb 6.69×10^{-5}	99.96
o+p xylenes: lb/hr	9800 ppb 1.33×10^{-1} ppb	0.4 ppb 6.69×10^{-5}	99.95
1,2-dibromoethane: lb/hr	ND < 7000 ppb 1.68×10^{-1}	ND < 7.0 ppb $< 2.07 \times 10^{-3}$	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 8.10 \times 10^{-2}$	ND < 5.0 ppb $< 9.97 \times 10^{-4}$	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

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TABLE 4-7
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 22
OCTOBER 26, 1992

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	3.98	3.86	3.92	12.21	11.92	12.07
CO ₂ , % dry	31.6	32.3	32.0	8.14	8.23	8.19
N ₂ , % dry	23.1	22.6	22.9	79.7	79.9	79.8
H ₂ O, %	6.9	6.7	6.8	10.1	10.2	10.2
Flow Rate, dscfm	898	877	888	10286	9907	10097
Temperature, °F				1596	1609	1603
NO _x :						
ppm				16.9	17.4	17.2
ppm @ 3% O ₂				34.8	34.7	34.7
lb/hr (as NO ₂)				1.26	1.25	1.26
CO:						
ppm				12.0	6.8	9.4
ppm @ 3% O ₂				24.7	13.6	19.1
lb/hr				0.546	0.298	0.422
HC:						
CH ₄ ppm	428000	434000	431000	ND < 1	ND < 1	ND < 1
TGNMO ppm	3440	3480	3460	7.01	5.20	6.11
TGNMO ppm @ 3% O ₂	—	—	—	14.44	10.37	12.40
TGNMO lb/hr (as CH ₄)	7.81	7.72	7.77	0.18	0.13	0.16
Destruction Eff. %	—	—	—	97.67	98.31	97.99
Particulate:						
Organic Fraction gr/dscf				0.0002	0.0001	0.0002
Inorganic Fraction gr/dscf				0.0035	0.0038	0.0037
Total Particulate gr/dscf				0.0037	0.0039	0.0038
gr/dscf @ 3% O ₂				0.0076	0.0078	0.0077
gr/dscf @ 12% CO ₂				0.0055	0.0057	0.0056
lb/hr				0.33	0.33	0.33
Sulfur Compounds:						
H ₂ S, ppm	49	56	53			
Methyl Mercaptan, ppm	0.9	1.0	1.0			
Ethyl Mercaptan, ppm	*	*	*			
Dimethyl Sulfide, ppm	2.3*	2.3*	2.3*			
Carbonyl Sulfide, ppm	ND < 0.3	ND < 0.3	ND < 0.3			
Carbon Disulfide, ppm	ND < 0.4	ND < 0.4	ND < 0.4			
Dimethyl Disulfide, ppm	ND < 0.9	ND < 0.9	ND < 0.9			
Total Sulfur Compounds, ppm	<55.1	<62.2	<59.2			

* Interference

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 22, TEST NO. 1
OCTOBER 26, 1992

Flow rate, Inlet dscfm	898		
Flow rate, Exhaust dscfm	10286		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	4900 ppb 5.91×10^{-2}	ND < 0.2 ppb $< 2.76 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 3.39 \times 10^{-3}$	ND < 0.2 ppb $< 3.88 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 7.58×10^{-3}	ND < 0.2 ppb $< 4.34 \times 10^{-5}$	> 99.43
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 4.37 \times 10^{-3}$	ND < 0.2 ppb $< 5.00 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 2.75 \times 10^{-3}$	ND < 0.2 ppb $< 3.15 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1200 ppb 2.24×10^{-2}	ND < 0.2 ppb $< 4.27 \times 10^{-5}$	> 99.81
Tetrachloroethylene: lb/hr	2400 ppb 5.65×10^{-2}	ND < 0.2 ppb $< 5.39 \times 10^{-5}$	> 99.90
Chlorobenzene: lb/hr	ND < 400 ppb $< 6.39 \times 10^{-3}$	ND < 0.4 ppb $< 7.32 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	700 ppb 6.21×10^{-3}	ND < 0.4 ppb $< 4.07 \times 10^{-5}$	> 99.35
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 4.17 \times 10^{-3}$	ND < 0.2 ppb $< 4.78 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	300 ppb 6.26×10^{-3}	ND < 0.2 ppb $< 4.78 \times 10^{-5}$	> 99.24

(continued)

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 22, TEST NO. 1
OCTOBER 26, 1992

Flow rate, Inlet dscfm	898		
Flow rate, Exhaust dscfm	10286		
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1600 ppb 2.25×10^{-2}	ND < 0.2 ppb $< 3.22 \times 10^{-5}$	> 99.86
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 2.81 \times 10^{-3}$	ND < 0.2 ppb $< 3.22 \times 10^{-5}$	N/A
Benzene: lb/hr	4000 ppb 4.44×10^{-2}	6.9 ppb 8.76×10^{-4}	98.02
Toluene: lb/hr	32000 ppb 4.19×10^{-1}	3.3 ppb 4.94×10^{-4}	99.88
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.17 \times 10^{-2}$	ND < 2.0 ppb $< 1.34 \times 10^{-4}$	N/A
m-xylenes: lb/hr	14000 ppb 2.11×10^{-1}	0.5 ppb 8.63×10^{-5}	99.96
o+p xylenes: lb/hr	11000 ppb 1.66×10^{-1} ppb	0.3 ppb 5.18×10^{-5}	99.97
1,2-dibromoethane: lb/hr	ND < 7000 ppb 1.87×10^{-1}	ND < 7.0 ppb $< 2.14 \times 10^{-3}$	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 8.99 \times 10^{-2}$	ND < 5.0 ppb $< 1.03 \times 10^{-3}$	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 22, TEST NO. 2
OCTOBER 26, 1992

Flow rate, Inlet dscfm 877			
Flow rate, Exhaust dscfm 9907			
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	4700 ppb 5.54×10^{-2}	0.3 ppb 3.99×10^{-5}	99.93
Chloroform: lb/hr	ND < 200 ppb $< 3.31 \times 10^{-3}$	ND < 0.2 ppb $< 3.74 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 7.40×10^{-3}	ND < 0.2 ppb $< 4.18 \times 10^{-5}$	> 99.44
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 4.27 \times 10^{-3}$	ND < 0.2 ppb $< 4.82 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 2.69 \times 10^{-3}$	0.5 ppb 7.59×10^{-5}	< 97.18
Trichloroethylene: lb/hr	1400 ppb 2.55×10^{-2}	ND < 0.2 ppb $< 4.12 \times 10^{-5}$	> 99.84
Tetrachloroethylene: lb/hr	2400 ppb 5.52×10^{-2}	ND < 0.2 ppb $< 5.20 \times 10^{-5}$	> 99.91
Chlorobenzene: lb/hr	ND < 400 ppb $< 6.24 \times 10^{-3}$	ND < 0.4 ppb $< 7.05 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	700 ppb 6.07×10^{-3}	ND < 0.4 ppb $< 3.92 \times 10^{-5}$	> 99.35
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 4.08 \times 10^{-3}$	ND < 0.2 ppb $< 4.61 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	300 ppb 6.12×10^{-3}	ND < 0.2 ppb $< 4.61 \times 10^{-5}$	> 99.25

(continued)

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 22, TEST NO. 2
OCTOBER 26, 1992

Flow rate, Inlet dscfm 877			
Flow rate, Exhaust dscfm 9907			
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1600 ppb 2.20×10^{-2}	ND < 0.2 ppb $< 3.10 \times 10^{-5}$	> 99.86
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 2.74 \times 10^{-3}$	ND < 0.2 ppb $< 3.10 \times 10^{-5}$	N/A
Benzene: lb/hr	4000 ppb 4.33×10^{-2}	1.5 ppb 1.84×10^{-4}	99.58
Toluene: lb/hr	33000 ppb 4.22×10^{-1}	4.3 ppb 6.21×10^{-4}	99.85
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.14 \times 10^{-2}$	ND < 2.0 ppb $< 1.29 \times 10^{-4}$	N/A
m-xylenes: lb/hr	15000 ppb 2.21×10^{-1}	0.5 ppb 8.31×10^{-5}	99.96
o+p xylenes: lb/hr	11000 ppb 1.62×10^{-1}	0.6 ppb 9.98×10^{-5}	99.94
1,2-dibromoethane: lb/hr	ND < 7000 ppb 1.82×10^{-1}	ND < 7.0 ppb $< 2.06 \times 10^{-3}$	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 8.78 \times 10^{-2}$	ND < 5.0 ppb $< 9.91 \times 10^{-4}$	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-10
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 24
OCTOBER 27, 1992

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.26	4.07	4.17	12.05	11.99	12.02
CO ₂ , % dry	31.0	31.2	31.1	8.19	8.14	8.17
N ₂ , % dry	23.8	23.2	23.5	79.8	79.9	79.8
H ₂ O, %	4.4	4.9	4.7	10.0	10.3	10.2
Flow Rate, dscfm	811	865	838	9595	9782	9689
Temperature, °F				1605	1613	1609
NO _x :						
ppm						
ppm @ 3% O ₂				15.2	15.9	15.6
lb/hr (as NO ₂)				30.7	31.9	31.3
				1.06	1.13	1.10
CO:						
ppm						
ppm @ 3% O ₂				3.2	7.7	5.5
lb/hr				6.5	15.5	11.0
				0.136	0.333	0.234
HC:						
CH ₄ ppm	412000	418000	415000	ND < 1	ND < 1	ND < 1
TGNMO ppm	3410	3470	3440	5.44	5.59	5.52
TGNMO ppm @ 3% O ₂	—	—	—	11.00	11.23	11.12
TGNMO lb/hr (as CH ₄)	7.00	7.59	7.29	0.13	0.14	0.14
Destruction Eff. %	—	—	—	98.11	98.18	98.15
Particulate:						
Organic Fraction gr/dscf				0.0002	0.0003	0.0003
Inorganic Fraction gr/dscf				0.0029	0.0028	0.0029
Total Particulate gr/dscf				0.0031	0.0031	0.0031
gr/dscf @ 3% O ₂				0.0063	0.0062	0.0062
gr/dscf @ 12% CO ₂				0.0046	0.0046	0.0046
lb/hr				0.26	0.26	0.26
Sulfur Compounds:						
H ₂ S, ppm	46	41	44			
Methyl Mercaptan, ppm	0.9	0.9	0.9			
Ethyl Mercaptan, ppm	*	*	*			
Dimethyl Sulfide, ppm	2.3*	2.3*	2.3*			
Carbonyl Sulfide, ppm	ND < 0.3	ND < 0.3	ND < 0.3			
Carbon Disulfide, ppm	ND < 0.4	ND < 0.4	ND < 0.4			
Dimethyl Disulfide, ppm	ND < 0.9	ND < 0.9	ND < 0.9			
Total Sulfur Compounds, ppm	< 52.1	< 47.1	< 49.6			

* Interference

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TABLE 4-11
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 24, TEST NO. 1
OCTOBER 27, 1992

Flow rate, Inlet dscfm 811			
Flow rate, Exhaust dscfm 9595			
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	4800 ppb 5.23×10^{-2}	ND < 0.2 ppb $< 2.58 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 3.06 \times 10^{-3}$	ND < 0.2 ppb $< 3.62 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 6.84×10^{-3}	ND < 0.2 ppb $< 4.05 \times 10^{-5}$	> 99.41
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 3.95 \times 10^{-3}$	ND < 0.2 ppb $< 4.67 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 2.49 \times 10^{-3}$	ND < 0.2 ppb $< 2.94 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1200 ppb 2.02×10^{-2}	ND < 0.2 ppb $< 3.99 \times 10^{-5}$	> 99.80
Tetrachloroethylene: lb/hr	2400 ppb 5.10×10^{-2}	ND < 0.2 ppb $< 5.03 \times 10^{-5}$	> 99.90
Chlorobenzene: lb/hr	ND < 400 ppb $< 5.77 \times 10^{-3}$	ND < 0.4 ppb $< 6.83 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	600 ppb 4.81×10^{-3}	ND < 0.4 ppb $< 3.79 \times 10^{-5}$	> 99.21
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 3.77 \times 10^{-3}$	ND < 0.2 ppb $< 4.46 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	ND < 300 ppb $< 5.65 \times 10^{-3}$	ND < 0.2 ppb $< 4.46 \times 10^{-5}$	> 99.21
(continued)			

TABLE 4-11
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 24, TEST NO. 1
OCTOBER 27, 1992

Flow rate, Inlet dscfm 811			
Flow rate, Exhaust dscfm 9595			
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1600 ppb 2.03×10^{-2}	ND < 0.2 ppb $< 3.00 \times 10^{-5}$	> 99.85
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 2.54 \times 10^{-3}$	ND < 0.2 ppb $< 3.00 \times 10^{-5}$	N/A
Benzene: lb/hr	3900 ppb 3.91×10^{-2}	ND < 0.1 ppb $< 1.18 \times 10^{-5}$	> 99.97
Toluene: lb/hr	32000 ppb 3.78×10^{-1}	ND < 1.0 ppb $< 1.40 \times 10^{-4}$	> 99.96
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.05 \times 10^{-2}$	ND < 2.0 ppb $< 1.25 \times 10^{-4}$	N/A
m-xylenes: lb/hr	14000 ppb 1.91×10^{-1}	ND < 0.2 ppb $< 3.22 \times 10^{-5}$	> 99.98
o+p xylenes: lb/hr	11000 ppb 1.50×10^{-1} ppb	ND < 0.2 ppb $< 3.22 \times 10^{-5}$	> 99.98
1,2-dibromoethane: lb/hr	ND < 7000 ppb 1.69×10^{-1}	ND < 7.0 ppb $< 1.99 \times 10^{-3}$	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 8.12 \times 10^{-2}$	ND < 5.0 ppb $< 9.60 \times 10^{-4}$	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-12
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 24, TEST NO. 2
OCTOBER 27, 1992

Flow rate, Inlet dscfm 865			
Flow rate, Exhaust dscfm 9782			
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	5000 ppb 5.81×10^{-2}	ND < 0.2 ppb $< 2.63 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 3.27 \times 10^{-3}$	ND < 0.2 ppb $< 3.69 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 7.30×10^{-3}	ND < 0.2 ppb $< 4.13 \times 10^{-5}$	> 99.43
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 4.21 \times 10^{-3}$	ND < 0.2 ppb $< 4.76 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 2.65 \times 10^{-3}$	ND < 0.2 ppb $< 3.00 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1300 ppb 2.34×10^{-2}	ND < 0.2 ppb $< 4.06 \times 10^{-5}$	> 99.83
Tetrachloroethylene: lb/hr	2400 ppb 5.44×10^{-2}	ND < 0.2 ppb $< 5.13 \times 10^{-5}$	> 99.91
Chlorobenzene: lb/hr	ND < 400 ppb $< 6.16 \times 10^{-3}$	ND < 0.4 ppb $< 6.96 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	600 ppb 5.13×10^{-3}	ND < 0.4 ppb $< 3.87 \times 10^{-5}$	> 99.25
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 4.02 \times 10^{-3}$	ND < 0.2 ppb $< 4.55 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	400 ppb 8.04×10^{-3}	ND < 0.2 ppb $< 4.55 \times 10^{-5}$	> 99.43

(continued)

TABLE 4-12
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUEENTE HILLS FLARES NO. 24, TEST NO. 2
OCTOBER 27, 1992

Flow rate, Inlet dscfm 865
Flow rate, Exhaust dscfm 9782

Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1600 ppb 2.17×10^{-2}	ND < 0.2 ppb < 3.06×10^{-5}	> 99.86
1,2-dichloroethane: lb/hr	ND < 200 ppb < 2.71×10^{-3}	ND < 0.2 ppb < 3.06×10^{-5}	N/A
Benzene: lb/hr	3900 ppb 4.17×10^{-2}	0.7 ppb 8.46×10^{-5}	99.80
Toluene: lb/hr	31000 ppb 3.91×10^{-1}	ND < 1.0 ppb < 1.42×10^{-4}	> 99.96
Acetonitrile: lb/hr	ND < 2000 ppb < 1.12×10^{-2}	ND < 2.0 ppb < 1.27×10^{-4}	N/A
m-xylenes: lb/hr	14000 ppb 2.03×10^{-1}	ND < 0.2 ppb < 3.28×10^{-5}	> 99.98
o+p xylenes: lb/hr	10000 ppb 1.45×10^{-1}	ND < 0.2 ppb < 3.28×10^{-5}	> 99.98
1,2-dibromoethane: lb/hr	ND < 7000 ppb 1.80×10^{-1}	ND < 7.0 ppb < 2.03×10^{-3}	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb < 8.66×10^{-2}	ND < 5.0 ppb < 9.79×10^{-4}	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSIONS TESTS ON FOUR FLARES
(FLARE NOS. 2, 4, 6 AND 8)
AT PUENTE HILLS LANDFILL
FEBRUARY 1993**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

MARCH 1993

TABLE 4-1
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE NO. 6

Test Date 12/19/91

Parameter	Fuel Gas			Exhaust Gas		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	4.8	--	4.8	12.92	13.20	13.06
CO ₂ , % dry	29.2	--	29.2	6.80	6.78	6.79
N ₂ , % dry	26.9	--	26.9	80.3	80.0	80.2
H ₂ O, %	2.7	3.9	3.3	8.2	8.2	8.2
Flow Rate, dscfm	856	816	836	9,688	10,060	9,874
Temperature, °F				1,530	1,540	1,535
NO _x :						
ppm				14.3	14.2	14.3
ppm @ 3% O ₂				32.1	33.0	32.5
lb/hr (as NO _x)				1.01	1.04	1.02
CO:						
ppm				4.6	4.7	4.7
ppm @ 3% O ₂				10.3	10.9	10.6
lb/hr				0.20	0.21	0.20
HC:						
CH ₄ ppm	397,000	398,000	397,500	ND <1	ND <1	ND <1
Total NMHC ppm (as CH ₄)	4,390	4,960	4,675	3.15	3.07	3.11
Total NMHC (as CH ₄) ppm @ 3% O ₂				7.07	7.14	7.10
NMHC lb/hr as CH ₄	9.51	10.24	9.87	0.077	0.078	0.078
Destruction Eff. %				99.19	99.24	99.21
Particulate:						
Organic Fraction grains/dscf				0.0004	0.0001	0.0003
Inorganic Fraction grains/DSCF				0.0045	0.0017	0.0031
Total Particulate grains/DSCF				0.0049	0.0018	0.0034
gr/dscfm @ 12% CO ₂				0.0086	0.0032	0.0059
Total lb/hr				0.41	0.15	0.28
Sulfur Compounds:						
H ₂ S, ppm	39	--	39			
Methyl Mercaptan, ppm	1.0	--	1.0			
Ethyl Mercaptan, ppm	ND <0.4	--	ND <0.4			
Dimethyl Sulfide, ppm	2.0	--	2.0			
Carbonyl Sulfide, ppm	0.4	--	0.4			
Carbon Disulfide, ppm	0.5	--	0.5			
Total Sulfur, ppm	<43.8		<43.8			

TABLE 4-2
EXHAUST TRACE ORGANIC SPECIES RESULTS
PUENTE HILLS LANDFILL FLARE NO. 6

Test Date 12/19/91

Species	Exhaust Test 1	Exhaust Test 2	Average
Methylene Chloride, ppb lb/hr	ND <0.2 <2.60 x 10 ⁻⁵	ND <0.2 <2.60 x 10 ⁻⁵	ND <0.2 <2.60 x 10 ⁻⁵
Chloroform, ppb lb/hr	ND <0.2 <3.66 x 10 ⁻⁵	ND <0.2 <3.66 x 10 ⁻⁵	ND <0.2 <3.66 x 10 ⁻⁵
1,1,1 trichloroethane, ppb lb/hr	ND <0.2 <4.09 x 10 ⁻⁵	ND <0.2 <4.09 x 10 ⁻⁵	ND <0.2 <4.09 x 10 ⁻⁵
Carbon Tetrachloride, ppb lb/hr	ND <0.2 <4.71 x 10 ⁻⁵	ND <0.2 <4.71 x 10 ⁻⁵	ND <0.2 <4.71 x 10 ⁻⁵
1,1-dichloroethene, ppb lb/hr	ND <0.2 <2.97 x 10 ⁻⁵	ND <0.2 <2.97 x 10 ⁻⁵	ND <0.2 <2.97 x 10 ⁻⁵
Trichloroethylene, ppb lb/hr	ND <0.2 <4.03 x 10 ⁻⁵	ND <0.2 <4.03 x 10 ⁻⁵	<0.2 <4.03 x 10 ⁻⁵
Tetrachloroethylene, ppb lb/hr	ND <0.2 <5.08 x 10 ⁻⁵	ND <0.2 <5.08 x 10 ⁻⁵	ND <0.2 <5.08 x 10 ⁻⁵
Chlorobenzene, ppb lb/hr	ND <0.2 <3.45 x 10 ⁻⁵	ND <0.2 <3.45 x 10 ⁻⁵	ND <0.2 <3.45 x 10 ⁻⁵
Vinyl Chloride, ppb lb/hr	ND <0.2 <1.91 x 10 ⁻⁵	ND <0.2 <1.91 x 10 ⁻⁵	ND <0.2 <1.91 x 10 ⁻⁵
1,2-dichlorobenzene, ppb lb/hr	ND <0.2 <4.50 x 10 ⁻⁵	ND <0.2 <4.50 x 10 ⁻⁵	ND <0.2 <4.50 x 10 ⁻⁵
1,3 + 1,4-dichlorobenzene lb/hr	ND <0.4 <9.01 x 10 ⁻⁵	ND <0.4 <9.01 x 10 ⁻⁵	ND <0.4 <9.01 x 10 ⁻⁵
1,1-dichloroethane, ppb lb/hr	ND <0.2 <3.03 x 10 ⁻⁵	ND <0.2 <3.03 x 10 ⁻⁵	ND <0.2 <3.03 x 10 ⁻⁵

Continued

TABLE 4-2 (cont)
EXHAUST TRACE ORGANIC SPECIES RESULTS
PUENTE HILLS LANDFILL FLARE NO. 6

Test Date 12/19/91

Species	Exhaust Test 1	Exhaust Test 2	Average
1,2-dichloroethane, ppb lb/hr	ND <0.2 <3.03 x 10 ⁻⁵	ND <0.2 <3.03 x 10 ⁻⁵	ND <0.2 <3.03 x 10 ⁻⁵
Benzene, ppb lb/hr	ND <1.0 <1.20 x 10 ⁻⁴	ND <1.0 <1.20 x 10 ⁻⁴	ND <1.0 <1.20 x 10 ⁻⁴
Toluene, ppb lb/hr	ND <1.0 <1.41 x 10 ⁻⁴	ND <1.0 <1.41 x 10 ⁻⁴	ND <1.0 <1.41 x 10 ⁻⁴
Acetronitrile, ppb lb/hr	ND <5.0 <3.14 x 10 ⁻⁴	ND <5.0 <3.14 x 10 ⁻⁴	ND <5.0 <3.14 x 10 ⁻⁴
Xylenes, ppb lb/hr	ND <0.6 <9.76 x 10 ⁻⁵	ND <0.6 <9.76 x 10 ⁻⁵	ND <0.6 <9.76 x 10 ⁻⁵
1,2-dibromoethane, ppb lb/hr	ND <0.4 <1.15 x 10 ⁻⁴	ND <0.4 <1.15 x 10 ⁻⁴	ND <0.4 <1.15 x 10 ⁻⁴
Benzyl Chloride, ppb lb/hr	ND <0.4 <7.76 x 10 ⁻⁵	ND <0.4 <7.76 x 10 ⁻⁵	ND <0.4 <7.76 x 10 ⁻⁵

ND indicates that the species was not detected. Values indicate the detection limit for these species.

TABLE 4-3
EXHAUST TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL FLARE NO. 6

Test Date 12/19/91			
Species	Inlet Landfill Gas	Average Exhaust Results	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	2,700 3.10×10^{-2}	ND <0.2 $<2.60 \times 10^{-5}$	>99.92
Chloroform, ppb lb/hr	ND <200 $<3.23 \times 10^{-3}$	ND <0.2 $<3.66 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	300 5.42×10^{-3}	ND <0.2 $<4.09 \times 10^{-5}$	>99.25
Carbon Tetrachloride, ppb lb/hr	ND <200 $<4.16 \times 10^{-3}$	ND <0.2 $<4.71 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 $<2.62 \times 10^{-3}$	ND <0.2 $<2.97 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	1,300 2.31×10^{-2}	ND <0.2 $<4.03 \times 10^{-5}$	>99.83
Tetrachloroethylene, ppb lb/hr	1,900 4.26×10^{-2}	ND <0.2 $<5.08 \times 10^{-5}$	>99.88
Chlorobenzene, ppb lb/hr	ND <400 $<6.09 \times 10^{-3}$	ND <0.2 $<3.45 \times 10^{-5}$	N/A
Vinyl Chloride, ppb lb/hr	1,600 1.35×10^{-2}	ND <0.2 $<1.91 \times 10^{-5}$	>99.86
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<3.98 \times 10^{-3}$	ND <0.2 $<4.50 \times 10^{-5}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	<800 $<1.59 \times 10^{-2}$	ND <0.4 $<9.01 \times 10^{-5}$	N/A
1,1-dichloroethane, ppb lb/hr	1,400 1.87×10^{-2}	ND <0.2 $<3.03 \times 10^{-5}$	>99.84

Continued

TABLE 4-3 (cont)
EXHAUST TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL FLARE NO. 6

Test Date 12/19/91			
Species	Inlet Landfill Gas	Average Exhaust Results	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 $<2.68 \times 10^{-3}$	ND <0.2 $<3.03 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	5,600 5.92×10^{-2}	ND <1.0 $<1.20 \times 10^{-4}$	>99.80
Toluene, ppb lb/hr	34,000 4.24×10^{-1}	ND <1.0 $<1.41 \times 10^{-4}$	>99.97
Acetonitrile, ppb lb/hr	ND <5,000 $<2.78 \times 10^{-2}$	ND <5.0 $<3.14 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	20,200 2.90×10^{-1}	ND <0.6 $<9.76 \times 10^{-5}$	>99.97
1,2-dibromoethane, ppb lb/hr	ND <2,000 $<5.09 \times 10^{-2}$	ND <0.4 $<1.15 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 $<3.43 \times 10^{-2}$	ND <0.4 $<7.76 \times 10^{-5}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-4
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE NO. 18

Test Date 12/18/91

Parameter	Fuel Gas			Exhaust Gas		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	4.6	—	4.6	13.52	13.25	13.39
CO ₂ , % dry	31.1	—	31.1	6.54	6.75	6.65
N ₂ , % dry	26.8	—	26.8	79.9	80.0	80.0
H ₂ O, %	4.0	4.1	4.1	8.8	8.8	8.8
Flow Rate, dscfm	825	809	817	10,109	9,688	9,899
Temperature °F				1,519	1,543	1,531
NO _x :						
ppm						
ppm @ 3% O ₂				13.9	14.3	14.1
lb/hr				33.7	33.5	33.6
CO:				1.02	1.01	1.01
ppm						
ppm @ 3% O ₂				2.7	2.6	2.7
lb/hr				6.5	6.1	6.3
				0.12	0.11	0.12
HC:						
CH ₄ ppm	393,000	406,000	399,500	ND <1	ND <1	ND <1
Total NMHC ppm	4,520	4,300	4,410	2.24	3.08	2.66
as CH ₄						
Total NMHC as	—	—	—	5.43	7.21	6.32
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	9.43	8.80	9.12	0.059	0.075	0.066
Destruction Eff. %	—	—	—	99.39	99.74	99.27
Particulate:						
Organic Fraction grains/DSCF						
Inorganic Fraction grains/DSCF				0.0000	0.0000	0.0000
Total Particulate grains/DSCF				0.0032	0.0010	0.0021
gr/dscfm @ 12% CO ₂				0.0032	0.0010	0.0021
Total lb/hr				0.0060	0.0018	0.0039
				0.28	0.08	0.18
Sulfur Compounds:						
H ₂ S, ppm	40	—	40			
Methyl Mercaptan, ppm	0.9	—	0.9			
Ethyl Mercaptan, ppm	ND <0.4	—	ND <0.4			
Dimethyl Sulfide, ppm	1.9	—	1.9			
Carbonyl Sulfide, ppm	0.6	—	0.6			
Carbon Disulfide, ppm	0.6	—	0.6			
Total Sulfur, ppm	<45.0	—	<45.0			

TABLE 4-5
EXHAUST TRACE ORGANIC SPECIES RESULTS
PUENTE HILLS LANDFILL FLARE NO. 18

Test Date 12/18/91			
Species	Exhaust Test 1	Exhaust Test 2	Average
Methylene Chloride, ppb lb/hr	0.2 2.72×10^{-5}	ND <0.2 $<2.72 \times 10^{-5}$	<0.2 $<2.72 \times 10^{-5}$
Chloroform, ppb lb/hr	ND <0.2 $<3.82 \times 10^{-5}$	ND <0.2 $<3.82 \times 10^{-5}$	ND <0.2 $<3.82 \times 10^{-5}$
1,1,1 trichloroethane, ppb lb/hr	ND <0.2 $<4.26 \times 10^{-5}$	ND <0.2 $<4.26 \times 10^{-5}$	ND <0.2 $<4.26 \times 10^{-5}$
Carbon Tetrachloride, ppb lb/hr	ND <0.2 $<4.92 \times 10^{-5}$	ND <0.2 $<4.92 \times 10^{-5}$	ND <0.2 $<4.92 \times 10^{-5}$
1,1-dichloroethene, ppb lb/hr	ND <0.2 $<3.10 \times 10^{-5}$	ND <0.2 $<3.10 \times 10^{-5}$	ND <0.2 $<3.10 \times 10^{-5}$
Trichloroethylene, ppb lb/hr	ND <0.2 $<4.20 \times 10^{-5}$	ND <0.2 $<4.20 \times 10^{-5}$	ND <0.2 $<4.20 \times 10^{-5}$
Tetrachloroethylene, ppb lb/hr	ND <0.2 $<5.30 \times 10^{-5}$	ND <0.2 $<5.30 \times 10^{-5}$	ND <0.2 $<5.30 \times 10^{-5}$
Chlorobenzene, ppb lb/hr	ND <0.2 $<3.60 \times 10^{-5}$	ND <0.2 $<3.60 \times 10^{-5}$	ND <0.2 $<3.60 \times 10^{-5}$
Vinyl Chloride, ppb lb/hr	ND <0.2 $<2.00 \times 10^{-5}$	ND <0.2 $<2.00 \times 10^{-5}$	ND <0.2 $<2.00 \times 10^{-5}$
1,2-dichlorobenzene, ppb lb/hr	ND <0.2 $<4.70 \times 10^{-5}$	ND <0.2 $<4.70 \times 10^{-5}$	ND <0.2 $<4.70 \times 10^{-5}$
1,3 + 1,4-dichlorobenzene lb/hr	ND <0.4 $<9.40 \times 10^{-5}$	ND <0.4 $<9.40 \times 10^{-5}$	ND <0.4 $<9.40 \times 10^{-5}$
1,1-dichloroethane, ppb lb/hr	ND <0.2 $<3.16 \times 10^{-5}$	ND <0.2 $<3.16 \times 10^{-5}$	ND <0.2 $<3.16 \times 10^{-5}$

Continued

TABLE 4-5 (cont)
EXHAUST TRACE ORGANIC SPECIES RESULTS
PUENTE HILLS LANDFILL FLARE NO. 18

Test Date 12/18/91

Species	Exhaust Test 1	Exhaust Test 2	Average
1,2-dichloroethane, ppb lb/hr	ND <0.2 <3.16 x 10 ⁻⁵	ND <0.2 <3.16 x 10 ⁻⁵	ND <0.2 <3.16 x 10 ⁻⁵
Benzene, ppb lb/hr	ND <0.4 <4.99 x 10 ⁻⁵	ND <0.4 <4.99 x 10 ⁻⁵	ND <0.4 <4.99 x 10 ⁻⁵
Toluene, ppb lb/hr	1.2 1.77 x 10 ⁻⁴	ND <1 <1.47 x 10 ⁻⁴	<1.1 <1.62 x 10 ⁻⁴
Acetronitrile, ppb lb/hr	ND <5.0 <3.28 x 10 ⁻⁵	ND <5.0 <3.28 x 10 ⁻⁵	ND <5.0 <3.28 x 10 ⁻⁵
Xylenes, ppb lb/hr	ND <0.6 <1.02 x 10 ⁻⁴	ND <0.6 <1.02 x 10 ⁻⁴	ND <0.6 <1.02 x 10 ⁻⁴
1,2-dibromoethane, ppb lb/hr	ND <0.4 <1.20 x 10 ⁻⁴	ND <0.4 <1.20 x 10 ⁻⁴	ND <0.4 <1.20 x 10 ⁻⁴
Benzyl Chloride, ppb lb/hr	ND <0.4 <8.09 x 10 ⁻⁵	ND <0.4 <8.09 x 10 ⁻⁵	ND <0.4 <8.09 x 10 ⁻⁵

ND indicates that the species was not detected. Values indicate the detection limit for these species.

TABLE 4-6
EXHAUST TRACE ORGANIC SPECIES DESTRUCTION EFFI-
PUENTE HILLS LANDFILL FLARE NO. 1

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Test Date 12/18/91

Species	Inlet Landfill Gas	Average Exhaust Results	
Methylene Chloride, ppb lb/hr	2,900 3.21×10^{-2}	<0.2 $<2.72 \times 10^{-5}$	>99.92
Chloroform, ppb lb/hr	ND <200 $<3.11 \times 10^{-3}$	ND <0.2 $<3.82 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	400 6.96×10^{-3}	ND <0.2 $<4.26 \times 10^{-5}$	>99.39
Carbon Tetrachloride, ppb lb/hr	ND <200 $<4.01 \times 10^{-3}$	ND <0.2 $<4.92 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 $<2.53 \times 10^{-3}$	ND <0.2 $<3.10 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	1,300 2.23×10^{-2}	ND <0.2 $<4.20 \times 10^{-5}$	>99.81
Tetrachloroethylene, ppb lb/hr	2,000 4.33×10^{-2}	ND <0.2 $<5.30 \times 10^{-5}$	>99.88
Chlorobenzene, ppb lb/hr	ND <400 $<5.87 \times 10^{-3}$	ND <0.2 $<3.60 \times 10^{-5}$	N/A
Vinyl Chloride, ppb lb/hr	1,600 1.30×10^{-2}	ND <0.2 $<2.00 \times 10^{-5}$	>99.85
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<3.84 \times 10^{-3}$	ND <0.2 $<4.70 \times 10^{-5}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	<800 $<1.53 \times 10^{-2}$	ND <0.4 $<9.40 \times 10^{-5}$	N/A
1,1-dichloroethane, ppb lb/hr	1,500 1.94×10^{-2}	ND <0.2 $<3.16 \times 10^{-5}$	>99.84

Continued

TABLE 4-6 (cont)
EXHAUST TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL FLARE NO. 18

Test Date 12/18/91			
Species	Inlet Landfill Gas	Average Exhaust Results	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 $<2.58 \times 10^{-3}$	ND <0.2 $<3.16 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	5,800 5.91×10^{-2}	ND <0.4 $<4.99 \times 10^{-5}$	>99.92
Toluene, ppb lb/hr	34,000 4.09×10^{-1}	<1.1 $<1.62 \times 10^{-4}$	>99.96
Acetonitrile, ppb lb/hr	ND <5,000 $<2.68 \times 10^{-2}$	ND <5.0 $<3.28 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	21,400 2.96×10^{-1}	ND <0.6 $<1.02 \times 10^{-4}$	>99.97
1,2-dibromoethane, ppb lb/hr	ND <2,000 $<4.90 \times 10^{-2}$	ND <0.4 $<1.20 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 $<3.30 \times 10^{-2}$	ND <0.4 $<8.09 \times 10^{-5}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-7
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE NO. 20

Test Date 12/16/91						
Parameter	Fuel Gas			Exhaust Gas		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	4.4	4.8	4.6	11.67	11.98	11.83
CO ₂ , % dry	30.3	30.7	30.5	8.22	7.78	8.00
N ₂ , % dry	25.4	26.5	26.0	80.1	80.2	80.2
H ₂ O, %	5.4	6.4	5.9	9.2	9.5	9.4
Flow Rate dscfm	1,043	1,030	1,037	9,655	9,465	9,560
Temperature °F				1,657	1,660	1,659
NO _x :						
ppm				16.9	17.6	17.3
ppm @ 3% O ₂				32.8	35.3	34.0
lb/hr				1.19	1.21	1.20
CO:						
ppm				3.0	3.8	3.4
ppm @ 3% O ₂				5.8	7.6	6.7
lb/hr				0.13	0.16	0.14
HC:						
CH ₄ ppm	387,000	393,000	390,000	ND < 1	ND < 1	ND < 1
Total NMHC ppm as CH ₄	3,760	3,530	3,645	4.13	3.91	4.02
Total NMHC as CH ₄ ppm @ 3% O ₂	--	--	--	8.01	7.85	7.93
Total NMHC lb/hr as CH ₄	9.92	9.20	9.56	0.101	0.094	0.097
Destruction Eff. %	--	--	--	98.98	98.98	98.98
Particulate:						
Organic Fraction grains/DSCF				0.0000	0.0000	0.0000
Inorganic Fraction grains/DSCF				0.0059	0.0063	0.0061
Total Particulate grains/DSCF				0.0059	0.0063	0.0061
gr/dscfm @ 12% CO ₂				0.0085	0.0098	0.0092
Total lb/hr				0.48	0.51	0.50
Sulfur Compounds:						
H ₂ S, ppm	41	42	42			
Methyl Mercaptan ppm	1.3	1.3	1.3			
Ethyl Mercaptan ppm	0.4	0.3	0.4			
Dimethyl Sulfide ppm	2.3	2.2	2.3			
Carbonyl Sulfide ppm	ND < 0.3	ND < 0.3	ND < 0.3			
Carbon Disulfide ppm	0.5	0.5	0.5			
Total Sulfur, ppm	< 46.3	< 47.1	< 46.7			

TABLE 4-8
EXHAUST TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL FLARE NO. 20, TEST 1

Test Date 12/16/91			
Species	Inlet Test 1 Landfill Gas	Exhaust Test 1	Average
Methylene Chloride, ppb lb/hr	3,500 4.90×10^{-2}	0.4 5.19×10^{-5}	99.89
Chloroform, ppb lb/hr	ND <200 $<3.94 \times 10^{-3}$	ND <0.2 $<3.64 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	500 1.10×10^{-2}	ND <0.2 $<4.07 \times 10^{-5}$	>99.42
Carbon Tetrachloride, ppb lb/hr	ND <200 $<5.07 \times 10^{-3}$	ND <0.2 $<4.70 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 $<3.20 \times 10^{-3}$	ND <0.2 $<2.96 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	1,600 3.47×10^{-2}	ND <0.2 $<4.01 \times 10^{-5}$	>99.88
Tetrachloroethylene, ppb lb/hr	2,500 6.84×10^{-2}	ND <0.2 $<5.06 \times 10^{-5}$	>99.93
Chlorobenzene, ppb lb/hr	400 7.42×10^{-3}	ND <0.2 $<3.44 \times 10^{-5}$	>99.54
Vinyl Chloride, ppb lb/hr	1,700 1.75×10^{-2}	ND <0.2 $<1.91 \times 10^{-5}$	>99.89
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<4.85 \times 10^{-3}$	ND <0.2 $<4.49 \times 10^{-5}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	<900 $<2.18 \times 10^{-2}$	ND <0.4 $<8.98 \times 10^{-5}$	N/A
1,1-dichloroethane, ppb lb/hr	1,800 2.94×10^{-2}	ND <0.2 $<3.02 \times 10^{-5}$	>99.90

Continued

TABLE 4-8 (cont)
EXHAUST TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS LANDFILL FLARE NO. 20, TEST 1

Test Date 12/16/91			
Species	Inlet Test 1 Landfill Gas	Exhaust Test 1	Average
1,2-dichloroethane, ppb lb/hr	ND <200 $<3.26 \times 10^{-3}$	ND <0.2 $<3.02 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	6,800 8.76×10^{-2}	ND <0.4 $<4.77 \times 10^{-5}$	>99.95
Toluene, ppb lb/hr	40,000 6.08×10^{-1}	1.5 2.11×10^{-4}	99.96
Acetonitrile, ppb lb/hr	ND <5,000 $<3.38 \times 10^{-2}$	ND <5.0 $<3.13 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	22,700 3.97×10^{-1}	<1.4 $<2.27 \times 10^{-4}$	>99.94
1,2-dibromoethane, ppb lb/hr	ND <2,000 $<6.20 \times 10^{-2}$	ND <0.4 $<1.15 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 $<4.17 \times 10^{-2}$	ND <0.4 $<7.73 \times 10^{-5}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

RESULTS

TABLE 4-1
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 2
FEBRUARY 9, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.44	4.42	4.43	12.97	12.64	12.81
CO ₂ , % dry	31.0	31.6	31.3	7.48	7.63	7.56
N ₂ , % dry	23.7	23.4	23.6	79.6	79.7	79.6
H ₂ O, %	4.4	4.2	4.3	10.1	9.7	9.9
Flow Rate, dscfm	1057	1085	1071	11970	10793	11382
Temperature, °F				1629	1613	1621
NO _x :				15.7	16.4	16.1
ppm				35.4	35.5	35.5
ppm @ 3% O ₂				1.37	1.29	1.33
lb/hr (as NO ₂)						
CO:				7.7	5.4	6.6
ppm				17.4	11.7	14.5
ppm @ 3% O ₂				0.41	0.26	0.33
lb/hr						
HC:	429000	435000	432000	ND < 1	ND < 1	ND < 1
CH ₄ , ppm	3920	3380	3650	3.72	6.14	4.93
TGNMO ppm	—	—	—	8.40	13.31	10.85
TGNMO ppm @ 3% O ₂	10.48	9.28	9.88	0.11	0.17	0.14
TGNMO lb/hr (as CH ₄)	—	—	—	98.93	98.19	98.56
Destruction Eff. %						
Particulate:				0.0001	0.0001	0.0001
Organic Fraction gr/dscf				0.0030	0.0040	0.0035
Inorganic Fraction gr/dscf				0.0031	0.0041	0.0036
Total Particulate gr/dscf				0.0070	0.0089	0.0079
gr/dscf @ 3% O ₂				0.0050	0.0065	0.0058
gr/dscf @ 12% CO ₂				0.318	0.380	0.349
lb/hr						
Sulfur Compounds:	64	71	68			
H ₂ S, ppm	1.0	1.0	1.0			
Methyl Mercaptan, ppm	0.51	0.44	0.48			
Ethyl Mercaptan, ppm	2.2	2.3	2.3			
Dimethyl Sulfide, ppm	0.36	0.41	0.39			
Carbonyl Sulfide, ppm	0.25	0.26	0.26			
Carbon Disulfide, ppm	ND < 0.20	ND < 0.20	ND < 0.20			
Dimethyl Disulfide, ppm						
Total Sulfur Compounds, ppm	< 69.0	< 76.1	< 73.1			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 2 TEST NO. 1
FEBRUARY 9, 1993

Flow rate, Inlet dscfm	1057		
Flow rate, Exhaust dscfm	11970		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	4100 ppb 5.82×10^{-2}	ND <0.2 ppb $<3.21 \times 10^{-5}$	>99.94
Chloroform: lb/hr	ND <200 ppb $<3.99 \times 10^{-3}$	ND <0.2 ppb $<4.52 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 8.92×10^{-3}	ND <0.2 ppb $<5.05 \times 10^{-5}$	>99.43
Carbon Tetrachloride: lb/hr	ND <200 ppb $<5.14 \times 10^{-3}$	ND <0.2 ppb $<5.82 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND <200 ppb $<3.24 \times 10^{-3}$	ND <0.2 ppb $<3.67 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1400 ppb 3.07×10^{-2}	ND <0.2 ppb $<4.97 \times 10^{-5}$	>99.84
Tetrachloroethylene: lb/hr	2400 ppb 6.65×10^{-2}	ND <0.2 ppb $<6.28 \times 10^{-5}$	>99.91
Chlorobenzene: lb/hr	500 ppb 9.41×10^{-3}	ND <0.4 ppb $<8.52 \times 10^{-5}$	>99.09
Vinyl Chloride: lb/hr	800 ppb 8.36×10^{-3}	ND <0.4 ppb $<4.73 \times 10^{-5}$	>99.43
m-dichlorobenzene: lb/hr	ND <200 ppb $<4.91 \times 10^{-3}$	ND <0.2 ppb $<5.56 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	500 ppb 1.23×10^{-2}	ND <0.2 ppb $<5.56 \times 10^{-5}$	>99.55

(continued)

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 2 TEST NO. 1
FEBRUARY 9, 1993

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		1057 11970		
Species	Inlet	Exhaust	Destruction Efficiency, %	
1,1-dichloroethane: lb/hr	1400 ppb 2.32×10^{-2}	ND < 0.2 ppb $< 3.75 \times 10^{-5}$	> 99.84	
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 3.31 \times 10^{-3}$	ND < 0.2 ppb $< 3.75 \times 10^{-5}$	N/A	
Benzene: lb/hr	3700 ppb 4.83×10^{-2}	ND < 0.1 ppb $< 1.48 \times 10^{-5}$	> 99.97	
Toluene: lb/hr	35000 ppb 5.39×10^{-1}	0.8 ppb 1.39×10^{-4}	99.97	
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.37 \times 10^{-2}$	ND < 2.0 ppb $< 1.55 \times 10^{-4}$	N/A	
m-xylenes: lb/hr	13000 ppb 2.31×10^{-1}	ND < 0.2 ppb 4.02×10^{-5}	> 99.98	
o+p xylenes: lb/hr	11000 ppb 1.95×10^{-1}	ND < 0.2 ppb $< 4.02 \times 10^{-5}$	> 99.98	
1,2-dibromoethane: lb/hr	ND < 7000 ppb $< 2.20 \times 10^{-1}$	ND < 7 ppb $< 2.49 \times 10^{-3}$	N/A	
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 1.06 \times 10^{-1}$	ND < 5 ppb $< 1.20 \times 10^{-3}$	N/A	

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 2, TEST NO. 2
FEBRUARY 9, 1993

Flow rate, Inlet dscfm	1057		
Flow rate, Exhaust dscfm	11970		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	3900 ppb 5.54×10^{-2}	ND <0.2 ppb $<3.21 \times 10^{-5}$	>99.94
Chloroform: lb/hr	ND <200 ppb $<3.99 \times 10^{-3}$	ND <0.2 ppb $<4.52 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 8.92×10^{-3}	ND <0.2 ppb $<5.05 \times 10^{-5}$	>99.43
Carbon Tetrachloride: lb/hr	ND <200 ppb $<5.14 \times 10^{-3}$	ND <0.2 ppb $<5.82 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND <200 ppb $<3.24 \times 10^{-3}$	ND <0.2 ppb $<3.67 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1300 ppb 2.85×10^{-2}	ND <0.2 ppb $<4.97 \times 10^{-5}$	>99.83
Tetrachloroethylene: lb/hr	2200 ppb 6.10×10^{-2}	ND <0.2 ppb $<6.28 \times 10^{-5}$	>99.90
Chlorobenzene: lb/hr	ND <400 ppb $<7.52 \times 10^{-3}$	ND <0.4 ppb $<8.52 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	700 ppb 7.31×10^{-3}	ND <0.4 ppb $<4.73 \times 10^{-5}$	>99.35
m-dichlorobenzene: lb/hr	ND <200 ppb $<4.91 \times 10^{-3}$	ND <0.2 ppb $<5.56 \times 10^{-5}$	N/A
o+p ichlorobenzene: lb/hr	500 ppb 1.23×10^{-2}	ND <0.2 ppb $<5.56 \times 10^{-5}$	>99.55
(continued)			

RESULTS

SECTION 4.0

TABLE 4-4
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 4
FEBRUARY 10, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.82	4.47	4.65	12.10	12.49	12.30
CO ₂ , % dry	31.3	30.4	30.9	8.03	7.75	7.89
N ₂ , % dry	25.4	24.3	24.9	79.9	79.8	79.8
H ₂ O, %	4.2	4.5	4.4	10.5	10.5	10.5
Flow Rate, dscfm	1079	1009	1044	10553	11368	10961
Temperature, °F				1696	1705	1701
NO _x :						
ppm						
ppm @ 3% O ₂				17.8	17.6	17.7
lb/hr (as NO ₂)				36.2	37.5	36.8
				1.37	1.46	1.41
CO:						
ppm						
ppm @ 3% O ₂				7.0	8.2	7.6
lb/hr				14.2	17.5	15.8
				0.33	0.41	0.37
HC:						
CH ₄ ppm	418000	447000	432500	ND<1	ND<1	ND<1
TGNMO ppm	3630	3910	3770	10.30	14.20	12.25
TGNMO ppm @ 3% O ₂	—	—	—	20.95	30.22	25.59
TGNMO lb/hr (as CH ₄)	9.91	9.98	9.94	0.27	0.41	0.34
Destruction Eff. %	—	—	—	97.22	95.91	96.57
Particulate:						
Organic Fraction gr/dscf				0.0001	0.0000	0.0001
Inorganic Fraction gr/dscf				0.0043	0.0054	0.0049
Total Particulate gr/dscf				0.0044	0.0054	0.0049
gr/dscf @ 3% O ₂				0.0090	0.0115	0.0102
gr/dscf @ 12% CO ₂				0.0066	0.0083	0.0075
lb/hr				0.399	0.522	0.461
Sulfur Compounds:						
H ₂ S, ppm	70	71	71			
Methyl Mercaptan, ppm	1.0	1.0	1.0			
Ethyl Mercaptan, ppm	0.3	0.3	0.3			
Dimethyl Sulfide, ppm	2.1	2.1	2.1			
Carbonyl Sulfide, ppm	0.4	0.4	0.4			
Carbon Disulfide, ppm	0.3	0.3	0.3			
Dimethyl Disulfide, ppm	ND<0.1	ND<0.1	ND<0.1			
Total Sulfur Compounds, ppm	<74.6	<75.6	<75.1			

RESULTS

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 4, TEST NO. 1
FEBRUARY 10, 1993

Flow rate, Inlet dscfm	1079		
Flow rate, Exhaust dscfm	10553		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	3700 ppb 5.36×10^{-2}	ND < 0.2 ppb $< 2.83 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 4.07 \times 10^{-3}$	ND < 0.2 ppb $< 3.98 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	300 ppb 6.83×10^{-3}	ND < 0.2 ppb $< 4.45 \times 10^{-5}$	> 99.35
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 5.25 \times 10^{-3}$	ND < 0.2 ppb $< 5.13 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 3.31 \times 10^{-3}$	ND < 0.2 ppb $< 3.23 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1100 ppb 2.47×10^{-2}	ND < 0.2 ppb $< 4.38 \times 10^{-5}$	> 99.82
Tetrachloroethylene: lb/hr	2000 ppb 5.66×10^{-2}	ND < 0.2 ppb $< 5.53 \times 10^{-5}$	> 99.90
Chlorobenzene: lb/hr	ND < 400 ppb $< 7.68 \times 10^{-3}$	ND < 0.4 ppb $< 7.51 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	600 ppb 6.40×10^{-3}	ND < 0.4 ppb $< 4.17 \times 10^{-5}$	> 99.35
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 5.02 \times 10^{-3}$	ND < 0.2 ppb $< 4.91 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	ND < 200 ppb $< 5.02 \times 10^{-3}$	ND < 0.2 ppb $< 4.91 \times 10^{-5}$	N/A

(continued)

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 4, TEST NO. 1
FEBRUARY 10, 1993

Flow rate, Inlet dscfm	1079		
Flow rate, Exhaust dscfm	10553		
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1300 ppb 2.19×10^{-2}	ND < 0.2 ppb < 3.30×10^{-5}	> 99.85
1,2-dichloroethane: lb/hr	ND < 200 ppb < 3.38×10^{-3}	ND < 0.2 ppb < 3.30×10^{-5}	N/A
Benzene: lb/hr	3600 ppb 4.80×10^{-2}	ND < 0.1 ppb < 1.30×10^{-5}	> 99.97
Toluene: lb/hr	34000 ppb 5.34×10^{-1}	ND < 1.0 ppb < 1.54×10^{-4}	> 99.97
Acetonitrile: lb/hr	ND < 2.0 ppb < 1.40×10^{-5}	ND < 2.0 ppb < 1.37×10^{-4}	N/A
m-xylenes: lb/hr	14000 ppb 2.54×10^{-1}	ND < 0.2 ppb < 3.54×10^{-5}	> 99.99
o+p xylenes: lb/hr	11000 ppb 1.99×10^{-1}	ND < 0.2 ppb < 3.54×10^{-5}	> 99.98
1,2-dibromoethane: lb/hr	ND < 7000 ppb < 2.24×10^{-1}	ND < 7 ppb < 2.19×10^{-3}	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb < 1.08×10^{-1}	ND < 5 ppb < 1.06×10^{-3}	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 4, TEST NO. 2
FEBRUARY 10, 1993

Flow rate, Inlet dscfm	1079		
Flow rate, Exhaust dscfm	10553		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	3800 ppb 5.51×10^{-2}	ND < 0.2 ppb $< 2.83 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 4.07 \times 10^{-3}$	ND < 0.2 ppb $< 3.98 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	300 ppb 6.83×10^{-3}	ND < 0.2 ppb $< 4.45 \times 10^{-5}$	> 99.35
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 5.25 \times 10^{-3}$	ND < 0.2 ppb $< 5.13 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 3.31 \times 10^{-3}$	ND < 0.2 ppb $< 3.23 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1100 ppb 2.47×10^{-2}	ND < 0.2 ppb $< 4.38 \times 10^{-5}$	> 99.82
Tetrachloroethylene: lb/hr	2100 ppb 5.94×10^{-2}	ND < 0.2 ppb $< 5.53 \times 10^{-5}$	> 99.91
Chlorobenzene: lb/hr	ND < 400 ppb $< 7.68 \times 10^{-3}$	ND < 0.4 ppb $< 7.51 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	600 ppb 6.40×10^{-3}	ND < 0.4 ppb $< 4.17 \times 10^{-5}$	> 99.35
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 5.02 \times 10^{-3}$	ND < 0.2 ppb $< 4.91 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	ND < 200 ppb $< 5.02 \times 10^{-3}$	ND < 0.2 ppb $< 4.91 \times 10^{-5}$	N/A

(continued)

RESULTS

SECTION 4.0

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 4, TEST NO. 2
FEBRUARY 10, 1993

Flow rate, Inlet dscfm	1079		
Flow rate, Exhaust dscfm	10553		
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1300 ppb 2.19×10^{-2}	ND < 0.2 ppb < 3.30×10^{-5}	> 99.85
1,2-dichloroethane: lb/hr	ND < 200 ppb < 3.38×10^{-3}	ND < 0.2 ppb < 3.30×10^{-5}	N/A
Benzene: lb/hr	3400 ppb 4.53×10^{-2}	ND < 0.1 ppb < 1.30×10^{-5}	> 99.97
Toluene: lb/hr	34000 ppb 5.34×10^{-1}	ND < 1.0 ppb < 1.54×10^{-4}	> 99.97
Acetonitrile: lb/hr	ND < 2000 ppb < 1.40×10^{-2}	ND < 2.0 ppb < 1.37×10^{-4}	N/A
m-xylenes: lb/hr	14000 ppb 2.54×10^{-1}	ND < 0.2 ppb < 3.54×10^{-5}	> 99.99
o+p xylenes: lb/hr	12000 ppb 2.17×10^{-1}	ND < 0.2 ppb < 3.54×10^{-5}	> 99.98
1,2-dibromoethane: lb/hr	ND < 7000 ppb < 2.24×10^{-1}	ND < 7 ppb < 2.19×10^{-3}	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb < 1.08×10^{-1}	ND < 5 ppb < 1.06×10^{-3}	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-7
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 6
FEBRUARY 11, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.46	4.57	4.52	13.63	13.12	13.38
CO ₂ , % dry	30.8	30.6	30.7	6.66	7.14	6.90
N ₂ , % dry	24.1	24.4	24.3	79.7	79.7	79.7
H ₂ O, %	3.5	3.3	3.4	8.9	8.8	8.9
Flow Rate, dscfm	1097	1149	1123	10615	11507	11061
Temperature, °F				1565	1563	1564
NO _x :						
ppm				14.0	15.1	14.6
ppm @ 3% O ₂				34.5	34.7	34.6
lb/hr (as NO ₂)				1.08	1.26	1.17
CO:						
ppm				4.3	5.1	4.7
ppm @ 3% O ₂				10.6	11.7	11.2
lb/hr				0.20	0.26	0.23
HC:						
CH ₄ ppm	412000	436000	424000	ND < 1	ND < 1	ND < 1
TGNMO ppm	3120	2960	3040	6.21	3.19	4.70
TGNMO ppm @ 3% O ₂	—	—	—	15.29	7.34	11.31
TGNMO lb/hr (as CH ₄)	8.66	8.60	8.63	0.17	0.09	0.13
Destruction Eff. %	—	—	—	98.07	98.92	98.50
Particulate:						
Organic Fraction gr/dscf				0.0001	0.0001	0.0001
Inorganic Fraction gr/dscf				0.0029	0.0033	0.0031
Total Particulate gr/dscf				0.0030	0.0034	0.0032
gr/dscf @ 3% O ₂				0.0074	0.0078	0.0076
gr/dscf @ 12% CO ₂				0.0055	0.0056	0.0056
lb/hr				0.277	0.332	0.305
Sulfur Compounds:						
H ₂ S, ppm	74	72	73			
Methyl Mercaptan, ppm	1.0	1.0	1.0			
Ethyl Mercaptan, ppm	0.3	0.3	0.3			
Dimethyl Sulfide, ppm	2.1	2.1	2.1			
Carbonyl Sulfide, ppm	0.3	0.4	0.4			
Carbon Disulfide, ppm	0.3	0.2	0.2			
Dimethyl Disulfide, ppm	ND < 0.3	ND < 0.3	ND < 0.3			
Total Sulfur Compounds, ppm	< 78.9	< 76.8	< 77.9			

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 6, TEST NO. 1
FEBRUARY 11, 1993

Flow rate, Inlet dscfm	1097		
Flow rate, Exhaust dscfm	10615		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	3900 ppb 5.75×10^{-2}	ND <0.2 ppb $<2.85 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND <200 ppb $<4.14 \times 10^{-3}$	ND <0.2 ppb $<4.01 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 9.26×10^{-3}	1.0 ppb 2.24×10^{-5}	97.58
Carbon Tetrachloride: lb/hr	ND <200 ppb $<5.34 \times 10^{-3}$	ND <0.2 ppb $<5.16 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND <200 ppb $<3.36 \times 10^{-3}$	ND <0.2 ppb $<3.25 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1200 ppb 2.73×10^{-2}	ND <0.2 ppb $<4.41 \times 10^{-5}$	> 99.84
Tetrachloroethylene: lb/hr	2300 ppb 6.62×10^{-2}	ND <0.2 ppb $<5.57 \times 10^{-5}$	> 99.92
Chlorobenzene: lb/hr	ND <400 ppb $<7.81 \times 10^{-3}$	ND <0.4 ppb $<7.56 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	500 ppb 5.42×10^{-3}	ND <0.4 ppb $<4.20 \times 10^{-5}$	> 99.23
m-dichlorobenzene: lb/hr	ND <200 ppb $<5.10 \times 10^{-3}$	ND <0.2 ppb $<4.93 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	ND <200 ppb $<5.10 \times 10^{-3}$	ND <0.2 ppb $<4.93 \times 10^{-5}$	N/A

(continued)

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY
PUENTE HILLS FLARES NO. 6, TEST
FEBRUARY 11, 1993

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		1097 10615		
Species	Inlet	Exhaust	Destruction Efficiency, %	
1,1-dichloroethane: lb/hr	1300 ppb 2.23×10^{-2}	ND < 0.2 ppb $< 3.32 \times 10^{-5}$	> 99.85	
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 3.43 \times 10^{-3}$	ND < 0.2 ppb $< 3.32 \times 10^{-5}$	N/A	
Benzene: lb/hr	3700 ppb 5.01×10^{-2}	ND < 0.1 ppb $< 1.31 \times 10^{-5}$	> 99.97	
Toluene: lb/hr	38000 ppb 6.07×10^{-1}	1.9 ppb 2.94×10^{-4}	99.95	
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.42 \times 10^{-2}$	ND < 2.0 ppb $< 1.38 \times 10^{-4}$	N/A	
m-xylenes: lb/hr	15000 ppb 2.76×10^{-1}	ND < 0.2 ppb $< 3.56 \times 10^{-5}$	> 99.99	
o+p xylenes: lb/hr	13000 ppb 2.39×10^{-1}	ND < 0.2 ppb $< 3.56 \times 10^{-5}$	> 99.99	
1,2-dibromoethane: lb/hr	ND < 7000 ppb $< 2.28 \times 10^{-1}$	ND < 7 ppb $< 2.21 \times 10^{-3}$	N/A	
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 1.10 \times 10^{-1}$	ND < 5 ppb $< 1.06 \times 10^{-3}$	N/A	

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

RESULTS

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 6, TEST NO. 2
FEBRUARY 11, 1993

Species	1097 Flow rate, Inlet dscfm	10615 Flow rate, Exhaust dscfm	Destruction Efficiency, %
	Inlet	Exhaust	
Methylene Chloride: lb/hr	3900 ppb 5.75×10^{-2}	ND < 0.2 ppb $< 2.85 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 4.14 \times 10^{-3}$	ND < 0.2 ppb $< 4.01 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	300 ppb 6.94×10^{-3}	0.4 ppb 8.96×10^{-5}	98.71
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 5.34 \times 10^{-3}$	ND < 0.2 ppb $< 5.16 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 3.36 \times 10^{-3}$	ND < 0.2 ppb $< 3.25 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	1200 ppb 2.73×10^{-2}	ND < 0.2 ppb $< 4.41 \times 10^{-5}$	> 99.84
Tetrachloroethylene: lb/hr	2200 ppb 6.33×10^{-2}	ND < 0.2 ppb $< 5.57 \times 10^{-5}$	> 99.91
Chlorobenzene: lb/hr	ND < 400 ppb $< 7.81 \times 10^{-3}$	ND < 0.4 ppb $< 7.56 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	500 ppb 5.42×10^{-3}	ND < 0.4 ppb $< 4.20 \times 10^{-5}$	> 99.23
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 5.10 \times 10^{-3}$	ND < 0.2 ppb $< 4.93 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	200 ppb $< 5.10 \times 10^{-3}$	ND < 0.2 ppb $< 4.93 \times 10^{-5}$	N/A

(continued)

RESULTS

SECTION 4.0

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 6, TEST NO. 2
FEBRUARY 11, 1993

Flow rate, Inlet dscfm	1097		
Flow rate, Exhaust dscfm	10615		
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1400 ppb 2.40×10^{-2}	ND < 0.2 ppb < 3.32×10^{-5}	> 99.86
1,2-dichloroethane: lb/hr	ND < 200 ppb < 3.43×10^{-3}	ND < 0.2 ppb < 3.32×10^{-5}	N/A
Benzene: lb/hr	3500 ppb 4.74×10^{-2}	ND < 0.1 ppb < 1.31×10^{-5}	> 99.97
Toluene: lb/hr	34000 ppb 5.43×10^{-1}	2.7 ppb 4.17×10^{-4}	99.92
Acetonitrile: lb/hr	ND < 2000 ppb < 1.42×10^{-2}	ND < 2.0 ppb < 1.38×10^{-4}	N/A
m-xylenes: lb/hr	14000 ppb 2.58×10^{-1}	ND < 0.2 ppb < 3.56×10^{-5}	> 99.99
o+p xylenes: lb/hr	13000 ppb 2.39×10^{-1}	0.3 ppb 5.34×10^{-5}	99.98
1,2-dibromoethane: lb/hr	ND < 7000 ppb < 2.28×10^{-1}	ND < 7 ppb < 2.21×10^{-3}	N/A
Benzyl Chloride: lb/hr	ND < 5000 ppb < 1.10×10^{-1}	ND < 5 ppb < 1.06×10^{-3}	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-10
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 8
FEBRUARY 11, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	3.51	3.50	3.51	11.65	11.43	11.54
CO ₂ , % dry	32.4	32.5	32.5	8.54	8.77	8.66
N ₂ , % dry	21.2	21.3	21.3	79.8	79.8	79.8
H ₂ O, %	4.9	5.1	5.0	9.7	10.8	10.3
Flow Rate, dscfm	1049	1119	1084	10976	12185	11581
Temperature, °F				1614	1696	1655
NO _x :						
ppm						
ppm @ 3% O ₂				17.2	18.7	18.0
lb/hr (as NO ₂)				33.3	35.3	34.3
				1.37	1.66	1.52
CO:						
ppm						
ppm @ 3% O ₂				4.9	4.8	4.9
lb/hr				9.5	9.1	9.3
				0.24	0.26	0.25
HC:						
CH ₄ ppm	443000	443000	443000	ND < 1	ND < 1	ND < 1
TGNMO ppm	3160	3000	3080	8.09	8.17	8.13
TGNMO ppm @ 3% O ₂	—	—	—	15.66	15.44	15.55
TGNMO lb/hr (as CH ₄)	8.39	8.49	8.44	0.22	0.25	0.24
Destruction Eff. %	—	—	—	97.32	97.03	97.18
Particulate:						
Organic Fraction gr/dscf						
Inorganic Fraction gr/dscf				0.0001	0.0000	0.0001
Total Particulate gr/dscf				0.0032	0.0059	0.0046
gr/dscf @ 3% O ₂				0.0033	0.0059	0.0046
gr/dscf @ 12% CO ₂				0.0064	0.0112	0.0088
lb/hr				0.0046	0.0081	0.0064
				0.310	0.618	0.464
Sulfur Compounds:						
H ₂ S, ppm	78	79	79			
Methyl Mercaptan, ppm	1.1	1.1	1.1			
Ethyl Mercaptan, ppm	0.3	0.3	0.3			
Dimethyl Sulfide, ppm	2.2	2.2	2.2			
Carbonyl Sulfide, ppm	0.4	0.3	0.3			
Carbon Disulfide, ppm	0.3	0.2	0.3			
Dimethyl Disulfide, ppm	ND < 0.3	ND < 0.3	ND < 0.3			
Total Sulfur Compounds, ppm	< 83.2	< 83.9	< 83.6			

TABLE 4-11
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 8, TEST NO. 1
FEBRUARY 11, 1993

Flow rate, Inlet dscfm	1049		
Flow rate, Exhaust dscfm	10976		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	4000 ppb 5.63×10^{-2}	ND < 0.2 ppb $< 2.95 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 3.96 \times 10^{-3}$	ND < 0.2 ppb $< 4.14 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 8.85×10^{-3}	ND < 0.2 ppb $< 4.63 \times 10^{-5}$	> 99.48
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 5.10 \times 10^{-3}$	ND < 0.2 ppb $< 5.34 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 3.22 \times 10^{-3}$	ND < 0.2 ppb $< 3.36 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	900 ppb 1.96×10^{-2}	ND < 0.2 ppb $< 4.56 \times 10^{-5}$	> 99.77
Tetrachloroethylene: lb/hr	2300 ppb 6.33×10^{-2}	ND < 0.2 ppb $< 5.76 \times 10^{-5}$	> 99.91
Chlorobenzene: lb/hr	ND < 400 ppb $< 7.47 \times 10^{-3}$	ND < 0.4 ppb $< 7.81 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	1800 ppb 1.87×10^{-2}	ND < 0.4 ppb $< 4.34 \times 10^{-5}$	> 99.77
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 4.88 \times 10^{-3}$	ND < 0.2 ppb $< 5.10 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	< 900 ppb $< 2.19 \times 10^{-2}$	ND < 0.2 ppb $< 5.10 \times 10^{-5}$	N/A

(continued)

TABLE 4-11
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 8, TEST NO. 1
FEBRUARY 11, 1993

Flow rate, Inlet dscfm	1049		
Flow rate, Exhaust dscfm	10976		
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1600 ppb 2.63×10^{-2}	ND < 0.2 ppb < 3.43×10^{-5}	> 99.87
1,2-dichloroethane: lb/hr	ND < 200 ppb < 3.28×10^{-3}	ND < 0.2 ppb < 3.43×10^{-5}	N/A
Benzene: lb/hr	2600 ppb 3.37×10^{-2}	ND < 0.1 ppb < 1.36×10^{-5}	> 99.96
Toluene: lb/hr	34000 ppb 5.20×10^{-1}	ND < 1.0 ppb < 1.60×10^{-4}	> 99.97
Acetonitrile: lb/hr	ND < 2000 ppb < 1.36×10^{-2}	ND < 2.0 ppb < 1.42×10^{-4}	N/A
m-xylenes: lb/hr	6300 ppb 1.11×10^{-1}	ND < 0.2 ppb < 3.68×10^{-5}	> 99.97
o+p xylenes: lb/hr	16000 ppb 2.82×10^{-1}	ND < 0.2 ppb < 3.68×10^{-5}	> 99.99
1,2-dibromoethane: lb/hr	ND < 500 ppb < 1.56×10^{-2}	ND < 7.0 ppb < 2.28×10^{-3}	N/A
Benzyl Chloride: lb/hr	ND < 1000 ppb < 2.10×10^{-2}	ND < 5.0 ppb < 1.10×10^{-3}	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-12
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 8, TEST NO. 2
FEBRUARY 11, 1993

Flow rate, Inlet dscfm	1049		
Flow rate, Exhaust dscfm	10976		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	4200 ppb 5.92×10^{-2}	ND < 0.2 ppb $< 2.95 \times 10^{-5}$	> 99.95
Chloroform: lb/hr	ND < 200 ppb $< 3.96 \times 10^{-3}$	ND < 0.2 ppb $< 4.14 \times 10^{-5}$	N/A
1,1,1-trichloroethane: lb/hr	400 ppb 8.85×10^{-3}	2.8 ppb 6.48×10^{-4}	92.68
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 5.10 \times 10^{-3}$	ND < 0.2 ppb $< 5.34 \times 10^{-5}$	N/A
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 3.22 \times 10^{-3}$	ND < 0.2 ppb $< 3.36 \times 10^{-5}$	N/A
Trichloroethylene: lb/hr	900 ppb 1.96×10^{-2}	ND < 0.2 ppb $< 4.56 \times 10^{-5}$	> 99.77
Tetrachloroethylene: lb/hr	2300 ppb 6.33×10^{-2}	ND < 0.2 ppb $< 5.76 \times 10^{-5}$	> 99.91
Chlorobenzene: lb/hr	ND < 400 ppb $< 7.47 \times 10^{-3}$	ND < 0.4 ppb $< 7.81 \times 10^{-5}$	N/A
Vinyl Chloride: lb/hr	2000 ppb 2.07×10^{-2}	ND < 0.4 ppb $< 4.34 \times 10^{-5}$	> 99.79
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 4.88 \times 10^{-3}$	ND < 0.2 ppb $< 5.10 \times 10^{-5}$	N/A
o+p dichlorobenzene: lb/hr	< 800 ppb $< 1.95 \times 10^{-2}$	ND < 0.2 ppb $< 5.10 \times 10^{-5}$	N/A

(continued)

TABLE 4-12
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 8, TEST NO. 2
FEBRUARY 11, 1993

Flow rate, Inlet dscfm	1049		
Flow rate, Exhaust dscfm	10976		
Species	Inlet	Exhaust	Destruction Efficiency, %
1,1-dichloroethane: lb/hr	1700 ppb 2.79×10^{-2}	ND < 0.2 ppb $< 3.43 \times 10^{-5}$	> 99.88
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 3.28 \times 10^{-3}$	ND < 0.2 ppb $< 3.43 \times 10^{-5}$	N/A
Benzene: lb/hr	2700 ppb 3.50×10^{-2}	ND < 0.1 ppb $< 1.36 \times 10^{-5}$	> 99.96
Toluene: lb/hr	34000 ppb 5.20×10^{-1}	ND < 1.0 ppb $< 1.60 \times 10^{-4}$	> 99.97
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.36 \times 10^{-2}$	ND < 2.0 ppb $< 1.42 \times 10^{-4}$	N/A
m-xylenes: lb/hr	6200 ppb 1.09×10^{-1}	ND < 0.2 ppb $< 3.68 \times 10^{-5}$	> 99.97
o+p xylenes: lb/hr	16000 ppb 2.82×10^{-1}	ND < 0.2 ppb $< 3.68 \times 10^{-5}$	> 99.99
1,2-dibromoethane: lb/hr	ND < 500 ppb $< 1.56 \times 10^{-2}$	ND < 7 ppb $< 2.28 \times 10^{-3}$	N/A
Benzyl Chloride: lb/hr	ND < 1000 ppb $< 2.10 \times 10^{-2}$	ND < 5 ppb $< 1.10 \times 10^{-3}$	N/A

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSIONS TESTS ON FOUR FLARES
(FLARE NOS. 10, 12, 14 AND 16)
AT PUENTE HILLS LANDFILL
DECEMBER 1993**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Bhaskar A. Chandan, P.E.

**CARNOT
Tustin, California**

FEBRUARY 1994

TABLE 4-1
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 10
DECEMBER 27, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	3.77	3.79	3.78	13.28	13.24	13.26
CO ₂ , % dry	30.3	30.4	30.4	7.23	7.17	7.20
N ₂ , % dry	25.9	26.0	26.0	79.5	79.6	79.5
H ₂ O, %	4.3	4.8	4.6	9.7	9.9	9.8
Flow Rate, dscfm	957	927	942	10,052	9,716	9,884
Temperature, °F	114	119	117	1,573	1,537	1,555
NO _x :						
ppm				15.0	14.9	14.9
ppm @ 3% O ₂				35.3	34.7	35.0
lb/hr (as NO ₂)				1.10	1.05	1.07
CO:						
ppm				4.03	3.16	3.60
ppm @ 3% O ₂				9.47	7.38	8.43
lb/hr				0.18	0.14	0.16
SO _x :						
ppm				2.35	3.12	2.74
ppm @ 3% O ₂				5.52	7.29	6.41
lb/hr				0.24	0.31	0.27
HC:						
CH ₄ ppm	412,000	415,000	413,500	ND < 1	ND < 1	ND < 1
TGNMO ppm	3,630	3,510	3,570	2.56	4.87	3.72
TGNMO ppm @ 3% O ₂	--	--	--	6.01	11.38	8.70
TGNMO lb/hr (as CH ₄)	8.79	8.23	8.51	0.07	0.12	0.09
Destruction Eff. %	--	--	--	99.26	98.55	98.90
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0038	0.0024	0.0031
Total Particulate gr/dscf				0.0038	0.0024	0.0031
gr/dscf @ 3% O ₂				0.0089	0.0056	0.0073
gr/dscf @ 12% CO ₂				0.0063	0.0039	0.0051
lb/hr				0.33	0.20	0.26
Sulfur Compounds:						
H ₂ S, ppm	48	49	48.5			
Methyl Mercaptan, ppm	1.5	1.5	1.5			
Ethyl Mercaptan, ppm	ND < 0.97	ND < 0.97	ND < 0.97			
Carbonyl Sulfide, ppm	ND < 0.77	ND < 0.77	ND < 0.77			
Carbon Disulfide, ppm	ND < 0.97	ND < 0.97	ND < 0.97			
Dimethyl Sulfide, ppm	1.5	1.5	1.5			
Dimethyl Disulfide, ppm	ND < 0.99	ND < 0.99	ND < 0.99			
Total Sulfur Compounds, ppm	< 56.66	< 57.66	< 57.16			

RESULTS

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 10 TEST NO. 1
DECEMBER 27, 1993

Flow rate, Inlet dscfm	957		
Flow rate, Exhaust dscfm	10,052		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3200 ppm(1)	ND < 0.1 ppb	> 99.97
lb/hr	4.11×10^{-2}	$< 1.35 \times 10^{-5}$	
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	NA
lb/hr	$< 1.81 \times 10^{-3}$	$< 1.90 \times 10^{-5}$	
1,1,1 Trichloroethane:	300 ppb	ND < 0.1 ppb	> 99.65
lb/hr	6.06×10^{-3}	$< 2.12 \times 10^{-5}$	
Carbon Tetrachloride:	ND < 84 ppb	ND < 0.1 ppb	NA
lb/hr	$< 1.96 \times 10^{-3}$	$< 2.44 \times 10^{-5}$	
1,1-Dichloroethene:	ND < 110 ppb	ND < 0.1 ppb	NA
lb/hr	$< 1.61 \times 10^{-3}$	$< 1.54 \times 10^{-5}$	
Trichloroethylene:	700 ppb	ND < 0.1 ppb	> 99.85
lb/hr	1.39×10^{-2}	$< 2.09 \times 10^{-5}$	
Tetrachloroethylene:	1600 ppb(1)	ND < 0.1 ppb	> 99.93
lb/hr	4.02×10^{-2}	$< 2.64 \times 10^{-5}$	
Chlorobenzene:	340 ppb	ND < 0.2 ppb	> 99.38
lb/hr	5.79×10^{-3}	$< 3.58 \times 10^{-5}$	
Vinyl Chloride:	690 ppb	ND < 0.4 ppb	> 99.39
lb/hr	6.53×10^{-3}	$< 3.97 \times 10^{-5}$	
m-Dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	NA
lb/hr	$< 5.12 \times 10^{-3}$	$< 4.67 \times 10^{-5}$	
1,1-Dichloroethane:	1300 ppb	ND < 0.1 ppb	> 99.92
lb/hr	1.95×10^{-2}	$< 1.57 \times 10^{-5}$	
1,2-Dichloroethane:	ND < 210 ppb	ND < 0.2 ppb	NA
lb/hr	$< 3.14 \times 10^{-3}$	$< 3.15 \times 10^{-5}$	
Benzene:	6800 ppb	0.6 ppb	99.91
lb/hr	8.04×10^{-2}	7.45×10^{-5}	
Toluene:	33000 ppb	1.3 ppb	99.96
lb/hr	4.60×10^{-1}	1.90×10^{-4}	
Acetonitrile:	ND < 5700 ppb	ND < 5.7 ppb	NA
lb/hr	$< 3.54 \times 10^{-2}$	$< 3.72 \times 10^{-4}$	
m-Xylene:	13000 ppb	0.4 ppb	99.97
lb/hr	2.09×10^{-1}	6.75×10^{-5}	
o+p Xylenes:	11000 ppb	ND < 0.2 ppb	> 99.98
lb/hr	1.77×10^{-1}	$< 3.37 \times 10^{-5}$	
1,2-Dibromoethane:	ND < 590 ppb	ND < 0.6 ppb	NA
lb/hr	$< 1.68 \times 10^{-2}$	$< 1.79 \times 10^{-4}$	
o+p Dichlorobenzene:	490 ppb(1)	ND < 0.2 ppb	> 99.57
lb/hr	1.09×10^{-2}	$< 4.67 \times 10^{-5}$	
Benzyl Chloride:	ND < 1000 ppb	ND < 1 ppb	NA
lb/hr	$< 1.92 \times 10^{-2}$	$< 2.01 \times 10^{-4}$	

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(1) - These compounds failed QA acceptance criteria; the numbers given here are best estimates.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 10 TEST NO. 2
DECEMBER 27, 1993

Flow rate, Inlet dscfm	927		
Flow rate, Exhaust dscfm	9,716		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3300 ppb(1)	ND < 0.1 ppb	
lb/hr	4.11×10^{-2}	$< 1.30 \times 10^{-3}$	> 99.97
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 1.75 \times 10^{-3}$	$< 1.83 \times 10^{-3}$	NA
1,1,1 Trichloroethane:	280 ppb	ND < 0.1 ppb	
lb/hr	5.48×10^{-3}	$< 2.05 \times 10^{-3}$	> 99.63
Carbon Tetrachloride:	ND < 84 ppb	ND < 0.1 ppb	
lb/hr	$< 1.89 \times 10^{-3}$	$< 2.36 \times 10^{-3}$	NA
1,1-Dichloroethene:	ND < 110 ppb	ND < 0.1 ppb	
lb/hr	$< 1.56 \times 10^{-3}$	$< 1.49 \times 10^{-3}$	NA
Trichloroethylene:	710 ppb	ND < 0.1 ppb	
lb/hr	1.37×10^{-2}	$< 2.02 \times 10^{-3}$	> 99.85
Tetrachloroethylene:	1500 ppb(1)	ND < 0.1 ppb	
lb/hr	3.65×10^{-2}	$< 2.55 \times 10^{-3}$	> 99.93
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 3.63 \times 10^{-3}$	$< 3.46 \times 10^{-3}$	NA
Vinyl Chloride:	480 ppb	ND < 0.4 ppb	
lb/hr	4.40×10^{-3}	$< 3.84 \times 10^{-3}$	> 99.13
m-Dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	
lb/hr	$< 4.96 \times 10^{-3}$	$< 4.52 \times 10^{-3}$	NA
1,1-Dichloroethane:	1300 ppb	ND < 0.1 ppb	
lb/hr	1.89×10^{-2}	$< 1.52 \times 10^{-3}$	> 99.92
1,2-Dichloroethane:	ND < 210 ppb	ND < 0.2 ppb	
lb/hr	$< 3.05 \times 10^{-3}$	$< 3.04 \times 10^{-3}$	NA
Benzene:	6700 ppb	0.2 ppb	
lb/hr	7.67×10^{-2}	2.40×10^{-3}	99.97
Toluene:	31000 ppb	1.1 ppb	
lb/hr	4.19×10^{-1}	1.56×10^{-4}	99.96
Acetonitrile:	ND < 5700 ppb	ND < 5.7 ppb	
lb/hr	$< 3.43 \times 10^{-2}$	$< 3.59 \times 10^{-4}$	NA
m-Xylene:	13000 ppb	ND < 0.2 ppb	
lb/hr	2.02×10^{-1}	$< 3.26 \times 10^{-3}$	> 99.98
o+p Xylenes:	11000 ppb	ND < 0.2 ppb	
lb/hr	1.71×10^{-1}	$< 3.26 \times 10^{-3}$	> 99.98
1,2-Dibromoethane:	ND < 590 ppb	ND < 0.6 ppb	
lb/hr	$< 1.62 \times 10^{-2}$	$< 1.73 \times 10^{-4}$	NA
o+p Dichlorobenzene:	410 ppb(1)	ND < 0.2 ppb	
lb/hr	8.83×10^{-3}	$< 4.52 \times 10^{-3}$	> 99.49
Benzyl Chloride:	ND < 1000 ppb	ND < 1 ppb	
lb/hr	$< 1.86 \times 10^{-2}$	$< 1.94 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(1) - These compounds failed QA acceptance criteria; the numbers given here are best estimates.

TABLE 4-4
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 12
DECEMBER 28, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.43	4.19	4.31	12.52	11.65	12.09
CO ₂ , % dry	30.5	30.6	30.6	7.89	8.65	8.27
N ₂ , % dry	28.4	27.6	28.0	79.6	79.7	79.6
H ₂ O, %	2.6	3.6	3.1	9.0	8.9	9.0
Flow Rate, dscfm	1,019	903	961	10,452	10,345	10,399
Temperature, °F	83	100	92	1,683	1,672	1,678
NO _x :						
ppm				16.9	17.8	17.4
ppm @ 3% O ₂				36.2	34.5	35.3
lb/hr (as NO ₂)				1.29	1.34	1.31
CO:						
ppm				4.91	3.38	4.15
ppm @ 3% O ₂				10.49	6.54	8.51
lb/hr				0.23	0.15	0.19
SO _x :						
ppm				8.3	8.8	8.5
ppm @ 3% O ₂				17.62	16.93	17.28
lb/hr				0.87	0.92	0.89
HC:						
CH ₄ ppm	393,000	404,000	398,500	ND < 1	ND < 1	ND < 1
TGNMO ppm	3,830	4,400	4,115	2.11	3.96	3.04
TGNMO ppm @ 3% O ₂	--	--	--	4.51	7.66	6.09
TGNMO lb/hr (as CH ₄)	9.87	10.05	9.96	0.06	0.10	0.08
Destruction Eff. %	--	--	--	99.43	98.97	99.20
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0058	0.0044	0.0051
Total Particulate gr/dscf				0.0058	0.0044	0.0051
gr/dscf @ 3% O ₂				0.0124	0.0085	0.0105
gr/dscf @ 12% CO ₂				0.0088	0.0061	0.0075
lb/hr				0.521	0.391	0.456
Sulfur Compounds:						
H ₂ S, ppm	59	60	59.5			
Methyl Mercaptan, ppm	1.8	2.2	2			
Ethyl Mercaptan, ppm	ND < 1	ND < 1	ND < 1			
Carbonyl Sulfide, ppm	ND < 0.8	ND < 0.8	ND < 0.8			
Carbon Disulfide, ppm	ND < 1	ND < 1	ND < 1			
Dimethyl Sulfide, ppm	1.9	2.0	1.95			
Dimethyl Disulfide, ppm	ND < 1	ND < 1	ND < 1			
Total Sulfur Compounds, ppm	< 68.5	< 70.0	< 69.2			

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 12 TEST NO. 1
DECEMBER 28, 1993

Flow rate, Inlet dscfm	1019		
Flow rate, Exhaust dscfm	10,452		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3400 ppb(1)	ND < 0.1 ppb	> 99.97
lb/hr	4.65×10^{-2}	$< 1.40 \times 10^{-5}$	
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	NA
lb/hr	$< 1.92 \times 10^{-3}$	$< 1.97 \times 10^{-5}$	
1,1,1 Trichloroethane:	300 ppb	ND < 0.1 ppb	> 99.66
lb/hr	6.45×10^{-3}	$< 2.20 \times 10^{-5}$	
Carbon Tetrachloride:	ND < 84 ppb	ND < 0.1 ppb	NA
lb/hr	$< 2.08 \times 10^{-3}$	$< 2.54 \times 10^{-5}$	
1,1-Dichloroethene:	ND < 110 ppb	ND < 0.1 ppb	NA
lb/hr	$< 1.72 \times 10^{-3}$	$< 1.60 \times 10^{-5}$	
Trichloroethylene:	750 ppb	ND < 0.1 ppb	> 99.86
lb/hr	1.59×10^{-2}	$< 2.17 \times 10^{-5}$	
Tetrachloroethylene:	2200 ppb	ND < 0.1 ppb	> 99.95
lb/hr	5.88×10^{-2}	$< 2.74 \times 10^{-5}$	
Chlorobenzene:	230 ppb	ND < 0.2 ppb	> 99.11
lb/hr	4.17×10^{-3}	$< 3.72 \times 10^{-5}$	
Vinyl Chloride:	670 ppb	ND < 0.4 ppb	> 99.39
lb/hr	6.75×10^{-3}	$< 4.13 \times 10^{-5}$	
m-Dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	NA
lb/hr	$< 5.45 \times 10^{-3}$	$< 4.86 \times 10^{-5}$	
1,1-Dichloroethane:	1300 ppb	ND < 0.1 ppb	> 99.92
lb/hr	2.07×10^{-2}	$< 1.64 \times 10^{-5}$	
1,2-Dichloroethane:	ND < 210 ppb	ND < 0.2 ppb	NA
lb/hr	$< 3.35 \times 10^{-3}$	$< 3.27 \times 10^{-5}$	
Benzene:	7000 ppb	0.3 ppb	99.96
lb/hr	8.81×10^{-2}	3.87×10^{-5}	
Toluene:	35000 ppb	1.4 ppb	99.96
lb/hr	5.19×10^{-1}	2.13×10^{-4}	
Acetonitrile:	ND < 5700 ppb	ND < 5.7 ppb	NA
lb/hr	$< 3.77 \times 10^{-2}$	$< 3.87 \times 10^{-4}$	
m-Xylene:	14000 ppb	ND < 0.2 ppb	> 99.99
lb/hr	2.39×10^{-1}	$< 3.51 \times 10^{-5}$	
o+p Xylenes:	12000 ppb	ND < 0.2 ppb	> 99.98
lb/hr	2.05×10^{-1}	$< 3.51 \times 10^{-5}$	
1,2-Dibromoethane:	ND < 590 ppb	ND < 0.6 ppb	NA
lb/hr	$< 1.79 \times 10^{-2}$	$< 1.86 \times 10^{-4}$	
o+p Dichlorobenzene:	550 ppb(1)	ND < 0.2 ppb	> 99.63
lb/hr	1.30×10^{-2}	$< 4.86 \times 10^{-5}$	
Benzyl Chloride:	ND < 1000 ppb	ND < 1 ppb	NA
lb/hr	$< 2.04 \times 10^{-2}$	$< 2.09 \times 10^{-4}$	

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(1) - These compounds failed QA acceptance criteria; the numbers given here are best estimates.

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 12 TEST NO. 2
DECEMBER 28, 1993

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		903 10,345		
Species	Inlet	Exhaust	Destruction Efficiency, %	
Methylene Chloride:	3500 ppb(1)	ND < 0.1 ppb	> 99.97	
lb/hr	4.24×10^{-2}	$< 1.39 \times 10^{-3}$		
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	NA	
lb/hr	$< 1.70 \times 10^{-3}$	$< 1.95 \times 10^{-3}$		
1,1,1 Trichloroethane:	380 ppb	ND < 0.1 ppb	> 99.70	
lb/hr	7.24×10^{-3}	$< 2.18 \times 10^{-3}$		
Carbon Tetrachloride:	ND < 84 ppb	ND < 0.1 ppb	NA	
lb/hr	$< 1.84 \times 10^{-3}$	$< 2.52 \times 10^{-3}$		
1,1-Dichloroethene:	120 ppb	ND < 0.1 ppb	> 99.05	
lb/hr	1.66×10^{-3}	$< 1.59 \times 10^{-3}$		
Trichloroethylene:	830 ppb	ND < 0.1 ppb	> 99.86	
lb/hr	1.56×10^{-2}	$< 2.15 \times 10^{-3}$		
Tetrachloroethylene:	2100 ppb	ND < 0.1 ppb	> 99.95	
lb/hr	4.97×10^{-2}	$< 2.71 \times 10^{-3}$		
Chlorobenzene:	300 ppb	ND < 0.2 ppb	> 99.24	
lb/hr	4.82×10^{-3}	$< 3.68 \times 10^{-3}$		
Vinyl Chloride:	610 ppb	ND < 0.4 ppb	> 99.25	
lb/hr	5.44×10^{-3}	$< 4.09 \times 10^{-3}$		
m-Dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	NA	
lb/hr	$< 4.83 \times 10^{-3}$	$< 4.81 \times 10^{-3}$		
1,1-Dichloroethane:	1400 ppb	ND < 0.1 ppb	> 99.92	
lb/hr	1.98×10^{-2}	$< 1.62 \times 10^{-3}$		
1,2-Dichloroethane:	ND < 210 ppb	ND < 0.2 ppb	NA	
lb/hr	$< 2.97 \times 10^{-3}$	$< 3.24 \times 10^{-3}$		
Benzene:	7100 ppb	0.4 ppb	99.94	
lb/hr	7.92×10^{-2}	5.11×10^{-5}		
Toluene:	35000 ppb	2.6 ppb	99.91	
lb/hr	4.60×10^{-1}	3.92×10^{-4}		
Acetonitrile:	ND < 5700 ppb	ND < 5.7 ppb	NA	
lb/hr	$< 3.34 \times 10^{-2}$	$< 3.83 \times 10^{-4}$		
m-Xylene:	14000 ppb	0.3 ppb	99.98	
lb/hr	2.12×10^{-1}	5.21×10^{-5}		
o+p Xylenes:	12000 ppb	0.3 ppb	99.97	
lb/hr	1.82×10^{-1}	5.21×10^{-5}		
1,2-Dibromoethane:	ND < 590 ppb	ND < 0.6 ppb	NA	
lb/hr	$< 1.58 \times 10^{-2}$	$< 1.84 \times 10^{-4}$		
o+p Dichlorobenzene:	490 ppb(1)	ND < 0.2 ppb	> 99.53	
lb/hr	1.03×10^{-2}	$< 4.81 \times 10^{-5}$		
Benzyl Chloride:	ND < 1000 ppb	(2)	NA	
lb/hr	$< 1.81 \times 10^{-2}$	-		

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(1) - These compounds failed QA acceptance criteria; the numbers given here are best estimates.

(2) - Benzyl chloride failed the QA acceptance criteria and cannot be determined.

TABLE 4-7
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 14
DECEMBER 28, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	3.75	3.74	3.75	12.61	12.84	12.73
CO ₂ , % dry	30.7	31.4	31.1	7.70	7.57	7.64
N ₂ , % dry	26.2	26.2	26.2	79.7	79.6	79.6
H ₂ O, %	5.4	3.7	4.6	8.6	8.6	8.6
Flow Rate, dscfm	995	962	979	9,794	9,839	9,817
Temperature, F	107	105	106	1,609	1,633	1,621
NO _x :						
ppm				15.7	15.4	15.5
ppm @ 3% O ₂				33.9	34.2	34.0
lb/hr (as NO ₂)				1.12	1.10	1.11
CO:						
ppm				3.23	2.88	3.06
ppm @ 3% O ₂				6.97	6.40	6.69
lb/hr				0.14	0.13	0.13
SO _x :						
ppm				7.8	7.9	7.9
ppm @ 3% O ₂				16.84	17.54	17.19
lb/hr				0.77	0.79	0.78
HC:						
CH ₄ , ppm	409,000	403,000	406,000	ND < 1	ND < 1	ND < 1
TGNMO ppm	3,420	4,520	3,970	3.10	1	2.05
TGNMO ppm @ 3% O ₂	--	--	--	6.69	2.22	4.46
TGNMO lb/hr (as CH ₄)	8.61	11.00	9.80	0.08	0.02	0.05
Destruction Eff. %	--	--	--	99.11	99.77	99.44
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0045	0.0050	0.0048
Total Particulate gr/dscf				0.0045	0.0050	0.0048
gr/dscf @ 3% O ₂				0.0097	0.0111	0.0104
gr/dscf @ 12% CO ₂				0.0071	0.0080	0.0076
lb/hr				0.381	0.424	0.402
Sulfur Compounds:						
H ₂ S, ppm	60	60	60			
Methyl Mercaptan, ppm	1.6	2.8	2.2			
Ethyl Mercaptan, ppm	ND < 1	ND < 1	ND < 1			
Carbonyl Sulfide, ppm	ND < 0.8	ND < 0.8	ND < 0.8			
Carbon Disulfide, ppm	ND < 1	ND < 1	ND < 1			
Dimethyl Sulfide, ppm	2.0	1.9	1.95			
Dimethyl Disulfide, ppm	ND < 1	ND < 1	ND < 1			
Total Sulfur Compounds, ppm	< 69.4	< 70.5	< 69.95			

RESULTS

SECTION 4.0

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 14, TEST NO. 1
DECEMBER 28, 1993

Flow rate, Inlet dscfm	995		
Flow rate, Exhaust dscfm	9,794		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3300 ppb	ND < 0.1 ppb	> 99.97
lb/hr	4.41×10^{-2}	$< 1.32 \times 10^{-3}$	
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	NA
lb/hr	$< 1.88 \times 10^{-3}$	$< 1.85 \times 10^{-5}$	
1,1,1-trichloroethane:	300 ppb	ND < 0.1 ppb	> 99.67
lb/hr	6.30×10^{-3}	$< 2.07 \times 10^{-5}$	
Carbon Tetrachloride:	ND < 84 ppb	ND < 0.1 ppb	NA
lb/hr	$< 2.03 \times 10^{-3}$	$< 2.38 \times 10^{-5}$	
1,1-dichloroethene:	ND < 110 ppb	ND < 0.1 ppb	NA
lb/hr	$< 1.68 \times 10^{-3}$	$< 1.50 \times 10^{-5}$	
Trichloroethylene:	750 ppb	ND < 0.1 ppb	> 99.87
lb/hr	1.55×10^{-2}	$< 2.03 \times 10^{-5}$	
Tetrachloroethylene:	1900 ppb	ND < 0.1 ppb	> 99.95
lb/hr	4.96×10^{-2}	$< 2.57 \times 10^{-5}$	
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	NA
lb/hr	$< 3.90 \times 10^{-3}$	$< 3.49 \times 10^{-5}$	
Vinyl Chloride:	510 ppb	ND < 0.4 ppb	> 99.23
lb/hr	5.01×10^{-3}	$< 3.87 \times 10^{-5}$	
m-dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	NA
lb/hr	$< 5.32 \times 10^{-3}$	$< 4.55 \times 10^{-5}$	
1,1-dichloroethane:	1300 ppb	ND < 0.1 ppb	> 99.92
lb/hr	2.02×10^{-2}	$< 1.53 \times 10^{-5}$	
1,2-dichloroethane:	ND < 210 ppb	ND < 0.2 ppb	NA
lb/hr	$< 3.27 \times 10^{-3}$	$< 3.06 \times 10^{-5}$	
Benzene:	6900 ppb	0.2 ppb	99.97
lb/hr	8.48×10^{-2}	2.42×10^{-3}	
Toluene:	33000 ppb	1.2 ppb	99.96
lb/hr	4.78×10^{-1}	1.71×10^{-4}	
Acetonitrile:	ND < 5700 ppb	ND < 5.7 ppb	NA
lb/hr	$< 3.68 \times 10^{-2}$	$< 3.62 \times 10^{-4}$	
m-xylenes:	13000 ppb	ND < 0.2 ppb	> 99.98
lb/hr	2.17×10^{-1}	$< 3.29 \times 10^{-5}$	
o+p xylenes:	11000 ppb	ND < 0.2 ppb	> 99.98
lb/hr	1.84×10^{-1}	$< 3.29 \times 10^{-5}$	
1,2-dibromoethane:	ND < 590 ppb	ND < 0.6 ppb	NA
lb/hr	$< 1.74 \times 10^{-2}$	$< 1.75 \times 10^{-4}$	
o+p dichlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	NA
lb/hr	$< 5.09 \times 10^{-3}$	$< 4.55 \times 10^{-5}$	
Benzyl Chloride:	(2)	(2)	(2)
lb/hr	—	—	—

ND < indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(1) - These compounds failed QA acceptance criteria; the numbers given here are best estimates.

(2) - Benzyl chloride failed the QA acceptance criteria and cannot be determined.

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 14, TEST NO. 2
DECEMBER 28, 1993

Flow rate, Inlet dscfm	962		
Flow rate, Exhaust dscfm	9,839		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3300 ppb	ND < 0.1 ppb	
lb/hr	4.26×10^{-2}	$< 1.32 \times 10^{-5}$	> 99.97
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 1.82 \times 10^{-3}$	$< 1.86 \times 10^{-5}$	NA
1,1,1-trichloroethane:	250 ppb	ND < 0.1 ppb	
lb/hr	5.07×10^{-3}	$< 2.08 \times 10^{-5}$	> 99.59
Carbon Tetrachloride:	ND < 84 ppb	ND < 0.1 ppb	
lb/hr	$< 1.97 \times 10^{-3}$	$< 2.39 \times 10^{-5}$	NA
1,1-dichloroethene:	ND < 110 ppb	ND < 0.1 ppb	
lb/hr	$< 1.62 \times 10^{-3}$	$< 1.51 \times 10^{-5}$	NA
Trichloroethylene:	730 ppb	ND < 0.1 ppb	
lb/hr	1.46×10^{-2}	$< 2.04 \times 10^{-5}$	> 99.86
Tetrachloroethylene:	1900 ppb	ND < 0.1 ppb	
lb/hr	4.79×10^{-2}	$< 2.58 \times 10^{-5}$	> 99.95
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 3.77 \times 10^{-3}$	$< 3.50 \times 10^{-5}$	NA
Vinyl Chloride:	650 ppb	ND < 0.4 ppb	
lb/hr	6.18×10^{-3}	$< 3.89 \times 10^{-5}$	> 99.37
m-dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	
lb/hr	$< 5.14 \times 10^{-3}$	$< 4.57 \times 10^{-5}$	NA
1,1-dichloroethane:	1300 ppb	ND < 0.1 ppb	
lb/hr	1.96×10^{-2}	$< 1.54 \times 10^{-5}$	> 99.92
1,2-dichloroethane:	ND < 210 ppb	ND < 0.2 ppb	
lb/hr	$< 3.16 \times 10^{-3}$	$< 3.08 \times 10^{-5}$	NA
Benzene:	6900 ppb	0.1 ppb	
lb/hr	8.20×10^{-2}	1.22×10^{-5}	99.99
Toluene:	34000 ppb	0.7 ppb	
lb/hr	4.76×10^{-1}	1.00×10^{-4}	99.98
Acetonitrile:	ND < 5700 ppb	ND < 5.7 ppb	
lb/hr	$< 3.56 \times 10^{-2}$	$< 3.64 \times 10^{-4}$	NA
m-xylenes:	13000 ppb	ND < 0.2 ppb	
lb/hr	2.10×10^{-1}	$< 3.30 \times 10^{-5}$	> 99.98
o+p xylenes:	11000 ppb	ND < 0.2 ppb	
lb/hr	1.78×10^{-1}	$< 3.30 \times 10^{-5}$	> 99.98
1,2-dibromoethane:	ND < 590 ppb	ND < 0.6 ppb	
lb/hr	$< 1.69 \times 10^{-2}$	$< 1.75 \times 10^{-4}$	NA
o+p dichlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 4.92 \times 10^{-3}$	$< 4.57 \times 10^{-5}$	NA
Benzyl Chloride:	(2)	(2)	
lb/hr	—	—	(2)

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(1) - These compounds failed QA acceptance criteria; the numbers given here are best estimates.

(2) - Benzyl Chloride failed the QA acceptance criteria and cannot be determined.

**TABLE 4-10
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 16
DECEMBER 29, 1993**

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.40	4.50	4.45	14.22	14.08	14.15
CO ₂ , % dry	30.2	29.8	30.0	6.28	6.47	6.38
N ₂ , % dry	28.2	28.5	28.4	79.5	79.5	79.5
H ₂ O, %	4.3	3.7	4.0	7.4	6.3	6.9
Flow Rate, dscfm	856	936	896	11,342	10,669	11,006
Temperature, °F	110	118	114	1,504	1,477	1,491
NO _x :						
ppm				13.4	13.7	13.5
ppm @ 3% O ₂				35.9	35.9	35.9
lb/hr (as NO ₂)				1.11	1.06	1.08
CO:						
ppm				11.5	16.1	13.8
ppm @ 3% O ₂				30.7	42.1	36.4
lb/hr				0.58	0.76	0.67
SO _x :						
ppm				7.1	6.1	6.6
ppm @ 3% O ₂				18.97	16.06	17.52
lb/hr				0.81	0.66	0.74
HC:						
CH ₄ , ppm	413,000	428,000	420,500	3.59	ND < 1	2.3
TGNMO ppm	4,460	4,200	4,330	2.99	3.98	3.49
TGNMO ppm @ 3% O ₂	--	--	--	8.01	10.45	9.23
TGNMO lb/hr (as CH ₄)	9.66	9.94	9.80	0.09	0.11	0.10
Destruction Eff. %	--	--	--	99.11	98.92	99.02
Particulate:						
Organic Fraction gr/dscf				0.0000	0.0029	0.0015
Inorganic Fraction gr/dscf				0.0055	0.0072	0.0064
Total Particulate gr/dscf				0.0055	0.0101	0.0078
gr/dscf @ 3% O ₂				0.0147	0.0265	0.0206
gr/dscf @ 12% CO ₂				0.0105	0.0134	0.0120
lb/hr				0.533	0.661	0.597
Sulfur Compounds:						
H ₂ S, ppm	55	53	54			
Methyl Mercaptan, ppm	1.6	1.6	1.6			
Ethyl Mercaptan, ppm	ND < 1	ND < 1	ND < 1			
Carbonyl Sulfide, ppm	ND < 0.8	ND < 0.8	ND < 0.8			
Carbon Disulfide, ppm	ND < 1	ND < 1	ND < 1			
Dimethyl Sulfide, ppm	1.7	1.7	1.7			
Dimethyl Disulfide, ppm	ND < 1	ND < 1	ND < 1			
Total Sulfur Compounds, ppm	< 83.2	< 83.9	< 83.6			

TABLE 4-11
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 16, TEST NO. 1
DECEMBER 29, 1993

Flow rate, Inlet dscfm	856		
Flow rate, Exhaust dscfm	11,342		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3300 ppb	ND < 0.1 ppb	
lb/hr	3.79×10^{-2}	$< 1.52 \times 10^{-5}$	> 99.96
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 1.622 \times 10^{-3}$	$< 2.14 \times 10^{-5}$	NA
1,1,1-trichloroethane:	340 ppb	ND < 0.1 ppb	
lb/hr	6.14×10^{-3}	$< 2.39 \times 10^{-5}$	> 99.61
Carbon Tetrachloride:	ND < 84 ppb	ND < 0.1 ppb	
lb/hr	$< 1.75 \times 10^{-3}$	$< 2.76 \times 10^{-5}$	NA
1,1-dichloroethene:	ND < 110 ppb	ND < 0.1 ppb	
lb/hr	$< 1.44 \times 10^{-3}$	$< 1.74 \times 10^{-5}$	NA
Trichloroethylene:	700 ppb	ND < 0.1 ppb	
lb/hr	1.24×10^{-2}	$< 2.36 \times 10^{-5}$	> 99.81
Tetrachloroethylene:	1800 ppb	ND < 0.1 ppb	
lb/hr	4.04×10^{-2}	$< 2.97 \times 10^{-5}$	> 99.93
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 3.35 \times 10^{-3}$	$< 4.04 \times 10^{-5}$	NA
Vinyl Chloride:	670 ppb	ND < 0.4 ppb	
lb/hr	5.67×10^{-3}	$< 4.48 \times 10^{-5}$	> 99.21
m-dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	
lb/hr	$< 4.58 \times 10^{-3}$	$< 5.27 \times 10^{-5}$	NA
1,1-dichloroethane:	1300 ppb	ND < 0.1 ppb	
lb/hr	1.74×10^{-2}	$< 1.77 \times 10^{-5}$	> 99.90
1,2-dichloroethane:	ND < 210 ppb	ND < 0.2 ppb	
lb/hr	$< 2.81 \times 10^{-3}$	$< 3.55 \times 10^{-5}$	NA
Benzene:	6700 ppb	0.2 ppb	
lb/hr	7.08×10^{-2}	2.80×10^{-5}	99.96
Toluene:	32000 ppb	0.8 ppb	
lb/hr	3.99×10^{-1}	1.32×10^{-4}	99.97
Acetonitrile:	ND < 5700 ppb	ND < 5.7 ppb	
lb/hr	$< 3.17 \times 10^{-2}$	$< 4.20 \times 10^{-4}$	NA
m-xylenes:	12000 ppb	ND < 0.2 ppb	
lb/hr	1.72×10^{-1}	$< 3.81 \times 10^{-5}$	> 99.98
o+p xylenes:	9900 ppb	ND < 0.2 ppb	
lb/hr	1.42×10^{-1}	$< 3.81 \times 10^{-5}$	> 99.97
1,2-dibromoethane:	ND < 590 ppb	ND < 0.6 ppb	
lb/hr	$< 1.50 \times 10^{-2}$	$< 2.02 \times 10^{-4}$	NA
o+p dichlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 4.38 \times 10^{-3}$	$< 5.27 \times 10^{-5}$	NA
Benzyl Chloride:	(2)	(2)	
lb/hr	-	-	(2)

ND < indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(1) - These compounds failed QA acceptance criteria; the numbers given here are best estimates.

(2) - Benzyl Chloride failed the QA acceptance criteria and cannot be determined.

TABLE 4-12
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 16, TEST NO. 2
DECEMBER 29, 1993

Flow rate, Inlet dscfm	936		
Flow rate, Exhaust dscfm	10,669		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3300 ppb	ND < 0.1 ppb	
lb/hr	4.15×10^{-2}	$< 1.43 \times 10^{-5}$	> 99.97
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 1.77 \times 10^{-3}$	$< 2.01 \times 10^{-5}$	NA
1,1,1-trichloroethane:	330 ppb	ND < 0.1 ppb	
lb/hr	6.52×10^{-3}	$< 2.25 \times 10^{-5}$	> 99.65
Carbon Tetrachloride:	ND < 84 ppb	ND < 0.1 ppb	
lb/hr	$< 1.91 \times 10^{-3}$	$< 2.59 \times 10^{-5}$	NA
1,1-dichloroethene:	ND < 110 ppb	ND < 0.1 ppb	
lb/hr	$< 1.58 \times 10^{-3}$	$< 1.64 \times 10^{-5}$	NA
Trichloroethylene:	660 ppb	ND < 0.1 ppb	
lb/hr	1.28×10^{-2}	$< 2.22 \times 10^{-5}$	> 99.83
Tetrachloroethylene:	1700 ppb	ND < 0.1 ppb	
lb/hr	4.17×10^{-2}	$< 2.80 \times 10^{-5}$	> 99.93
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 3.66 \times 10^{-3}$	$< 3.80 \times 10^{-5}$	NA
Vinyl Chloride:	480 ppb	ND < 0.4 ppb	
lb/hr	4.44×10^{-3}	$< 4.22 \times 10^{-5}$	> 99.05
m-dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	
lb/hr	$< 5.00 \times 10^{-3}$	$< 4.96 \times 10^{-5}$	NA
1,1-dichloroethane:	1200 ppb	ND < 0.1 ppb	
lb/hr	1.76×10^{-2}	$< 1.67 \times 10^{-5}$	> 99.91
1,2-dichloroethane:	ND < 210 ppb	ND < 0.2 ppb	
lb/hr	$< 3.08 \times 10^{-3}$	$< 3.34 \times 10^{-5}$	NA
Benzene:	6500 ppb	ND < 0.1 ppb	
lb/hr	7.51×10^{-2}	$< 1.32 \times 10^{-5}$	> 99.98
Toluene:	31000 ppb	0.7 ppb	
lb/hr	4.23×10^{-1}	1.09×10^{-4}	99.97
Acetonitrile:	ND < 5700 ppb	ND < 5.7 ppb	
lb/hr	$< 3.46 \times 10^{-2}$	$< 3.95 \times 10^{-4}$	NA
m-xylenes:	12000 ppb	ND < 0.2 ppb	
lb/hr	1.89×10^{-1}	$< 3.58 \times 10^{-5}$	> 99.98
o+p xylenes:	9800 ppb	ND < 0.2 ppb	
lb/hr	1.54×10^{-1}	$< 3.58 \times 10^{-5}$	> 99.98
1,2-dibromoethane:	ND < 590 ppb	ND < 0.6 ppb	
lb/hr	$< 1.64 \times 10^{-2}$	$< 1.90 \times 10^{-4}$	NA
o+p dichlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 4.79 \times 10^{-3}$	$< 4.96 \times 10^{-5}$	NA
Benzyl Chloride:	(2)	(2)	
lb/hr	—	—	(2)

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(1) - These compounds failed QA acceptance criteria; the numbers given here are best estimates.

(2) - Benzyl Chloride failed the QA acceptance criteria and cannot be determined.

TD: Chung, M

312-104-10



AIR MEASUREMENT SERVICES, INC.

L01-005-FR

**EMISSIONS TESTS ON FLARES NO. 3, NO. 5, NO. 7 and No. 9
AT THE PUENTE HILLS LANDFILL**

MAY 1994

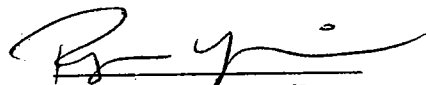
Prepared for:

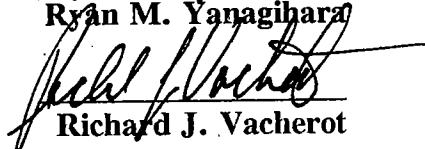
**LOS ANGELES COUNTY SANITATION DISTRICTS
Post Office Box 4998
Whittier, California 90607**

Prepared by:

**HORIZON AIR MEASUREMENT SERVICES, INC.
996 Lawrence Drive, Suite 108
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94 JUL 5 AM 9:55


Ryan M. Yanagihara


Richard J. Vacherot

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TABLE 5-1
Summary of Results - Flare No. 3
Puente Hills Landfill
May 9, 1994

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	132	130	131	1545	1529	1537
Moisture (%)	6.1	6.2	6.2	7.5	7.3	7.4
Flow Rate (acfm)*	1084	1283	1184	39212	37954	38583
(dscfm)	882	1046	964	9245	9030	9138
Fixed Gases						
Oxygen (%)	3.9	4.1	4.0	12.5	13.2	12.9
Carbon Dioxide (%)	32.5	32.2	32.4	7.3	6.7	7.0
EMISSIONS						
Oxides of Nitrogen						
ppm	----	----	----	14.8	13.1	14.0
ppm @ 3% O ₂	----	----	----	31.5	30.5	31.0
lb/hr	----	----	----	0.981	0.848	0.915
Carbon Monoxide						
ppm	----	----	----	0.6	1.3	1.0
ppm @ 3% O ₂	----	----	----	1.3	3.0	2.2
lb/hr	----	----	----	0.024	0.051	0.038
Particulate Matter						
organic fraction gr/dscf	----	----	----	0.0000	0.0000	0.0000
inorganic fraction, gr/dscf	----	----	----	0.0030	0.0016	0.0023
total, gr/dscf	----	----	----	0.0030	0.0016	0.0023
total, gr/dscf @ 3% O ₂	----	----	----	0.0064	0.0037	0.0051
Total, lb/hr	----	----	----	0.24	0.121	0.18
Hydrocarbons						
methane, ppm	441000	443000	442000	**	<1	<1
TNMHC, ppm (as CH ₄)	3340	3580	3460	**	4.36	4.36
TNMHC, lb/hr (as CH ₄)	7.45	9.47	8.46	**	0.100	0.100
destruction efficiency					98.9	98.9
Sulfur Compounds						
hydrogen sulfide (ppm)	65.0	68.0	66.5	----	----	----
total sulfur compounds (ppm as H ₂ S)	68.9	70.3	69.6	----	----	----
Oxides of Sulfur						
ppm	----	----	----	6.37	6.15	6.26
ppm @ 3% O ₂	----	----	----	11.88	12.65	12.27
lb/hr (as SO ₂)	----	----	----	0.559	0.528	0.544

- * The inlet flow rate measurements have an accuracy of $\pm 10\%$ due to flow distribution at the sample location.
 ** For Flare #3, Run #1, the exhaust Tedlar bag sample was received flat by the laboratory.

TABLE 5-2
Summary of Results - Flare No. 5
Puente Hills Landfill
May 10, 1994

STACK GAS CHARACTERISTICS	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
Temperature (°F)	124	127	126	1625	1615	1620
Moisture (%)	7.6	6.6	7.1	7.6	9.8	8.7
Flow Rate (acfm)*	1124	1151	1138	37861	37351	37606
(dscfm)	912	939	926	8578	8291	8435
Fixed Gases						
Oxygen (%)	4.2	3.9	4.1	11.3	12.2	11.8
Carbon Dioxide (%)	31.8	32.3	32.1	8.3	7.7	8.0
EMISSIONS						
Oxides of Nitrogen						
ppm	---	---	---	15.1	15.5	15.3
ppm @ 3% O ₂	---	---	---	28.2	31.9	30.1
lb/hr	---	---	---	0.929	0.921	0.925
Carbon Monoxide						
ppm	---	---	---	1.2	0.5	0.9
ppm @ 3% O ₂	---	---	---	2.2	1.0	1.6
lb/hr	---	---	---	0.045	0.018	0.032
Particulate Matter						
organic fraction gr/dscf	---	---	---	0.0003	0.0000	0.0002
insoluble, gr/dscf	---	---	---	0.0187	0.0023	0.0104
total, gr/dscf	---	---	---	0.0190	0.0023	0.0107
total, gr/dscf @ 3% O ₂	---	---	---	1.40	0.17	0.79
Total, lb/hr	---	---	---	2.61	0.35	1.48
Hydrocarbons						
methane, ppm	429000	432000	430500	<1	<1	<1
TNMHC, ppm (as CH ₄)	3300	3470	3385	6.32	5.53	5.93
TNMHC, lb/hr (as CH ₄)	7.61	8.24	7.9	10.135	0.118	0.127
destruction efficiency				98.2	98.6	98.4
Sulfur Compounds						
hydrogen sulfide (ppm)	74.0	70.0	72.0	---	---	---
total sulfur compounds (ppm as H ₂ S)	77.8	73.7	75.8	---	---	---
Oxides of Sulfur						
ppm	---	---	---	4.91	6.50	5.71
ppm @ 3% O ₂	---	---	---	9.16	12.79	10.98
lb/hr (as SO ₂)	---	---	---	0.400	0.512	0.456

The inlet flow rate measurements have an accuracy of $\pm 10\%$ due to flow distribution at the sample location.

TABLE 5-3
Summary of Results - Flare No. 7
Puente Hills Landfill
May 11, 1994

STACK GAS CHARACTERISTICS	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
Temperature (°F)	194	120	120	1533	1594	1564
Moisture (%)	5.0	8.1	6.6	8.0	7.6	7.8
Flow Rate (acfm)*	840	852	846	31210	35200	33205
(dscfm)	707	692	700	7360	8089	7725
Fixed Gases						
Oxygen (%)	4.1	4.2	4.2	13.2	11.9	12.6
Carbon Dioxide (%)	32.7	32.0	32.4	6.6	7.7	7.2
EMISSIONS						
Oxides of Nitrogen						
ppm	---	---	---	13.4	16.0	14.7
ppm @ 3% O ₂	---	---	---	31.2	31.8	31.5
lb/hr	---	---	---	0.717	0.941	0.829
Carbon Monoxide						
ppm	---	---	---	1.4	1.8	1.6
ppm @ 3% O ₂	---	---	---	3.3	3.6	3.5
lb/hr	---	---	---	0.046	0.064	0.055
particulate Matter						
organic fraction gr/dscf	---	---	---	0.0000	0.0000	0.0000
insoluble, gr/dscf	---	---	---	0.0008	0.0005	0.0007
total, gr/dscf	---	---	---	0.0008	0.0005	0.0007
total, gr/dscf @ 3% O ₂	---	---	---	0.0019	0.0010	0.0015
Total, lb/hr	---	---	---	0.05	0.04	0.05
Hydrocarbons						
methane, ppm	410000	434000	422000	<1	<1	<1
TNMHC, ppm (as CH ₄)	3170	3190	3180	4.60	8.70	6.7
TNMHC, lb/hr (as CH ₄)	5.67	5.59	5.63	0.086	0.178	0.132
destruction efficiency				98.5	96.8	97.7
Sulfur Compounds						
hydrogen sulfide (ppm)	74.0	73.0	73.5	---	---	---
total sulfur compounds (ppm as H ₂ S)	77.8	76.6	77.2	---	---	---
Oxides of Sulfur						
ppm	---	---	---	4.11	4.42	4.27
ppm @ 3% O ₂	---	---	---	9.55	8.79	9.17
lb/hr (as SO ₂)	---	---	---	0.287	0.340	0.314

The inlet flow rate measurements have an accuracy of $\pm 10\%$ due to flow distribution at the sample location.

TABLE 5-4
Summary of Results - Flare No. 9
Puente Hills Landfill
May 12, 1994

STACK GAS CHARACTERISTICS	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
Temperature (°F)	111	121	116	1510	1534	1522
Moisture (%)	3.8	4.3	4.1	9.1	7.8	8.45
Flow Rate (acfm)*	1138	918	1028	38908	38031	38470
(dscfm)	984	776	880	9179	8990	9085
Fixed Gases						
Oxygen (%)	4.2	4.1	4.15	13.3	12.8	13.1
Carbon Dioxide (%)	32.1	32.4	32.25	6.5	6.9	6.7
EMISSIONS						
Oxides of Nitrogen						
ppm	---	---	---	13.1	13.6	13.35
ppm @ 3% O ₂	---	---	---	30.9	30.1	30.5
lb/hr	---	---	---	0.874	0.889	0.882
Carbon Monoxide						
ppm	---	---	---	1.1	0.3	0.7
ppm @ 3% O ₂	---	---	---	2.6	0.7	1.7
lb/hr	---	---	---	0.045	0.012	0.029
Particulate Matter						
organic fraction gr/dscf	---	---	---	0.0000	0.0000	0.0000
insoluble, gr/dscf	---	---	---	0.0021	0.0003	0.0012
total, gr/dscf	---	---	---	0.0021	0.0003	0.0012
total, gr/dscf @ 3% O ₂	---	---	---	0.0049	0.0007	0.0028
Total, lb/hr	---	---	---	0.17	0.02	0.095
Hydrocarbons						
methane, ppm	421000	414000	417500	<1	<1	<1
TNMHC, ppm (as CH ₄)	3160	3170	3165	5.85	6.23	6.04
TNMHC, lb/hr (as CH ₄)	7.87	6.22	7.05	0.136	0.142	0.138
destruction efficiency				98.3	97.7	98.0
Sulfur Compounds						
hydrogen sulfide (ppm)	60.0	57.0	58.5	---	---	---
total sulfur compounds (ppm as H ₂ S)	63.4	60.4	61.9	---	---	---
Oxides of Sulfur						
ppm	---	---	---	6.0	5.4	5.7
ppm @ 3% O ₂	---	---	---	14.1	11.9	13.0
lb/hr (as SO ₂)	---	---	---	0.523	0.458	0.491

The inlet flow rate measurements have an accuracy of $\pm 10\%$ due to flow distribution at the sample location.

Table 5-5
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #3 - Run #1
May 9, 1994

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)		Concentration (ppb)	Emission Rate (lb/hr)		
Acetonitrile	< 5700	< 3.26E-02		< 5.7	< 3.41E-04		NA
Benzene	3100	3.37E-02		< 0.1	< 1.14E-05	>	99.97
Benzylchloride	< 2000	< 3.54E-02		< 2.0	< 3.71E-04		NA
Chlorobenzene	< 220	< 3.47E-03		< 0.2	< 3.30E-05		NA
Dichlorobenzenes	< 230	< 4.71E-03		< 0.2	< 4.29E-05		NA
1,1-dichloroethane	830	1.15E-02		< 0.1	< 1.45E-05	>	99.87
1,2-dichloroethane	< 210	< 2.90E-03		< 0.2	< 2.89E-05		NA
1,1-dichloroethylene	180	2.43E-03		< 0.1	< 1.42E-05	>	99.42
Dichloromethane	3000	3.56E-02		< 0.1	< 1.24E-05	>	99.97
Perchloroethene	830	2.74E-02		< 0.2	< 6.92E-05	>	99.75
Carbon tetrachloride	< 170	< 3.65E-03		< 0.2	< 4.50E-05		NA
Toluene	23000	2.95E-01		0.7	9.41E-05		99.97
1,1,1-trichloroethane	210	3.89E-03		< 0.1	< 2.72E-05	>	99.30
Trichloroethene	480	8.77E-03		< 0.2	< 3.83E-05	>	99.56
Chloroform	< 100	< 1.66E-03		< 0.1	< 1.74E-05		NA
Vinyl Chloride	< 380	< 3.31E-03		< 0.4	< 3.65E-05		NA
m xylenes	8400	1.24E-01		< 0.2	< 3.10E-05	>	99.98
o+p xylene	6000	8.87E-02		< 0.2	< 3.10E-05	>	99.97
TNMHC	3340000	7.45E+00		*	0.00E+00		*

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

* Tedlar bag leaked on route to the laboratory.

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-6
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #3 - Run #2
May 9, 1994

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Acetonitrile	< 5700	< 3.26E-02	< 5.7	< 3.41E-04	NA
Benzene	3400	3.70E-02	0.2	2.28E-05	> 99.94
Benzylchloride	< 2000	< 3.54E-02	< 2.0	< 3.71E-04	NA
Chlorobenzene	< 220	< 3.47E-03	< 0.2	< 3.30E-05	NA
Dichlorobenzenes	< 230	< 4.71E-03	< 0.2	< 4.29E-05	NA
1,1-dichloroethane	800	1.10E-02	< 0.1	< 1.45E-05	> 99.87
1,2-dichloroethane	< 210	< 2.90E-03	< 0.2	< 2.89E-05	NA
1,1-dichloroethylene	< 110	< 1.49E-03	< 0.1	< 1.42E-05	NA
Dichloromethane	3100	3.67E-02	< 0.1	< 1.24E-05	> 99.97
Perchloroethene	720	2.38E-02	< 0.2	< 6.92E-05	> 99.71
Carbon tetrachloride	< 170	< 3.65E-03	< 0.2	< 4.50E-05	NA
Toluene	24000	3.08E-01	0.7	9.41E-05	99.97
1,1,1-trichloroethane	140	2.60E-03	< 0.1	< 2.72E-05	> 98.95
Trichloroethene	490	8.95E-03	< 0.2	< 3.83E-05	> 99.57
Chloroform	< 100	< 1.66E-03	< 0.1	< 1.74E-05	NA
Vinyl Chloride	440	3.83E-03	< 0.4	< 3.65E-05	> 98.90
m xylenes	6500	9.61E-02	< 0.2	< 3.10E-05	> 99.97
o+p xylene	4700	6.95E-02	< 0.2	< 3.10E-05	> 99.96
TNMHC	3580000	7.99E+00	4360.0	1.02E-01	98.72

All values preceded by "<" are below the detection limit - reported values are detection limit values
Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit

Table 5-7
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #5 - Run #1
May 10, 1994

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Acetonitrile	< 5700	< 3.26E-02	< 5.7	< 3.41E-04	NA
Benzene	3700	4.02E-02	< 0.1	< 1.14E-05	> 99.97
Benzylchloride	< 2000	< 3.54E-02	< 0.0	< 0.00E+00	NA
Chlorobenzene	< 200	< 3.15E-03	< 0.2	< 3.30E-05	NA
Dichlorobenzenes	< 230	< 4.71E-03	< 0.2	< 4.29E-05	NA
1,1-dichloroethane	1000	1.38E-02	< 0.1	< 1.45E-05	> 99.90
1,2-dichloroethane	< 210	< 2.90E-03	< 0.2	< 2.89E-05	NA
1,1-dichloroethylene	< 110	< 1.49E-03	< 0.1	< 1.42E-05	NA
Dichloromethane	3700	4.39E-02	< 0.1	< 1.24E-05	> 99.97
Perchloroethene	1500	4.96E-02	< 0.2	< 6.92E-05	> 99.86
Carbon tetrachloride	< 170	< 3.65E-03	< 0.2	< 4.50E-05	NA
Toluene	32000	4.10E-01	1.1	1.48E-04	99.96
1,1,1-trichloroethane	290	5.38E-03	< 0.1	< 2.72E-05	> 99.49
Trichloroethene	530	9.68E-03	< 0.2	< 3.83E-05	> 99.60
Chloroform	< 100	< 1.66E-03	< 0.1	< 1.74E-05	NA
Vinyl Chloride	1000	8.71E-03	< 0.4	< 3.65E-05	> 98.90
m xylenes	13000	1.92E-01	< 0.2	< 3.10E-05	> 99.98
o+p xylene	10000	1.48E-01	< 0.2	< 3.10E-05	> 99.98
TNMHC	3300000	7.36E+00	6320.0	1.48E-01	98.72

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values
NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit

Table 5-8
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #5 - Run #2
May 10, 1994

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Acetonitrile	< 5700	< 3.26E-02	< 5.7	< 3.41E-04	NA
Benzene	3800	4.13E-02	< 0.1	< 1.14E-05	> 99.97
Benzylchloride	0	0.00E+00	< 0.0	< 0.00E+00	NA
Chlorobenzene	< 220	< 3.47E-03	< 0.2	< 3.30E-05	NA
Dichlorobenzenes	< 230	< 4.71E-03	< 0.2	< 4.29E-05	NA
1,1-dichloroethane	1100	1.52E-02	< 0.1	< 1.45E-05	> 99.90
1,2-dichloroethane	< 210	< 2.90E-03	< 0.2	< 2.89E-05	NA
1,1-dichloroethylene	< 110	< 1.49E-03	< 0.1	< 1.42E-05	NA
Dichloromethane	3600	4.27E-02	< 0.1	< 1.24E-05	> 99.97
Perchloroethene	1200	3.97E-02	< 0.2	< 6.92E-05	> 99.83
Carbon tetrachloride	< 170	< 3.65E-03	< 0.2	< 4.50E-05	NA
Toluene	31000	3.98E-01	0.7	9.41E-05	99.98
1,1,1-trichloroethane	230	4.27E-03	< 0.1	< 2.72E-05	> 99.36
Trichloroethene	550	1.00E-02	< 0.2	< 3.83E-05	> 99.62
Chloroform	< 100	< 1.66E-03	< 0.1	< 1.74E-05	NA
Vinyl Chloride	420	3.66E-03	< 0.4	< 3.65E-05	> 98.90
m xylenes	11000	1.63E-01	< 0.2	< 3.10E-05	> 99.98
o+p xylene	8100	1.20E-01	< 0.2	< 3.10E-05	> 99.97
TNMHC	3470000	7.74E+00	5530.0	1.29E-01	98.72

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-9
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #7 - Run #1
May 11, 1994

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Acetonitrile	< 5700	< 3.26E-02	< 5.7	< 3.41E-04	NA
Benzene	3800	4.13E-02	< 0.1	< 1.14E-05	> 99.97
Benzylchloride	0	0.00E+00	< 2.0	< 3.71E-04	NA
Chlorobenzene	< 220	< 3.47E-03	< 0.2	< 3.30E-05	NA
Dichlorobenzenes	< 230	< 4.71E-03	< 0.2	< 4.29E-05	NA
1,1-dichloroethane	1100	1.52E-02	< 0.1	< 1.45E-05	> 99.90
1,2-dichloroethane	< 210	< 2.90E-03	< 0.2	< 2.89E-05	NA
1,1-dichloroethylene	< 110	< 1.49E-03	< 0.1	< 1.42E-05	NA
Dichloromethane	3100	3.67E-02	< 0.1	< 1.24E-05	> 99.97
Perchloroethene	1300	4.30E-02	< 0.2	< 6.92E-05	> 99.84
Carbon tetrachloride	< 170	< 3.65E-03	< 0.2	< 4.50E-05	NA
Toluene	31000	3.98E-01	< 0.5	< 6.72E-05	> 99.98
1,1,1-trichloroethane	280	5.19E-03	< 0.1	< 2.72E-05	> 99.48
Trichloroethene	540	9.86E-03	< 0.2	< 3.83E-05	> 99.61
Chloroform	< 100	< 1.66E-03	< 0.1	< 1.74E-05	NA
Vinyl Chloride	480	4.18E-03	< 0.4	< 3.65E-05	> 99.13
m xylenes	12000	1.77E-01	< 0.2	< 3.10E-05	> 99.98
o+p xylene	8500	1.26E-01	< 0.2	< 3.10E-05	> 99.98
TNMHC	3170000	7.07E+00	4600.0	1.07E-01	98.72

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values
NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #7 - Run #2
May 11, 1994

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Acetonitrile	< 5700	< 3.26E-02	< 5.7	< 3.41E-04	NA
Benzene	3200	3.48E-02	< 0.1	< 1.14E-05	> 99.97
Benzylchloride	0	0.00E+00	< 2.0	< 3.71E-04	NA
Chlorobenzene	< 220	< 3.47E-03	< 0.2	< 3.30E-05	NA
Dichlorobenzenes	< 230	< 4.71E-03	< 0.2	< 4.29E-05	NA
1,1-dichloroethane	1100	1.52E-02	< 0.1	< 1.45E-05	> 99.90
1,2-dichloroethane	< 210	< 2.90E-03	< 0.2	< 2.89E-05	> 99.00
1,1-dichloroethylene	< 110	< 1.49E-03	< 0.1	< 1.42E-05	NA
Dichloromethane	3400	4.03E-02	< 0.1	< 1.24E-05	> 99.97
Perchloroethene	1000	3.30E-02	< 0.2	< 6.92E-05	> 99.79
Carbon tetrachloride	< 170	< 3.65E-03	< 0.2	< 4.50E-05	NA
Toluene	24000	3.08E-01	1.0	1.34E-04	99.96
1,1,1-trichloroethane	280	5.19E-03	< 0.1	< 2.72E-05	> 99.48
Trichloroethene	520	9.50E-03	< 0.2	< 3.83E-05	> 99.60
Chloroform	< 100	< 1.66E-03	< 0.1	< 1.74E-05	NA
Vinyl Chloride	650	5.66E-03	< 0.4	< 3.65E-05	> 99.36
m xylenes	7600	1.12E-01	< 0.2	< 3.10E-05	> 99.97
o+p xylene	5500	8.13E-02	< 0.2	< 3.10E-05	> 99.96
TNMHC	3190000	7.12E+00	8700.0	2.03E-01	97.14

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-11
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #9 - Run #1
May 12, 1994

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Acetonitrile	< 5700	< 3.26E-02	< 5.7	< 3.41E-04	NA
Benzene	2600	2.83E-02	0.5	5.70E-05	99.80
Benzylchloride	< 2000	< 3.54E-02	< 2.0	< 3.71E-04	NA
Chlorobenzene	< 440	< 6.93E-03	< 0.2	< 3.30E-05	NA
Dichlorobenzenes	< 230	< 4.71E-03	< 0.2	< 4.29E-05	NA
1,1-dichloroethane	1300	1.79E-02	< 0.1	< 1.45E-05	> 99.92
1,2-dichloroethane	< 210	< 2.90E-03	< 0.2	< 2.89E-05	NA
1,1-dichloroethylene	< 110	< 1.49E-03	< 0.1	< 1.42E-05	NA
Dichloromethane	3300	3.91E-02	< 0.1	< 1.24E-05	> 99.97
Perchloroethene	1300	4.30E-02	< 0.2	< 6.92E-05	> 99.84
Carbon tetrachloride	< 84	< 1.80E-03	< 0.2	< 4.50E-05	NA
Toluene	19000	2.44E-01	< 0.5	< 6.72E-05	> 99.97
1,1,1-trichloroethane	260	4.82E-03	< 0.1	< 2.72E-05	> 99.44
Trichloroethene	620	1.13E-02	< 0.2	< 3.83E-05	> 99.66
Chloroform	< 100	< 1.66E-03	< 0.1	< 1.74E-05	NA
Vinyl Chloride	1100	9.59E-03	< 0.4	< 3.65E-05	> 99.62
m xylenes	9300	1.37E-01	0.7	1.08E-04	99.92
o+p xylene	3200	4.73E-02	< 0.2	< 3.10E-05	> 99.93
TNMHC	3160000	7.05E+00	5850.0	1.37E-01	98.06

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-12
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #9 - Run #2
May 12, 1994

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Acetonitrile	< 5700	< 3.26E-02	< 5.7	< 3.41E-04	NA
Benzene	2500	2.72E-02	0.2	2.28E-05	99.92
Benzylchloride	< 2000	< 3.54E-02	< 2.0	< 3.71E-04	NA
Chlorobenzene	< 440	< 6.93E-03	< 0.2	< 3.30E-05	NA
Dichlorobenzenes	< 230	< 4.71E-03	< 0.2	< 4.29E-05	NA
1,1-dichloroethane	1300	1.79E-02	< 0.1	< 1.45E-05	> 99.92
1,2-dichloroethane	< 210	< 2.90E-03	< 0.2	< 2.89E-05	NA
1,1-dichloroethylene	< 110	< 1.49E-03	< 0.1	< 1.42E-05	NA
Dichloromethane	3200	3.79E-02	< 0.1	< 1.24E-05	> 99.97
Perchloroethene	1000	3.30E-02	< 0.2	< 6.92E-05	> 99.79
Carbon tetrachloride	< 84	< 1.80E-03	< 0.2	< 4.50E-05	NA
Toluene	18000	2.31E-01	1.8	2.42E-04	99.90
1,1,1-trichloroethane	260	4.82E-03	< 0.1	< 2.72E-05	> 99.44
Trichloroethene	580	1.06E-02	< 0.2	< 3.83E-05	> 99.64
Chloroform	< 100	< 1.66E-03	< 0.1	< 1.74E-05	NA
Vinyl Chloride	1000	8.71E-03	< 0.4	< 3.65E-05	> 99.58
m xylenes	6500	9.61E-02	< 0.2	< 3.10E-05	> 99.97
o+p xylene	2300	3.40E-02	< 0.2	< 3.10E-05	> 99.91
TNMHC	3170000	7.07E+00	6230.0	1.46E-01	97.94

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values
NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

**EMISSIONS TESTS ON FOUR FLARES
(FLARES NOS. 6, 8, 10, AND 12) AT
PUENTE HILLS LANDFILL
MARCH 1995**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

APRIL 1995

RESULTS

SECTION 4.0

**TABLE 4-1
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 6
MARCH 6, 1995**

Parameter	First Run	INLET Second Run	Average	First Run	EXHAUST GAS Second Run	Average
O ₂ , %	4.17	3.61	3.89	13.16	12.20	12.68
CO ₂ , %	31.6	32.2	31.9	7.25	8.21	7.73
N ₂ , %	22.4	20.6	21.5	79.6	79.6	79.6
H ₂ O, %	5.8	5.8	5.8	10.0	9.2	9.6
Flow Rate, dscfm	786	784	785	8,003	9,985	8,994
Temperature, °F	111	115	113	1,560	1,552	1,556
NO _x :						
ppm						
ppm @ 3% O ₂				1.7	13.3	7.5
lb/hr (as NO ₂)				3.9	27.3	15.6
				0.10	0.97	0.53
CO:						
ppm						
ppm @ 3% O ₂				14.4	1.1	7.7
lb/hr				33.2	2.2	17.7
				0.508	0.048	0.278
SO _x :						
ppm						
ppm @ 3% O ₂				10.4	9.9	10.1
lb/hr (as SO ₂)				24.0	20.3	22.1
				0.84	1.00	0.92
HC:						
CH ₄ ppm						
TGNMO ppm	456,000	461,000	458,500	ND < 1	1.05	< 1.03
TGNMO ppm @ 3% O ₂	3,000	3,080	3,040	1.04	1.13	1.09
TGNMO lb/hr (as CH ₄)	---	---	---	2.41	2.32	2.37
Destruction Eff. %	5.96	6.11	6.03	0.02	0.03	0.02
	---	---	---	99.65	99.53	99.59
Particulate:						
Organic fraction gr/dscf						
Inorganic fraction gr/dscf				0.0004	0.0000	0.0002
Total Particulate gr/dscf				0.0096	0.0063	0.0080
gr/dscf @ 3% O ₂				0.0100	0.0063	0.0081
gr/dscf @ 3% CO ₂				0.0231	0.0129	0.0180
lb/hr				0.0160	0.0092	0.0126
				0.661	0.537	0.599
Sulfur Compounds:						
H ₂ S, ppm	78	68	73			
Methyl Mercaptan, ppm	2.0	1.4	1.7			
Ethyl Mercaptan, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Sulfide, ppm	2.2	1.7	2.0			
Carbonyl Sulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Carbon Disulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	85.4	74.3	79.9			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 6, TEST NO. 1
MARCH 6, 1995

Flow rate, Inlet dscfm	786			
Flow rate, Exhaust dscfm	8,003			
Species	Inlet	Exhaust	Destruction Efficiency, %	
Methylene Chloride:	2000 ppb	6.8 ppb		
lb/hr	2.11×10^{-2}	7.31×10^{-4}	96.54	
Chloroform:	ND < 100 ppb	ND < 0.3 ppb		
lb/hr	< 1.48×10^{-3}	< 4.53×10^{-5}	NA	
1,1,1 Trichloroethane:	ND < 100 ppb	ND < 0.3 ppb		
lb/hr	< 1.66×10^{-3}	< 5.06×10^{-5}	NA	
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.3 ppb		
lb/hr	< 1.91×10^{-3}	< 5.84×10^{-5}	NA	
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.5 ppb		
lb/hr	< 2.53×10^{-3}	< 6.13×10^{-5}	NA	
Trichloroethylene:	560 ppb	ND < 0.3 ppb		
lb/hr	9.14×10^{-3}	< 4.99×10^{-5}	> 99.45	
Tetrachloroethylene:	1300 ppb	ND < 0.3 ppb		
lb/hr	2.68×10^{-2}	< 6.30×10^{-5}	> 99.76	
Chlorobenzene:	ND < 210 ppb	ND < 0.5 ppb		
lb/hr	< 2.94×10^{-3}	< 7.12×10^{-5}	NA	
Vinyl Chloride:	520	ND < 0.5 ppb		
lb/hr	4.03×10^{-3}	< 3.95×10^{-5}	> 99.02	
m-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb		
lb/hr	< 7.67×10^{-3}	< 2.05×10^{-4}	NA	
o-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb		
lb/hr	< 7.67×10^{-3}	< 2.05×10^{-4}	NA	
p-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb		
lb/hr	< 7.67×10^{-3}	< 2.05×10^{-4}	NA	
1,1-Dichloroethane:	950 ppb	ND < 0.5 ppb		
lb/hr	1.17×10^{-2}	< 6.26×10^{-5}	> 99.46	
1,2-Dichloroethane:	ND < 100 ppb	ND < 0.3 ppb		
lb/hr	< 1.23×10^{-3}	< 3.76×10^{-5}	NA	
Benzene:	2500 ppb	ND < 0.3 ppb		
lb/hr	2.43×10^{-2}	< 2.96×10^{-5}	> 99.88	
Toluene:	23000 ppb	ND < 1.1 ppb		
lb/hr	2.63×10^{-1}	< 1.28×10^{-4}	> 99.95	
Acetonitrile:	ND < 5100 ppb	ND < 13 ppb		
lb/hr	< 2.60×10^{-2}	< 6.75×10^{-4}	NA	
o-Xylenes:	4900 ppb	ND < 0.5 ppb		
lb/hr	6.46×10^{-2}	< 6.72×10^{-5}	> 99.90	
m+p Xylenes:	12000 ppb	ND < 1.1 ppb		
lb/hr	1.58×10^{-1}	< 1.48×10^{-4}	> 99.91	
1,2-Dibromoethane:	ND < 420 ppb	ND < 1.0 ppb		
lb/hr	< 9.80×10^{-3}	< 2.38×10^{-4}	NA	
Benzyl Chloride:	ND < 420 ppb	ND < 1.1 ppb		
lb/hr	< 6.60×10^{-3}	< 1.76×10^{-4}	NA	

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 6, TEST NO. 2
MARCH 6, 1995

Flow rate, Inlet dscfm	784		
Flow rate, Exhaust dscfm	9,985		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	2000 ppb	ND < 1.0 ppb	
lb/hr	2.11×10^{-2}	$< 1.34 \times 10^{-4}$	> 99.36
Chloroform:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 1.48 \times 10^{-3}$	$< 5.65 \times 10^{-5}$	NA
1,1,1 Trichloroethane:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 1.65 \times 10^{-3}$	$< 6.32 \times 10^{-5}$	NA
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 191 \times 10^{-3}$	$< 7.29 \times 10^{-5}$	NA
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	$< 2.52 \times 10^{-3}$	$< 7.65 \times 10^{-5}$	NA
Trichloroethylene:	570 ppb	ND < 0.3 ppb	
lb/hr	9.28×10^{-3}	$< 6.22 \times 10^{-5}$	> 99.33
Tetrachloroethylene:	1200 ppb	ND < 0.3 ppb	
lb/hr	2.47×10^{-2}	$< 7.85 \times 10^{-5}$	> 99.68
Chlorobenzene:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	$< 2.93 \times 10^{-3}$	$< 8.88 \times 10^{-5}$	NA
Vinyl Chloride:	840 ppb	ND < 0.5 ppb	
lb/hr	6.51×10^{-3}	$< 4.93 \times 10^{-5}$	> 99.24
m+o Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 7.6 \times 10^{-3}$	$< 2.55 \times 10^{-4}$	NA
o-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 7.65 \times 10^{-3}$	$< 2.55 \times 10^{-4}$	NA
p-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 7.65 \times 10^{-3}$	$< 2.55 \times 10^{-4}$	NA
1,1-Dichloroethane:	800 ppb	ND < 0.5 ppb	
lb/hr	9.81×10^{-3}	7.81×10^{-5}	> 99.20
1,2-Dichloroethane:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 1.23 \times 10^{-3}$	$< 4.69 \times 10^{-5}$	NA
Benzene:	2800 ppb	ND < 0.3 ppb	
lb/hr	2.71×10^{-2}	$< 3.70 \times 10^{-5}$	> 99.86
Toluene:	28000 ppb	ND < 1.1 ppb	
lb/hr	3.20×10^{-1}	$< 1.60 \times 10^{-4}$	> 99.95
Acetonitrile:	ND < 5100 ppb	ND < 13 ppb	
lb/hr	$< 2.59 \times 10^{-2}$	$< 8.42 \times 10^{-4}$	NA
o-Xylenes:	5700 ppb	ND < 0.5 ppb	
lb/hr	7.50×10^{-2}	$< 8.38 \times 10^{-5}$	> 99.89
m+p Xylenes:	14000 ppb	ND < 1.1 ppb	
lb/hr	1.84×10^{-1}	$< 1.84 \times 10^{-5}$	> 99.90
1,2-Dibromoethane:	ND < 420ppb	ND < 1.0 ppb	
lb/hr	$< 9.78 \times 10^{-3}$	$< 2.97 \times 10^{-4}$	NA
Benzyl Chloride:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 6.59 \times 10^{-3}$	$< 2.20 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-4
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 8
MARCH 8, 1995

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	5.16	3.98	4.57	12.84	12.99	12.92
CO ₂ , %	29.8	31.6	30.7	7.28	7.25	7.26
N ₂ , %	25.6	21.6	23.6	79.9	79.8	79.8
H ₂ O, %	3.2	4.8	4.0	8.7	8.8	8.8
Flow Rate, dscfm	838	847	842	10,002	9,945	9,974
Temperature, °F	96	108	102	1,555	1,577	1,566
NO _x :						
ppm				3.5	4.1	3.8
ppm @ 3% O ₂				7.8	9.3	8.5
lb/hr (as NO ₂)				0.68	0.67	0.67
CO:						
ppm				15.3	15.2	15.3
ppm @ 3% O ₂				34.0	34.5	34.2
lb/hr				0.68	0.67	0.67
SO _x :						
ppm				10.6	9.8	10.2
ppm @ 3% O ₂				23.5	22.1	22.8
lb/hr (as SO ₂)				1.07	0.98	1.03
HC:						
CH ₄ ppm	326,000	350,000	338,000	2.36	1.17	1.77
TGNMO ppm	3,080	3,440	3,260	ND < 1	1.77	< 1.39
TGNMO ppm @ 3% O ₂	—	—	—	< 2.22	4.01	< 3.11
TGNMO lb/hr (as CH ₄)	6.53	7.37	6.95	< 0.03	0.04	< 0.03
Destruction Eff. %	—	—	—	> 99.61	99.40	> 99.50
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0047	0.0052	0.0050
Total Particulate gr/dscf				0.0047	0.0052	0.0050
gr/dscf @ 3% O ₂				0.0105	0.0118	0.0111
gr/dscf @ 12% CO ₂				0.0078	0.0086	0.0082
lb/hr				0.405	0.444	0.425
Sulfur Compounds:						
H ₂ S, ppm	79	84	82			
Methyl Mercaptan, ppm	1.6	1.7	1.7			
Ethyl Mercaptan, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Sulfide, ppm	1.8	1.9	1.9			
Carbonyl Sulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Carbon Disulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	85.6	87.6	86.6			

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 8, TEST NO. 1
MARCH 8, 1995

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		838 10,002		
Species	Inlet	Exhaust	Destruction Efficiency, %	
Methylene Chloride:	1800 ppb	ND < 0.8 ppb	> 99.47	
lb/hr	2.03×10^{-2}	$< 1.07 \times 10^{-4}$		
Chloroform:	ND < 100 ppb	ND < 0.2 ppb	NA	
lb/hr	$< 1.58 \times 10^{-3}$	$< 3.78 \times 10^{-5}$		
1,1,1 Trichloroethane:	ND < 100 ppb	ND < 0.2 ppb	NA	
lb/hr	$< 1.77 \times 10^{-3}$	$< 4.22 \times 10^{-5}$		
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.2 ppb	NA	
lb/hr	$< 2.04 \times 10^{-3}$	$< 4.87 \times 10^{-5}$		
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.4 ppb	NA	
lb/hr	$< 2.70 \times 10^{-3}$	$< 6.13 \times 10^{-5}$		
Trichloroethylene:	610 ppb	ND < 0.2 ppb	> 99.61	
lb/hr	1.06×10^{-2}	$< 4.16 \times 10^{-5}$		
Tetrachloroethylene:	1400 ppb	ND < 0.2 ppb	> 99.83	
lb/hr	3.08×10^{-2}	$< 5.25 \times 10^{-5}$		
Chlorobenzene:	ND < 210 ppb	ND < 0.4 ppb	NA	
lb/hr	$< 3.13 \times 10^{-3}$	$< 7.12 \times 10^{-5}$		
Vinyl Chloride:	800 ppb	ND < 0.4 ppb	> 99.40	
lb/hr	6.63×10^{-3}	$< 3.95 \times 10^{-5}$		
m-Dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	NA	
lb/hr	$< 8.18 \times 10^{-3}$	$< 1.86 \times 10^{-4}$		
o-Dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	NA	
lb/hr	$< 8.18 \times 10^{-3}$	$< 1.86 \times 10^{-4}$		
p-Dichlorobenzene:	570 ppb	ND < 0.8 ppb	> 98.33	
lb/hr	1.11×10^{-2}	$< 1.86 \times 10^{-4}$		
1,1-Dichloroethane:	880 ppb	ND < 0.4 ppb	> 99.46	
lb/hr	1.15×10^{-2}	$< 6.26 \times 10^{-5}$		
1,2-Dichloroethane:	ND < 100 ppb	ND < 0.2 ppb	NA	
lb/hr	$< 1.31 \times 10^{-3}$	$< 3.13 \times 10^{-5}$		
Benzene:	2600 ppb	ND < 0.2 ppb	> 99.91	
lb/hr	2.69×10^{-2}	$< 2.47 \times 10^{-5}$		
Toluene:	29000 ppb	ND < 0.8 ppb	> 99.97	
lb/hr	3.54×10^{-1}	$< 1.17 \times 10^{-4}$		
Acetonitrile:	ND < 5100 ppb	ND < 10 ppb	NA	
lb/hr	$< 2.77 \times 10^{-2}$	$< 6.49 \times 10^{-4}$		
o-Xylenes:	6700 ppb	ND < 0.4 ppb	> 99.93	
lb/hr	9.43×10^{-2}	$< 6.72 \times 10^{-5}$		
m+p Xylenes:	16000 ppb	ND < 0.8 ppb	> 99.94	
lb/hr	2.25×10^{-1}	$< 1.34 \times 10^{-4}$		
1,2-Dibromoethane:	ND < 420 ppb	ND < 0.8 ppb	NA	
lb/hr	$< 1.05 \times 10^{-2}$	$< 2.38 \times 10^{-4}$		
Benzyl Chloride:	ND < 420 ppb	ND < 0.8 ppb	NA	
lb/hr	$< 7.05 \times 10^{-3}$	$< 1.60 \times 10^{-4}$		

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 8, TEST NO. 2
MARCH 8, 1995

Flow rate, Inlet dscfm	847		
Flow rate, Exhaust dscfm	9,945		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	1900 ppb	ND < .08 ppb	
lb/hr	2.16×10^{-2}	$< 1.07 \times 10^{-4}$	> 99.51
Chloroform:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	$< 1.60 \times 10^{-3}$	$< 3.75 \times 10^{-5}$	NA
1,1,1 Trichloroethane:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	$< 1.79 \times 10^{-3}$	$< 4.20 \times 10^{-5}$	NA
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	$< 2.06 \times 10^{-3}$	$< 4.84 \times 10^{-5}$	NA
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.4 ppb	
lb/hr	$< 2.72 \times 10^{-3}$	$< 6.10 \times 10^{-5}$	NA
Trichloroethylene:	540 ppb	ND < 0.2 ppb	
lb/hr	9.50×10^{-3}	$< 4.13 \times 10^{-5}$	> 99.56
Tetrachloroethylene:	1100 ppb	ND < 0.2 ppb	
lb/hr	2.44×10^{-2}	$< 5.22 \times 10^{-5}$	> 99.79
Chlorobenzene:	ND < 210 ppb	ND < 0.4 ppb	
lb/hr	$< 3.16 \times 10^{-3}$	$< 7.08 \times 10^{-5}$	NA
Vinyl Chloride:	870 ppb	ND < 0.4 ppb	
lb/hr	7.28×10^{-3}	$< 3.93 \times 10^{-5}$	> 99.46
m-Dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 8.26 \times 10^{-3}$	$< 1.85 \times 10^{-4}$	NA
o-Dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 8.26 \times 10^{-3}$	$< 1.85 \times 10^{-4}$	NA
p-Dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 8.26 \times 10^{-3}$	$< 1.85 \times 10^{-4}$	NA
1,1-Dichloroethane:	820 ppb	ND < 0.4 ppb	
lb/hr	1.09×10^{-2}	$< 6.22 \times 10^{-5}$	> 99.43
1,2-Dichloroethane:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	$< 1.32 \times 10^{-3}$	$< 3.11 \times 10^{-5}$	NA
Benzene:	2200 ppb	ND < 0.2 ppb	
lb/hr	2.30×10^{-2}	$< 2.46 \times 10^{-5}$	> 99.89
Toluene:	23000 ppb	ND < 0.8 ppb	
lb/hr	2.84×10^{-1}	$< 1.16 \times 10^{-4}$	> 99.96
Acetonitrile:	ND < 5100 ppb	ND < 10 ppb	
lb/hr	$< 2.80 \times 10^{-2}$	$< 6.45 \times 10^{-4}$	NA
o-Xylene:	5000 ppb	ND < 0.4 ppb	
lb/hr	7.10×10^{-2}	$< 6.68 \times 10^{-5}$	> 99.91
m+p Xylenes:	12000 ppb	ND < 0.8 ppb	
lb/hr	1.71×10^{-1}	$< 1.34 \times 10^{-4}$	> 99.92
1,2-Dibromoethane:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 1.06 \times 10^{-2}$	$< 2.36 \times 10^{-4}$	NA
Benzyl Chloride:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 7.12 \times 10^{-3}$	$< 1.59 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

RESULTS

SECTION 4.0

TABLE 4-7
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 10
MARCH 7, 1995

Parameter	First Run	INLET Second Run	Average	EXHAUST GAS		
				First Run	Second Run	Average
O ₂ %	4.02	3.70	3.86	12.95	13.50	13.23
CO ₂ %	30.2	31.3	30.8	7.23	6.76	6.99
N ₂ %	22.0	20.8	21.4	79.8	79.7	79.8
H ₂ O %	5.3	6.1	5.7	8.8	8.9	8.8
Flow Rate, dscfm	949	922	935	9,962	8,948	9,455
Temperature, F	98	110	104	1,609	1,634	1,622
NO _x :						
ppm						
ppm @ 3 % O ₂				2.8	3.0	2.9
lb/hr (as NO ₂)				6.4	7.2	6.8
CO:				0.21	0.19	0.20
ppm						
ppm @ 3 % O ₂				16.9	15.0	16.0
lb/hr				38.2	36.3	37.3
SO _x :				0.75	0.60	0.67
ppm						
ppm @ 3 % O ₂				9.0	10.2	9.6
lb/hr (as SO ₂)				20.3	24.7	22.5
HC:				0.91	0.93	0.92
CH ₄ ppm						
TGNMO ppm	440,000	452,000	446,000	1.72	1.28	1.50
TGNMO ppm @3 % O ₂	3,070	3,180	3,125	1.23	1.48	1.36
TGNMO lb/hr (as CH ₄)	—	—	—	2.77	3.58	3.17
Destruction Eff. %	7.37	7.42	7.39	0.03	0.03	0.03
	—	—	—	99.58	99.55	99.56
Particulate:						
Organic fraction gr/dscf						
Inorganic fraction gr/dscf						
Total Particulate gr/dscf				0.00001	0.0000	0.0000
gr/dscf @3 % O ₂				0.0043	0.0018	0.0030
gr/dscf @12 % CO ₂				0.0044	0.0018	0.0031
lb/hr				0.0098	0.0042	0.0070
				0.0071	0.0031	0.0051
				0.365	0.135	0.250
Sulfur Compounds:						
H ₂ S, ppm	81	78	80			
Methyl Mercaptan, ppm	1.7	1.6	1.7			
Ethyl Mercaptan, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Sulfide, ppm	1.9	1.9	1.9			
Carbonyl Sulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Carbon Disulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	87.8	84.7	86.3			

NA: The results for H₂S and dimethyl sulfide are not available due to interference in analysis.

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 10, TEST NO. 1
MARCH 7, 1995

Flow rate, Inlet dscfm	949		
Flow rate, Exhaust dscfm	9,962		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	1900 ppb	ND < 1.0 ppb	
lb/hr	2.42×10^{-2}	$< 1.34 \times 10^{-4}$	> 99.45
Chloroform:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 1.79 \times 10^{-3}$	$< 5.64 \times 10^{-5}$	NA
1,1,1-trichloroethane:	190 ppb	ND < 0.3 ppb	
lb/hr	3.80×10^{-3}	$< 6.30 \times 10^{-5}$	> 98.34
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 2.31 \times 10^{-3}$	$< 7.27 \times 10^{-5}$	NA
1,1-dichloroethene:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	$< 3.05 \times 10^{-3}$	$< 7.63 \times 10^{-5}$	NA
Trichloroethylene:	440 ppb	ND < 0.3 ppb	
lb/hr	8.67×10^{-3}	$< 6.21 \times 10^{-5}$	> 99.28
Tetrachloroethylene:	1000 ppb	ND < 0.3 ppb	
lb/hr	2.49×10^{-2}	$< 7.84 \times 10^{-5}$	> 99.68
Chlorobenzene:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	$< 3.54 \times 10^{-3}$	$< 8.86 \times 10^{-5}$	NA
Vinyl Chloride:	800 ppb	ND < 0.5 ppb	
lb/hr	7.50×10^{-3}	$< 4.92 \times 10^{-5}$	> 99.34
m-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 9.26 \times 10^{-3}$	$< 2.55 \times 10^{-4}$	NA
o-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 9.26 \times 10^{-3}$	$< 2.57 \times 10^{-4}$	NA
p-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 9.26 \times 10^{-3}$	$< 2.55 \times 10^{-4}$	NA
1,1-dichloroethane:	740 ppb	ND < 0.5 ppb	
lb/hr	1.10×10^{-2}	$< 7.79 \times 10^{-5}$	> 99.29
1,2-dichloroethane:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 1.48 \times 10^{-3}$	$< 4.68 \times 10^{-5}$	NA
Benzene:	2500 ppb	ND < 0.3 ppb	
lb/hr	2.93×10^{-2}	$< 3.69 \times 10^{-5}$	> 99.87
Toluene:	23000 ppb	ND < 1.1 ppb	
lb/hr	3.18×10^{-1}	1.60×10^{-4}	> 99.95
Acetonitrile:	ND < 5100 ppb	ND < 13 ppb	
lb/hr	$< 3.14 \times 10^{-2}$	$< 8.04 \times 10^{-4}$	NA
o-Xylenes:	4500 ppb	ND < 0.5 ppb	
lb/hr	7.16×10^{-2}	$< 8.36 \times 10^{-5}$	> 99.88
m+p Xylenes:	11000 ppb	ND < 1.1 ppb	
lb/hr	1.75×10^{-1}	$< 1.84 \times 10^{-4}$	> 99.89
1,2-dibromoethane:	ND < 420 ppb	ND < 1.0 ppb	
lb/hr	$< 1.18 \times 10^{-2}$	$< 2.96 \times 10^{-4}$	NA
Benzyl Chloride:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 7.97 \times 10^{-3}$	$< 2.19 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 10, TEST NO. 2
MARCH 7, 1995

Flow rate, Inlet dscfm	922		
Flow rate, Exhaust dscfm	8,948		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	1700 ppb	ND < 1.0 ppb	
lb/hr	2.10×10^{-2}	< 1.20×10^{-4}	> 99.43
Chloroform:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	< 1.74×10^{-3}	< 5.07×10^{-5}	NA
1,1,1-Trichloroethane:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	< 1.94×10^{-3}	< 5.66×10^{-5}	NA
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	< 2.24×10^{-3}	< 6.53×10^{-5}	NA
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	< 2.97×10^{-3}	< 6.86×10^{-5}	NA
Trichloroethylene:	400 ppb	ND < 0.3 ppb	
lb/hr	7.66×10^{-3}	< 5.58×10^{-5}	> 99.27
Tetrachloroethylene:	920 ppb	ND < 0.3 ppb	
lb/hr	2.22×10^{-2}	< 7.04×10^{-5}	> 99.68
Chlorobenzene:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	< 3.44×10^{-3}	< 7.96×10^{-5}	NA
Vinyl Chloride:	810 ppb	ND < 0.5 ppb	
lb/hr	7.38×10^{-3}	< 4.42×10^{-5}	> 99.40
m-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	< 9.00×10^{-3}	< 2.29×10^{-4}	NA
o-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	< 9.00×10^{-3}	< 2.29×10^{-4}	NA
p-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	< 9.00×10^{-3}	< 2.29×10^{-4}	NA
1,1-Dichloroethane:	650 ppb	ND < 0.5 ppb	
lb/hr	9.37×10^{-3}	< 7.00×10^{-5}	> 99.25
1,2-Dichloroethane:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	< 1.44×10^{-3}	< 4.20×10^{-5}	NA
Benzene:	2100 ppb	ND < 0.3 ppb	
lb/hr	2.39×10^{-2}	< 3.32×10^{-5}	> 99.86
Toluene:	21000 ppb	ND < 1.1 ppb	
lb/hr	2.82×10^{-1}	< 1.43×10^{-4}	> 99.95
Acetonitrile:	ND < 5100 ppb	ND < 13 ppb	
lb/hr	< 3.05×10^{-2}	< 7.55×10^{-4}	NA
o-Xylenes:	4500 ppb	ND < 0.5 ppb	
lb/hr	6.96×10^{-2}	< 7.51×10^{-5}	> 99.89
m+p Xylenes:	11000 ppb	ND < 1.1 ppb	
lb/hr	1.70×10^{-1}	< 1.65×10^{-4}	> 99.90
1,2-Dibromomethane:	ND < 420 ppb	ND < 1.0 ppb	
lb/hr	< 1.5×10^{-2}	< 2.66×10^{-4}	NA
Benzyl Chloride:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	< 7.75×10^{-3}	< 1.97×10^{-4}	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**TABLE 4-10
GENERAL RESULTS
PUENTE HILLS LANDFILL, FLARE NO. 12
MARCH 8, 1995**

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	3.43	4.37	3.90	12.69	12.75	12.72
CO ₂ , %	32.3	31.0	31.7	7.45	7.43	7.44
N ₂ , %	19.7	22.7	21.2	79.9	79.8	79.8
H ₂ O, %	5.7	6.1	5.9	9.5	9.3	9.4
Flow Rate, dscfm	855	905	880	10,104	9,700	9,902
Temperature, °F	115	116	116	1,642	1,687	1,665
NO _x :						
ppm				4.1	8.5	6.3
ppm @ 3% O ₂				9.1	18.6	13.8
lb/hr (as NO ₂)				0.30	0.60	0.45
CO:						
ppm				16.9	17.0	16.9
ppm @ 3% O ₂				36.9	37.2	37.1
lb/hr				0.76	0.73	0.74
SO _x :						
ppm				10.4	9.9	10.1
ppm @ 3% O ₂				22.6	21.8	22.2
lb/hr (as SO ₂)				1.06	0.97	1.02
HC:						
CH ₄ ppm	292,000	360,000	326,000	ND<1	ND<1	ND<1
TGNMO ppm	3,080	3,430	3,255	ND<1	ND<1	ND<1
TGNMO ppm @ 3% O ₂	--	--	--	<2.18	<2.20	<2.19
TGNMO lb/hr (as CH ₄)	6.66	7.85	7.26	<0.03	<0.02	<0.03
Destruction Eff. %	--	--	--	>99.62	>99.69	>99.65
Particulate:						
Organic Fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic Fraction gr/dscf				0.0050	0.0053	0.0052
Total Particulate gr/dscf				0.0050	0.0053	0.0052
gr/dscf @ 3% O ₂				0.0108	0.0117	0.0113
gr/dscf @ 12% CO ₂				0.0080	0.0086	0.0083
lb/hr				0.430	0.444	0.437
Sulfur Compounds:						
H ₂ S, ppm	80	79	80			
Methyl Mercaptan, ppm	1.6	1.6	1.7			
Ethyl Mercaptan, ppm	ND<1.1	ND<1.1	ND<1.1			
Dimethyl Sulfide, ppm	1.9	2.0	2.0			
Carbonyl Sulfide, ppm	ND<1.1	ND<1.1	ND<1.1			
Carbon Disulfide, ppm	ND<1.1	ND<1.1	ND<1.1			
Dimethyl Disulfide, ppm	ND<1.0	ND<1.0	ND<1.0			
Total Sulfur Compounds, ppm	86.7	82.6	84.7			

RESULTS

SECTION 4.0

TABLE 4-11
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUEBLO HILLS FLARES NO. 12, TEST NO. 1
MARCH 8, 1995

Flow rate, Inlet scfm		855		
Flow rate, Exhaust scfm		10,104		
Species		Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:				
lb/hr		2800 ppb	ND < 1.0 ppb	
Chloroform:		3.22×10^{-2}	$< 1.36 \times 10^{-4}$	> 99.58
lb/hr		ND < 100 ppb	ND < 0.3 ppb	
1,1,1-Trichloroethane:		$< 1.61 \times 10^{-3}$	$< 5.72 \times 10^{-5}$	NA
lb/hr		ND < 100 ppb	ND < 0.3 ppb	
Carbon Tetrachloride:		$< 1.0 \times 10^{-3}$	$< 6.39 \times 10^{-5}$	NA
lb/hr		ND < 100 ppb	ND < 0.3 ppb	
1,1-Dichloroethene:		$< 2.08 \times 10^{-3}$	$< 7.73 \times 10^{-5}$	NA
lb/hr		ND < 210 ppb	ND < 0.5 ppb	
Trichloroethylene:		$< 2.75 \times 10^{-3}$	$< 7.74 \times 10^{-5}$	NA
lb/hr		810 ppb	ND < 0.3 ppb	
Tetrachloroethylene:		1.44×10^{-2}	$< 6.30 \times 10^{-5}$	> 99.56
lb/hr		1800 ppb	ND < 0.3 ppb	
Chlorobenzene:		4.04×10^{-2}	$< 7.95 \times 10^{-5}$	> 99.80
lb/hr		ND < 210 ppb	ND < 0.5 ppb	
Vinyl Chloride:		$< 3.20 \times 10^{-3}$	$< 8.99 \times 10^{-5}$	NA
lb/hr		750 ppb	ND < 0.5 ppb	
m-Dichlorobenzene:		6.34×10^{-3}	$< 4.99 \times 10^{-5}$	> 99.21
lb/hr		ND < 420 ppb	ND < 1.1 ppb	
o-Dichlorobenzene:		$< 8.35 \times 10^{-3}$	$< 2.58 \times 10^{-4}$	NA
lb/hr		ND < 420 ppb	ND < 1.1 ppb	
p-Dichlorobenzene:		$< 8.35 \times 10^{-3}$	$< 2.61 \times 10^{-4}$	NA
lb/hr		ND < 420 ppb	ND < 1.1 ppb	
1,1-Dichloroethane:		$< 8.35 \times 10^{-3}$	$< 2.58 \times 10^{-4}$	NA
lb/hr		1100 ppb	ND < 0.5 ppb	
1,2-Dichloroethane:		1.47×10^{-2}	$< 7.90 \times 10^{-5}$	> 99.46
lb/hr		ND < 100 ppb	ND < 0.3 ppb	
Benzene:		$< 1.34 \times 10^{-3}$	$< 4.74 \times 10^{-5}$	NA
lb/hr		3600 ppb	ND < 0.3 ppb	
Toluene:		3.80×10^{-2}	$< 3.74 \times 10^{-5}$	> 99.90
lb/hr		36000 ppb	ND < 1.1 ppb	
Acetonitrile:		4.48×10^{-1}	$< 1.62 \times 10^{-4}$	> 99.96
lb/hr		ND < 5100 ppb	ND < 5.1 ppb	
o-Xylenes:		$< 2.83 \times 10^{-2}$	$< 3.34 \times 10^{-4}$	NA
lb/hr		7800 ppb	ND < 0.5 ppb	
m+p Xylenes:		1.12×10^{-1}	$< 8.48 \times 10^{-5}$	> 99.92
lb/hr		18000 ppb	ND < 1.1 ppb	
1,2-Dibromomethane:		2.58×10^{-1}	$< 1.87 \times 10^{-4}$	> 99.93
lb/hr		ND < 420 ppb	ND < 1.0 ppb	
Benzyl Chloride:		$< 1.07 \times 10^{-2}$	$< 3.00 \times 10^{-5}$	NA
lb/hr		ND < 420 ppb	ND < 1.1 ppb	
		$< 7.19 \times 10^{-3}$	$< 2.22 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-12
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PUENTE HILLS FLARES NO. 12, TEST NO. 2
MARCH 8, 1995

Flow rate, Inlet dscfm	905		
Flow rate, Exhaust dscfm	9,700		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	2000 ppb	1.9 ppb	
lb/hr	2.43×10^{-2}	2.47×10^{-4}	98.98
Chloroform:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 1.71 \times 10^{-3}$	$< 5.49 \times 10^{-5}$	NA
1,1,1-Trichloroethane:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 1.91 \times 10^{-3}$	$< 6.14 \times 10^{-5}$	NA
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 2.20 \times 10^{-3}$	$< 7.08 \times 10^{-5}$	NA
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	$< 2.91 \times 10^{-3}$	$< 7.437 \times 10^{-5}$	NA
Trichloroethylene:	560 ppb	ND < 0.3 ppb	
lb/hr	1.05×10^{-2}	$< 6.05 \times 10^{-5}$	> 99.43
Tetrachloroethylene:	1200 ppb	0.4 ppb	
lb/hr	2.85×10^{-2}	1.02×10^{-4}	99.64
Chlorobenzene:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	$< 3.38 \times 10^{-3}$	$< 8.63 \times 10^{-5}$	NA
Vinyl Chloride:	610 ppb	ND < 0.5 ppb	
lb/hr	5.45×10^{-3}	$< 4.79 \times 10^{-5}$	> 99.12
m-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 8.83 \times 10^{-3}$	$< 2.48 \times 10^{-4}$	NA
o-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 8.83 \times 10^{-3}$	$< 2.48 \times 10^{-4}$	NA
p-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 8.83 \times 10^{-3}$	$< 2.48 \times 10^{-4}$	NA
1,1-Dichloroethane:	860 ppb	ND < 0.5 ppb	
lb/hr	1.22×10^{-2}	$< 7.59 \times 10^{-5}$	> 99.38
1,2-Dichloroethane:	ND < 100 ppb	ND < 0.3 ppb	
lb/hr	$< 1.42 \times 10^{-3}$	$< 4.55 \times 10^{-5}$	NA
Benzene:	2600 ppb	0.3 ppb	
lb/hr	2.90×10^{-2}	3.59×10^{-5}	99.88
Toluene:	24000 ppb	ND < 1.1 ppb	
lb/hr	3.16×10^{-1}	$< 1.55 \times 10^{-4}$	NA
Acetonitrile:	> 5100 ppb	ND < 5.1 ppb	
lb/hr	$> 2.99 \times 10^{-2}$	$< 3.21 \times 10^{-4}$	> 98.93
o-Xylenes:	4400 ppb	ND < 0.5 ppb	
lb/hr	6.68×10^{-2}	$< 8.14 \times 10^{-5}$	> 99.88
m+p Xylenes:	13000 ppb	ND < 1.1 ppb	
lb/hr	1.97×10^{-1}	$< 1.79 \times 10^{-4}$	> 99.91
1,2-Dibromomethane:	ND < 420 ppb	ND < 1.0 ppb	
lb/hr	$< 1.13 \times 10^{-2}$	$< 2.88 \times 10^{-4}$	NA
Benzyl Chloride:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 7.60 \times 10^{-3}$	$< 2.14 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.



SCEC EMISSIONS TESTS ON FOUR FLARES (FLARE NOS. 2, 4, 18, 24)

PREPARED FOR:

**COUNTY SANITATION DISTRICTS OF
LOS ANGELES COUNTY**

EQUIPMENT LOCATION:

**Puente Hills Landfill
1955 Workman Mill Road
Whittier, California 90601**

TEST DATES:

August 7-10, 1995

ISSUE DATE:

October 5, 1995

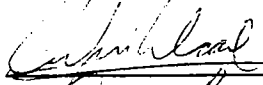
PARAMETERS MEASURED:

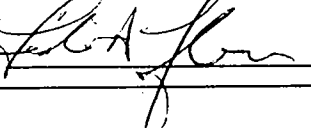
**Flare Exhaust: PM, NO_x, CO, SO_x, TGNMO, Speciated Organic Compounds
Flare Inlet: TGNMO, Speciated Organic Compounds, Speciated Sulfur Compounds**

TESTED BY:

**S C E C
1582-1 N. Batavia
Orange, CA 92667**

Report No: 27909

Tested By: 

Reviewed By: 

1.0 - Executive Summary (Continued)

TABLE 1.1
Puente Hills Landfill Flare No. 4
August 7, 1995
Results Summary - Permit Conditions versus Test Data

Parameter	Units	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
O ₂	%	2.93	12.95	-	-
CO ₂	%	33.80	7.0	-	-
N ₂	%	21.1	80.1	-	-
H ₂ O	%	8.92	5.57	-	-
Volume Flow	DSCFM	641	8,925	-	-
Temperature	°F	174	1,485	> 1,400	PC
NO _x					
Concentration	ppmv	-	14.75	-	-
Concentration @ 3% O ₂	ppmv	-	33.21	-	-
Emission Rate as NO ₂	lb/hr	-	0.96	-	-
CO					
Concentration	ppmv	-	2.45	2,000	407
Concentration @ 3% O ₂	ppmv	-	5.52	-	-
Emission Rate	lb/hr	-	0.10	-	-
SO _x					
Concentration	ppmv	-	3.13	-	-
Concentration @ 3% O ₂	ppmv	-	7.05	-	-
Emission Rate as SO ₂	lb/hr	-	0.28	-	-

1.0 - Executive Summary (Continued)

TABLE 1.1 (cont.)
Puente Hills Landfill Flare No. 4
August 7, 1995
Results Summary - Permit Conditions versus Test Data

Parameter	Units	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
Hydrocarbons (HC) CH ₄	ppmv	422,000	<0.62	-	-
TGNMO					
Concentration	ppmv	3,850	16.0	-	-
Concentration @ 3% O ₂	ppmv	3,834	33.8	-	-
Emission Rate as CH ₄	lb/hr	5.81	0.34	-	-
Flare Control Efficiency	%	-	93.8	-	-
Particulate Matter (PM)					
Concentration	gr/DSCF	-	0.0008	0.0827	404
Emission Rate	lb/hr	-	0.06	-	-
Total Sulfur	ppmv	104.3	-	UV	431.1

Notes:

1. Average of Runs 1 and 2 reported for both inlet and exhaust.
2. PC - Permit condition.
3. UV - Under variance.

1.0 - Executive Summary (Continued)

TABLE 1.2
Puente Hills Landfill Flare No.2
August 8, 1995
Results Summary - Permit Conditions versus Test Data

Parameter	Units	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
O ₂	%	3.18	13.87	-	-
CO ₂	%	33.35	5.6	-	-
N ₂	%	14.3	80.5	-	-
H ₂ O	%	7.51	8.66	-	-
Volume Flow	DSCFM	713	9,770	-	-
Temperature	°F	173	1,468	> 1,400	PC
NO _x					
Concentration	ppmv	-	12.28	-	-
Concentration @ 3% O ₂	ppmv	-	31.27	-	-
Emission Rate as NO ₂	lb/hr	-	0.88	-	-
CO					
Concentration	ppmv	-	3.71	2,000	407
Concentration @ 3% O ₂	ppmv	-	9.45	-	-
Emission Rate	lb/hr	-	0.16	-	-
SO _x					
Concentration	ppmv	-	5.71	-	-
Concentration @ 3% O ₂	ppmv	-	14.54	-	-
Emission Rate as SO ₂	lb/hr	-	0.57	-	-

1.0 - Executive Summary (Continued)

TABLE 1.2 (cont.)
Puente Hills Landfill Flare No.2
August 8, 1995
Results Summary - Permit Conditions versus Test Data

Parameter	Units	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
Hydrocarbons (HC) CH ₄	ppmv	413,000	<0.50	-	-
TGNMO					
Concentration	ppmv	3,750	15.0	-	-
Concentration @ 3% O ₂	ppmv	3,787	38.3	-	-
Emission Rate as CH ₄	lb/hr	6.30	0.37	-	-
Flare Control Efficiency	%	-	94.1	-	-
Particulate Matter (PM)					
Concentration	gr/DSCF	-	0.0005	0.0827	404
Emission Rate	lb/hr	-	0.04	-	-
Total Sulfur	ppmv	98.3	-	UV	431.1

Notes:

1. Average of Runs 1 and 2 reported for both inlet and exhaust.
2. PC - Permit condition.
3. UV - Under variance.

1.0 - Executive Summary (Continued)

TABLE 1.3
Puente Hills Landfill Flare No.18
August 9, 1995
Results Summary - Permit Conditions versus Test Data

Parameter	Units	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
O ₂	%	3.21	13.10	-	-
CO ₂	%	33.15	6.9	-	-
N ₂	%	22.2	80.1	-	-
H ₂ O	%	9.63	10.37	-	-
Volume Flow	DSCFM	702	6,613	-	-
Temperature	°F	155	1,495	> 1,400	PC
NO _x					
Concentration	ppmv	-	13.72	-	-
Concentration @ 3% O ₂	ppmv	-	31.49	-	-
Emission Rate as NO ₂	lb/hr	-	0.66	-	-
CO					
Concentration	ppmv	-	0.69	2,000	407
Concentration @ 3% O ₂	ppmv	-	1.58	-	-
Emission Rate	lb/hr	-	0.02	-	-
SO _x					
Concentration	ppmv	-	5.52	-	-
Concentration @ 3% O ₂	ppmv	-	12.67	-	-
Emission Rate as SO ₂	lb/hr	-	0.37	-	-

1.0 - Executive Summary (Continued)

TABLE 1.3 (cont.)
Puente Hills Landfill Flare No.18
August 9, 1995
Results Summary - Permit Conditions versus Test Data

Parameter	Units	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
Hydrocarbons (HC) CH ₄	ppmv	415,000	<0.50	-	-
TGNMO Concentration	ppmv	3,750	26.0	-	-
Concentration @ 3% O ₂	ppmv	3,791	59.6	-	-
Emission Rate as CH ₄	lb/hr	6.19	0.43	-	-
Flare Control Efficiency	%	-	92.8	-	-
Particulate Matter (PM) Concentration	gr/DSCF	-	0.0049	0.0827	404
Emission Rate	lb/hr	-	0.28	-	-
Total Sulfur	ppmv	93.8	-	UV	431.1

Notes:

1. Average of Runs 1 and 2 reported for both inlet and exhaust.
2. PC - Permit condition.
3. UV - Under variance.

1.0 - Executive Summary (Continued)

TABLE 1.4
Puente Hills Landfill Flare No.24
August 10, 1995
Results Summary - Permit Conditions versus Test Data

Parameter	Units	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
O ₂	%	3.48	12.62	-	-
CO ₂	%	32.73	7.2	-	-
N ₂	%	23.1	80.2	-	-
H ₂ O	%	5.26	9.66	-	-
Volume Flow	DSCFM	630	8,046	-	-
Temperature	°F	161	1,533	> 1,400	PC
NO _x					
Concentration	ppmv	-	14.52	-	-
Concentration @ 3% O ₂	ppmv	-	31.39	-	-
Emission Rate as NO ₂	lb/hr	-	0.85	-	-
CO					
Concentration	ppmv	-	0.96	2,000	407
Concentration @ 3% O ₂	ppmv	-	2.08	-	-
Emission Rate	lb/hr	-	0.04	-	-
SO _x					
Concentration	ppmv	-	6.18	-	-
Concentration @ 3% O ₂	ppmv	-	13.36	-	-
Emission Rate as SO ₂	lb/hr	-	0.50	-	-

1.0 - Executive Summary (Continued)

TABLE 1.4 (cont.)
Puente Hills Landfill Flare No.24
August 10, 1995
Results Summary - Permit Conditions versus Test Data

Parameter	Units	Inlet	Exhaust	Permit Limit	Applicable SCAQMD Rule
Hydrocarbons (HC) CH ₄	ppmv	407,000	< 0.85	-	-
TGNMO					
Concentration	ppmv	3,175	22.5	-	-
Concentration @ 3% O ₂	ppmv	3,255	48.9	-	-
Emission Rate as CH ₄	lb/hr	4.72	0.46	-	-
Flare Control Efficiency	%	-	90.0	-	-
Particulate Matter (PM)					
Concentration	gr/DSCF	-	0.0006	0.0827	404
Emission Rate	lb/hr	-	0.04	-	-
Total Sulfur	ppmv	97.6	-	UV	431.1

Notes:

1. Average of Runs 1 and 2 reported for both inlet and exhaust.
2. PC - Permit condition.
3. UV - Under variance.

TABLE 4.1
Puente Hills Landfill Flare No. 4
August 7, 1995

Summary of Results - Emissions of NO_x, CO, SO_x, HC, PM, and Sulfur Compounds

Parameter	Units	Inlet			Exhaust		
		Run 1	Run 2	Average	Run 1	Run 2	Average
O ₂	%	2.93	2.92	2.93	12.96	12.94	12.95
CO ₂	%	33.7	33.9	33.8	7.0	7.0	7.0
N ₂	%	21.4	20.8	21.1	80.0	80.1	80.1
H ₂ O	%	8.81	9.03	8.92	5.20	5.94	5.57
Volume Flow	DSCFM	579	703	641	9,517	8,333	8,925
Temperature	°F	173	175	174	1,481	1,489	1,485
NO _x							
Concentration	ppmv	-	-	-	14.89	14.61	14.75
Concentration @ 3% O ₂	ppmv	-	-	-	33.57	32.85	33.21
Emission Rate as NO ₂	lb/hr	-	-	-	1.03	0.89	0.96
CO							
Concentration	ppmv	-	-	-	4.01	0.88	2.45
Concentration @ 3% O ₂	ppmv	-	-	-	9.04	1.98	5.51
Emission Rate	lb/hr	-	-	-	0.17	0.03	0.10
SO _x							
Concentration	ppmv	-	-	-	2.97	3.28	3.13
Concentration @ 3% O ₂	ppmv	-	-	-	6.70	7.38	7.04
Emission Rate as SO ₂	lb/hr	-	-	-	0.29	0.28	0.28
Hydrocarbons (HC)							
CH ₄	ppmv	420,000	424,000	422,000	0.74	<0.50	<0.62
TGNMO							
Concentration	ppmv	3,700	4,000	3,850	18.0	12.0	16.0
Concentration @ 3% O ₂	ppmv	3,686	3,982	3,834	40.6	27.0	33.8
Emission Rate as CH ₄	lb/hr	5.02	6.60	5.81	0.43	0.25	0.34
PM							
Organic Fraction	gr/DSCF	-	-	-	0.0009	0.0006	0.0008
Inorganic Fraction	gr/DSCF	-	-	-	-	-	-

TABLE 4.1 (cont.)
Puente Hills Landfill Flare No. 4
August 7, 1995

Summary of Results - Emissions of NO_x, CO, SO_x, HC, PM, and Sulfur Compounds

Parameter	Units	Inlet			Exhaust		
		Run 1	Run 2	Average	Run 1	Run 2	Average
Total PM	gr/DSCF	-	-	-	0.0009	0.0006	0.0008
Concentration @3% O ₂	gr/DSCF	-	-	-	0.0020	0.0013	0.0017
Concentration @ 12% CO ₂	gr/DSCF	-	-	-	0.0016	0.0011	0.0013
Emission Rate	lb/hr	-	-	-	0.08	0.05	0.06
Sulfur Compounds							
Hydrogen Sulfide	ppmv	92.0	110.0	101.1	-	-	-
Methyl Mercaptan	ppmv	1.4	1.5	1.5	-	-	-
Ethyl Mercaptan	ppmv	<1.1	<1.1	<1.1	-	-	-
Dimethyl Sulfide	ppmv	1.8	1.8	1.8	-	-	-
Carbonyl Sulfide	ppmv	<1.1	<1.1	<1.1	-	-	-
Carbon Disulfide	ppmv	<1.1	<1.1	<1.1	-	-	-
Dimethyl Disulfide	ppmv	<1.0	<1.0	<1.0	-	-	-
Total Sulfur	ppmv	95.2	113.3	104.3	-	-	-

TABLE 4.2
Puente Hills Landfill Flare No. 2
August 8, 1995

Summary of Results - Emissions of NO_x, CO, SO_x, HC, PM, and Sulfur Compounds

Parameter	Units	Inlet			Exhaust		
		Run 1	Run 2	Average	Run 1	Run 2	Average
O ₂	%	3.31	3.05	3.18	13.71	12.95	13.83
CO ₂	%	33.0	33.7	33.4	5.6	5.6	5.6
N ₂	%	15.1	13.4	14.3	80.7	80.5	80.6
H ₂ O	%	6.06	8.95	7.51	8.76	8.56	8.66
Volume Flow	DSCFM	699	726	713	9,440	10,101	9,770
Temperature	°F	173	173	173	1,441	1,494	1,468
NO _x							
Concentration	ppmv	-	-	-	11.59	12.97	12.28
Concentration @ 3% O ₂	ppmv	-	-	-	28.85	33.40	31.13
Emission Rate as NO ₂	lb/hr	-	-	-	0.80	0.95	0.88
CO							
Concentration	ppmv	-	-	-	3.94	3.47	3.71
Concentration @ 3% O ₂	ppmv	-	-	-	9.81	8.94	9.37
Emission Rate	lb/hr	-	-	-	0.16	0.16	0.16
SO _x							
Concentration	ppmv	-	-	-	5.65	5.77	5.71
Concentration @ 3% O ₂	ppmv	-	-	-	14.07	14.86	14.46
Emission Rate as SO ₂	lb/hr	-	-	-	0.54	0.59	0.57
Hydrocarbons (HC)							
CH ₄	ppmv	408,000	418,000	413,000	<0.50	<0.50	<0.50
TGNMO							
Concentration	ppmv	3,600	3,900	3,750	14.0	16.0	15.0
Concentration @ 3% O ₂	ppmv	3,663	3,911	3,787	34.9	41.6	38.3
Emission Rate as CH ₄	lb/hr	5.93	6.67	6.30	0.34	0.41	0.38
PM							
Organic Fraction	gr/DSCF	-	-	-	0.0009	0.0001	0.0006
Inorganic Fraction	gr/DSCF	-	-	-	-	-	-

TABLE 4.2 (cont.)
 Puente Hills Landfill Flare No. 2
 August 8, 1995

Summary of Results - Emissions of NO_x, CO, SO_x, HC, PM, and Sulfur Compounds

Parameter	Units	Inlet			Exhaust		
		Run 1	Run 2	Average	Run 1	Run 2	Average
Total PM	gr/DSCF	-	-	-	0.0009	0.0001	0.0005
Concentration @3% O ₂	gr/DSCF	-	-	-	0.0022	0.0003	0.0012
Concentration @ 12% CO ₂	gr/DSCF	-	-	-	0.0019	0.0003	0.0011
Emission Rate	lb/hr	-	-	-	0.07	0.01	0.04
Sulfur Compounds							
Hydrogen Sulfide	ppmv	90.0	100.0	95.0	-	-	-
Methyl Mercaptan	ppmv	1.4	1.5	1.5	-	-	-
Ethyl Mercaptan	ppmv	<1.1	<1.1	<1.1	-	-	-
Dimethyl Sulfide	ppmv	1.8	1.9	1.9	-	-	-
Carbonyl Sulfide	ppmv	<1.1	<1.1	<1.1	-	-	-
Carbon Disulfide	ppmv	<1.1	<1.1	<1.1	-	-	-
Methyl Disulfide	ppmv	<1.0	<1.0	<1.0	-	-	-
Total Sulfur	ppmv	93.2	103.4	98.4	-	-	-

Summary of Results (Continued)

TABLE 4.3
Puente Hills Landfill Flare No. 18
August 9, 1995

Summary of Results - Emissions of NO_x, CO, SO_x, HC, PM, and Sulfur Compounds

Parameter	Units	Inlet			Exhaust		
		Run 1	Run 2	Average	Run 1	Run 2	Average
O ₂	%	3.58	2.84	3.21	13.01	13.18	13.10
	%	32.6	33.7	33.2	7.0	6.7	6.9
	%	23.1	21.2	22.2	80.0	80.1	80.0
O	%	11.70	7.55	9.63	11.05	9.68	10.37
Volume Flow	DSCFM	671	732	702	6,492	6,733	6,613
Temperature	°F	145	164	155	1,489	1,501	1,495
O _x							
Concentration	ppmv	-	-	-	13.77	13.66	13.72
Concentration @ 3% O ₂	ppmv	-	-	-	31.24	31.67	31.46
Emission Rate as NO ₂	lb/hr	-	-	-	0.65	0.67	0.66
CO							
Concentration	ppmv	-	-	-	0.97	0.41	0.69
Concentration @ 3% O ₂	ppmv	-	-	-	2.20	0.95	1.58
Emission Rate	lb/hr	-	-	-	0.03	0.01	0.02
SO _x							
Concentration	ppmv	-	-	-	5.66	5.37	5.52
Concentration @ 3% O ₂	ppmv	-	-	-	12.84	12.45	12.65
Emission Rate as SO ₂	lb/hr	-	-	-	0.37	0.37	0.37
Hydrocarbons (HC)							
CH ₄	ppmv	407,000	423,000	415,000	<0.50	<0.50	<0.50
TGNMO							
Concentration	ppmv	3,500	4,000	3,750	30.0	22.0	26.0
Concentration @ 3% O ₂	ppmv	3,617	3,965	3,791	68.1	51.0	59.6
Emission Rate as CH ₄	lb/hr	5.52	6.86	6.06	0.49	0.38	0.44
PM							
Organic Fraction	gr/DSCF	-	-	-	0.0041	0.0057	0.0049
Inorganic Fraction	gr/DSCF	-	-	-	-	-	-

*test all show
that PM is all
organic; likely an
error.*

TABLE 4.3 (cont.)
Puente Hills Landfill Flare No. 18

August 9, 1995

Summary of Results - Emissions of NO_x, CO, SO_x, HC, PM, and Sulfur Compounds

Parameter	Units	Inlet			Exhaust		
		Run 1	Run 2	Average	Run 1	Run 2	Average
Total PM	gr/DSCF	-	-	-	0.0041	0.0057	0.0049
Concentration @3% O ₂	gr/DSCF	-	-	-	0.0093	0.0132	0.0113
Concentration @ 12% CO ₂	gr/DSCF	-	-	-	0.0071	0.0102	0.0086
Emission Rate	lb/hr	-	-	-	0.23	0.33	0.28
Sulfur Compounds							
Hydrogen Sulfide	ppmv	84.0	97.0	90.5	-	-	-
Methyl Mercaptan	ppmv	1.3	1.5	<1.4	-	-	-
Ethyl Mercaptan	ppmv	<1.1	<1.1	<1.1	-	-	-
Dimethyl Sulfide	ppmv	1.8	2.0	1.9	-	-	-
Carbonyl Sulfide	ppmv	<1.1	<1.1	<1.1	-	-	-
Carbon Disulfide	ppmv	<1.1	<1.1	<1.1	-	-	-
Dimethyl Disulfide	ppmv	<1.0	<1.0	<1.0	-	-	-
Total Sulfur	ppmv	87.1	100.5	93.8	-	-	-

TABLE 4.4
Puente Hills Landfill Flare No. 24
August 10, 1995

Summary of Results - Emissions of NO_x, CO, SO_x, HC, PM, and Sulfur Compounds

Parameter	Units	Inlet			Exhaust		
		Run 1	Run 2	Average	Run 1	Run 2	Average
O ₂	%	3.92	3.03	3.48	13.12	12.11	12.62
CO ₂	%	32.1	33.4	32.8	6.6	7.7	7.2
N ₂	%	24.0	22.2	23.1	80.3	80.2	80.3
H ₂ O	%	4.05	6.46	5.26	9.07	10.26	9.66
Volume Flow	DSCFM	593	667	630	8,112	7,980	8,046
Temperature	°F	160	161	161	1,508	1,558	1,533
NO_x							
Concentration	ppmv	-	-	-	13.93	15.11	14.52
Concentration @ 3% O ₂	ppmv	-	-	-	32.05	30.77	31.41
Emission Rate as NO ₂	lb/hr	-	-	-	0.82	0.88	0.85
CO							
Concentration	ppmv	-	-	-	0.00	1.92	0.96
Concentration @ 3% O ₂	ppmv	-	-	-	0.00	3.91	1.95
Emission Rate	lb/hr	-	-	-	0.00	0.07	0.04
SO_x							
Concentration	ppmv	-	-	-	6.20	6.16	6.18
Concentration @ 3% O ₂	ppmv	-	-	-	14.26	12.54	13.40
Emission Rate as SO ₂	lb/hr	-	-	-	0.51	0.50	0.50
Hydrocarbons (HC)							
CH ₄	ppmv	400,000	414,000	407,000	1.20	<0.50	<0.85
TGNMO							
Concentration	ppmv	2,850	3,500	3,175	23.0	22.0	22.5
Concentration @ 3% O ₂	ppmv	3,004	3,506	3,255	52.9	44.8	48.9
Emission Rate as CH ₄	lb/hr	3.96	5.47	4.72	0.47	0.45	0.46
PM							
Organic Fraction	gr/DSCF	-	-	-	0.0002	0.0010	0.0006
Inorganic Fraction	gr/DSCF	-	-	-	-	-	-

TABLE 4.4 (cont.)
Puente Hills Landfill Flare No. 24
August 10, 1995

Summary of Results - Emissions of NO_x, CO, SO_x, HC, PM, and Sulfur Compounds

Parameter	Units	Inlet			Exhaust		
		Run 1	Run 2	Average	Run 1	Run 2	Average
Total PM	gr/DSCF	-	-	-	0.0002	0.0010	0.0006
Concentration @3% O ₂	gr/DSCF	-	-	-	0.0005	0.0020	0.0012
Concentration @ 12% CO ₂	gr/DSCF	-	-	-	0.0004	0.0016	0.0010
Emission Rate	lb/hr	-	-	-	0.02	0.07	0.04
Sulfur Compounds							
Hydrogen Sulfide	ppmv	96.0	93.0	94.5	-	-	-
Methyl Mercaptan	ppmv	1.3	1.5	<1.4	-	-	-
Ethyl Mercaptan	ppmv	<1.1	<1.1	<1.1	-	-	-
Dimethyl Sulfide	ppmv	1.6	1.8	1.7	-	-	-
Carbonyl Sulfide	ppmv	<1.1	<1.1	<1.1	-	-	-
Carbon Disulfide	ppmv	<1.1	<1.1	<1.1	-	-	-
Dimethyl Disulfide	ppmv	<1.0	<1.0	<1.0	-	-	-
al Sulfur	ppmv	98.9	96.3	97.6	-	-	-

4.0 - Summary of Results (Continued)

TABLE 4.5
Puente Hills Landfill Flare No. 4
August 7, 1995
Summary of Results - Emissions of SCAQMD Rule 1150.1 Contaminants
Run 1

Compound	Inlet		Exhaust		Flare Eff. (%)
	Conc. (ppbv)	Mass Flow (lb/hr)	Conc. (ppbv)	Emissions (lb/hr)	
Methylene Chloride	2200	1.71E-02	<1.0	<1.28E-04	>99.95
Chloroform	<100	<1.09E-03	<0.3	<5.40E-05	NA
1,1,1-Trichloroethane	<200	<2.45E-03	<0.5	<1.01E-04	NA
Carbon Tetrachloride	<100	<1.41E-03	<0.3	<6.95E-05	NA
1,1-Dichloroethene	<100	<8.89E-04	<0.5	<7.30E-05	NA
Trichloroethylene	600	7.23E-03	<0.3	<5.94E-05	>99.95
Tetrachloroethylene	1400	2.13E-02	1.7	4.25E-04	99.88
Chlorobenzene	<420	<4.33E-03	<0.5	<8.48E-05	NA
Vinyl Chloride	990	5.67E-03	<0.5	<4.71E-05	>99.95
o-Dichlorobenzene	<420	<5.66E-03	<1.1	<2.44E-04	NA
m-Dichlorobenzene	<420	<5.66E-03	<1.1	<2.44E-04	NA
p-Dichlorobenzene	<420	<5.66E-03	<1.1	<2.44E-04	NA
1,1-Dichloroethane	880	7.98E-03	<0.5	<7.46E-05	>99.94
1,2-Dichloroethane	<210	<1.90E-03	<0.3	<4.47E-05	NA
Benzene	2000	1.43E-02	<0.5	<5.88E-05	>99.98
Toluene	18000	1.52E-01	1.4	1.94E-04	99.99
o-Xylene	2500	2.43E-02	<0.5	<8.00E-05	>99.98
Acetonitrile	<5100	<1.92E-02	<13.0	<8.04E-04	NA
1,2-Dibromoethane	<420	<7.23E-03	<1.0	<2.83E-04	NA
Benzyl Chloride	<420	<4.87E-03	<1.1	<2.10E-04	NA
m+p-Xylene	9800	9.54E-02	<1.1	<1.76E-04	>99.99

TABLE 4.6
Puente Hills Landfill Flare No. 4
August 7, 1995
Summary of Results - Emissions of SCAQMD Rule 1150.1 Contaminants
Run 2

Compound	Inlet		Exhaust		Flare Eff. (%)
	Conc. (ppbv)	Mass Flow (lb/hr)	Conc. (ppbv)	Emissions (lb/hr)	
Methylene Chloride	2100	1.99E-02	<1.0	<1.12E-04	>99.95
Chloroform	<100	<1.33E-03	<0.3	<4.72E-05	NA
1,1,1-Trichloroethane	<200	<2.97E-03	<0.5	<8.80E-05	NA
Carbon Tetrachloride	<100	<1.71E-03	<0.3	<6.09E-05	NA
1,1-Dichloroethene	170	1.83E-03	<0.5	<6.39E-05	>99.71
Trichloroethylene	640	9.36E-03	<0.3	<5.20E-05	>99.95
Tetrachloroethylene	1700	3.14E-02	0.8	1.75E-04	99.95
Chlorobenzene	<420	<5.26E-03	<0.5	<7.42E-05	NA
Vinyl Chloride	1100	7.65E-03	<0.5	<4.12E-05	>99.95
o-Dichlorobenzene	<420	<6.87E-03	<1.1	<2.13E-04	NA
m-Dichlorobenzene	<420	<6.87E-03	<1.1	<2.13E-04	NA
p-Dichlorobenzene	<420	<6.87E-03	<1.1	<2.13E-04	NA
1,1-Dichloroethane	910	1.00E-02	<0.5	<6.53E-05	>99.95
1,2-Dichloroethane	<210	<2.31E-03	<0.3	<3.92E-05	NA
Benzene	2100	1.83E-02	<0.5	<5.15E-05	>99.98
Toluene	20000	2.05E-01	1.5	1.82E-04	99.99
o-Xylene	4000	4.73E-02	<0.5	<7.00E-05	>99.99
Acetonitrile	<5100	<2.33E-02	<13.0	<7.04E-04	NA
1,2-Dibromoethane	<420	<8.78E-03	<1.0	<2.48E-04	NA
Benzyl Chloride	<420	<5.92E-03	<1.1	<1.84E-04	NA
m+p-Xylene	12000	1.42E-01	<1.1	<1.54E-04	>99.99

1.0 - Summary of Results (Continued)

TABLE 4.7
Puente Hills Landfill Flare No. 2
August 8, 1995
Summary of Results - Emissions of SCAQMD Rule 1150.1 Contaminants
Run 1

Compound	Inlet		Exhaust		Flare Eff. (%)
	Conc. (ppbv)	Mass Flow (lb/hr)	Conc. (ppbv)	Emissions (lb/hr)	
Methylene Chloride	2200	2.07E-02	<1.0	<1.27E-04	>99.95
Chloroform	<100	<1.32E-03	<0.3	<5.35E-05	NA
1,1,1-Trichloroethane	<200	<2.95E-03	<0.5	<9.97E-05	NA
Carbon Tetrachloride	<100	<1.70E-03	<0.3	<6.90E-05	NA
1,1-Dichloroethene	<100	<1.07E-03	<0.5	<7.24E-05	NA
Trichloroethylene	570	8.29E-03	<0.3	<5.89E-05	>99.95
Tetrachloroethylene	1400	2.57E-02	0.5	1.24E-04	99.96
Chlorobenzene	<420	<5.23E-03	<0.5	<8.41E-05	NA
Vinyl Chloride	1000	6.92E-03	<0.5	<4.67E-05	>99.95
o-Dichlorobenzene	<420	<6.83E-03	<1.1	<2.42E-04	NA
m-Dichlorobenzene	<420	<6.83E-03	<1.1	<2.42E-04	NA
p-Dichlorobenzene	<420	<6.83E-03	<1.1	<2.42E-04	NA
1,1-Dichloroethane	780	8.54E-03	<0.5	<7.39E-05	>99.94
1,2-Dichloroethane	<210	<2.30E-03	<0.3	<4.44E-05	NA
Benzene	2000	1.73E-02	<0.5	<5.84E-05	>99.98
Toluene	18000	1.83E-01	0.8	1.10E-04	100.00
o-Xylene	3700	4.35E-02	<0.5	<7.93E-05	>99.99
Acetonitrile	<5100	<2.32E-02	<13.0	<7.97E-04	NA
1,2-Dibromoethane	<420	<8.73E-03	<1.0	<2.81E-04	NA
Benzyl Chloride	<420	<5.88E-03	<1.1	<2.08E-04	NA
m+p-Xylene	10000	1.17E-01	<1.1	<1.75E-04	>99.99

4.0 - Summary of Results (Continued)

TABLE 4.8
Puente Hills Landfill Flare No. 2
August 8, 1995
Summary of Results - Emissions of SCAQMD Rule 1150.1 Contaminants
Run 2

Compound	Inlet		Exhaust		Flare Eff. (%)
	Conc. (ppbv)	Mass Flow (lb/hr)	Conc. (ppbv)	Emissions (lb/hr)	
Methylene Chloride	2200	2.15E-02	<1.0	<1.36E-04	>99.95
Chloroform	<100	<1.37E-03	<0.3	<5.73E-05	NA
1,1,1-Trichloroethane	220	3.37E-03	<0.5	<1.07E-04	>99.77
Carbon Tetrachloride	<100	<1.77E-03	<0.3	<7.38E-05	NA
1,1-Dichloroethene	<100	<1.11E-03	<0.5	<7.75E-05	NA
Trichloroethylene	640	9.66E-03	<0.3	<6.30E-05	>99.95
Tetrachloroethylene	1500	2.86E-02	0.8	2.12E-04	99.95
Chlorobenzene	<420	<5.43E-03	<0.5	<9.00E-05	NA
Vinyl Chloride	1200	8.62E-03	<0.5	<5.00E-05	>99.96
o-Dichlorobenzene	<420	<7.10E-03	<1.1	<2.59E-04	NA
m-Dichlorobenzene	<420	<7.10E-03	<1.1	<2.59E-04	NA
p-Dichlorobenzene	<420	<7.10E-03	<1.1	<2.59E-04	NA
1,1-Dichloroethane	900	1.02E-02	<0.5	<7.91E-05	>99.94
1,2-Dichloroethane	<210	<2.39E-03	<0.3	<4.75E-05	NA
Benzene	2000	1.80E-02	<0.5	<6.24E-05	>99.98
Toluene	17000	1.80E-01	1.0	1.47E-04	99.99
o-Xylene	3400	4.15E-02	<0.5	<8.49E-05	>99.99
Acetonitrile	<5100	<2.41E-02	<13.0	<8.53E-04	NA
1,2-Dibromoethane	<420	<9.07E-03	<1.0	<3.00E-04	NA
Benzyl Chloride	<420	<6.11E-03	<1.1	<2.23E-04	NA
m+p-Xylene	9500	1.16E-01	<1.1	<1.87E-04	>99.99

4.0 - Summary of Results (Continued)

TABLE 4.9
Puente Hills Landfill Flare No. 18
August 9, 1995
Summary of Results - Emissions of SCAQMD Rule 1150.1 Contaminants
Run 1

Compound	Inlet		Exhaust		Flare Eff. (%)
	Conc. (ppbv)	Mass Flow (lb/hr)	Conc. (ppbv)	Emissions (lb/hr)	
Methylene Chloride	1400	1.26E-02	<1.0	<8.73E-05	>99.93
Chloroform	<100	<1.27E-03	<0.3	<3.68E-05	NA
1,1,1-Trichloroethane	<200	<2.83E-03	<0.5	<6.86E-05	NA
Carbon Tetrachloride	<100	<1.63E-03	<0.3	<4.74E-05	NA
1,1-Dichloroethene	<210	<2.16E-03	<0.5	<4.98E-05	NA
Trichloroethylene	410	5.72E-03	<0.3	<4.05E-05	>99.93
Tetrachloroethylene	1300	2.29E-02	0.5	8.52E-05	99.96
Chlorobenzene	<210	<2.51E-03	<0.5	<5.78E-05	NA
Vinyl Chloride	570	3.78E-03	<0.5	<3.21E-05	>99.91
o-Dichlorobenzene	<420	<6.56E-03	<1.1	<1.66E-04	NA
m-Dichlorobenzene	<420	<6.56E-03	<1.1	<1.66E-04	NA
p-Dichlorobenzene	<420	<6.56E-03	<1.1	<1.66E-04	NA
1,1-Dichloroethane	760	7.99E-03	<0.5	<5.09E-05	>99.93
1,2-Dichloroethane	<100	<1.05E-03	<0.3	<3.05E-05	NA
Benzene	1900	1.58E-02	<0.5	<4.01E-05	>99.97
Toluene	19000	1.86E-01	1.2	1.14E-04	99.99
o-Xylene	4300	4.85E-02	<0.5	<5.45E-05	>99.99
Acetonitrile	<5100	<2.22E-02	<13.0	<5.48E-04	NA
1,2-Dibromoethane	<420	<8.38E-03	<1.0	<1.93E-04	NA
Benzyl Chloride	<420	<5.65E-03	<1.1	<1.43E-04	NA
m+p-Xylene	11000	1.24E-01	<1.1	<1.20E-04	>99.99

4.0 - Summary of Results (Continued)

TABLE 4.10
Puente Hills Landfill Flare No. 18
August 9, 1995
Summary of Results - Emissions of SCAQMD Rule 1150.1 Contaminants
Run 2

Compound	Inlet		Exhaust		Flare Eff. (%)
	Conc. (ppbv)	Mass Flow (lb/hr)	Conc. (ppbv)	Emissions (lb/hr)	
Methylene Chloride	2300	2.26E-02	<1.0	<9.05E-05	>99.96
Chloroform	<100	<1.38E-03	<0.3	<3.82E-05	NA
1,1,1-Trichloroethane	<200	<3.09E-03	<0.5	<7.11E-05	NA
Carbon Tetrachloride	<100	<1.78E-03	<0.3	<4.92E-05	NA
1,1-Dichloroethene	<210	<2.36E-03	<0.5	<5.17E-05	NA
Trichloroethylene	540	8.22E-03	<0.3	<4.20E-05	>99.94
Tetrachloroethylene	1200	2.31E-02	0.3	5.30E-05	99.98
Chlorobenzene	<210	<2.74E-03	<0.5	<6.00E-05	NA
Vinyl Chloride	670	4.85E-03	<0.5	<3.33E-05	>99.93
o-Dichlorobenzene	<420	<7.15E-03	<1.1	<1.72E-04	NA
m-Dichlorobenzene	<420	<7.15E-03	<1.1	<1.72E-04	NA
p-Dichlorobenzene	<420	<7.15E-03	<1.1	<1.72E-04	NA
1,1-Dichloroethane	850	9.75E-03	<0.5	<5.27E-05	>99.94
1,2-Dichloroethane	<100	<1.15E-03	<0.3	<3.16E-05	NA
Benzene	1900	1.72E-02	<0.5	<4.16E-05	>99.97
Toluene	18000	1.92E-01	1.4	1.37E-04	99.99
o-Xylene	3500	4.31E-02	<0.5	<5.66E-05	>99.99
Acetonitrile	<5100	<2.43E-02	<13.0	<5.69E-04	NA
1,2-Dibromoethane	<420	<9.14E-03	<1.0	<2.00E-04	NA
Benzyl Chloride	<420	<6.16E-03	<1.1	<1.48E-04	NA
m+p-Xylene	9200	1.13E-01	<1.1	<1.24E-04	>99.99

4.0 - Summary of Results (Continued)

TABLE 4.11
Puente Hills Landfill Flare No. 24
August 10, 1995
Summary of Results - Emissions of SCAQMD Rule 1150.1 Contaminants
Run 1

Compound	Inlet		Exhaust		Flare Eff. (%)
	Conc. (ppbv)	Mass Flow (lb/hr)	Conc. (ppbv)	Emissions (lb/hr)	
Methylene Chloride	1400	1.12E-02	<1.0	<1.09E-04	>99.93
Chloroform	<100	<1.12E-03	<0.3	<4.60E-05	NA
1,1,1-Trichloroethane	<200	<2.50E-03	<0.5	<8.57E-05	NA
Carbon Tetrachloride	<100	<1.44E-03	<0.3	<5.93E-05	NA
1,1-Dichloroethene	<210	<1.91E-03	<0.5	<6.22E-05	NA
Trichloroethylene	430	5.30E-03	<0.3	<5.06E-05	>99.93
Tetrachloroethylene	1300	2.02E-02	<0.3	<6.39E-05	>99.98
Chlorobenzene	<210	<2.22E-03	<0.5	<7.23E-05	NA
Vinyl Chloride	570	3.34E-03	<0.5	<4.01E-05	>99.91
o-Dichlorobenzene	<420	<5.80E-03	<1.1	<2.08E-04	NA
m-Dichlorobenzene	<420	<5.80E-03	<1.1	<2.08E-04	NA
p-Dichlorobenzene	<420	<5.80E-03	<1.1	<2.08E-04	NA
1,1-Dichloroethane	730	6.78E-03	<0.5	<6.35E-05	>99.93
1,2-Dichloroethane	<100	<9.29E-04	<0.3	<3.81E-05	NA
Benzene	1900	1.39E-02	<0.5	<5.02E-05	>99.97
Toluene	18000	1.56E-01	0.9	1.06E-04	100.00
o-Xylene	3600	3.59E-02	<0.5	<6.82E-05	>99.99
Acetonitrile	<5100	<1.97E-02	<13.0	<6.85E-04	NA
1,2-Dibromoethane	<420	<7.41E-03	<1.0	<2.41E-04	NA
Benzyl Chloride	<420	<4.99E-03	<1.1	<1.79E-04	NA
m+p-Xylene	9900	9.87E-02	<1.1	<1.50E-04	>99.99

4.0 - Summary of Results (Continued)

TABLE 4.12
Puente Hills Landfill Flare No. 24
August 10, 1995
Summary of Results - Emissions of SCAQMD Rule 1150.1 Contaminants
Run 2

Compound	Inlet		Exhaust		Flare Eff. (%)
	Conc. (ppbv)	Mass Flow (lb/hr)	Conc. (ppbv)	Emissions (lb/hr)	
Methylene Chloride	2000	1.79E-02	<1.0	<1.07E-04	>99.95
Chloroform	<100	<1.26E-03	<0.3	<4.52E-05	NA
1,1,1-Trichloroethane	<200	<2.82E-03	<0.5	<8.43E-05	NA
Carbon Tetrachloride	<100	<1.62E-03	<0.3	<5.83E-05	NA
1,1-Dichloroethene	<210	<2.15E-03	<0.5	<6.12E-05	NA
Trichloroethylene	570	7.91E-03	<0.3	<4.98E-05	>99.95
Tetrachloroethylene	1300	2.28E-02	<0.3	<6.29E-05	>99.98
Chlorobenzene	<210	<2.50E-03	<0.5	<7.11E-05	NA
Vinyl Chloride	630	4.16E-03	<0.5	<3.95E-05	>99.92
o-Dichlorobenzene	<420	<6.52E-03	<1.1	<2.04E-04	NA
m-Dichlorobenzene	<420	<6.52E-03	<1.1	<2.04E-04	NA
p-Dichlorobenzene	<420	<6.52E-03	<1.1	<2.04E-04	NA
1,1-Dichloroethane	810	8.46E-03	<0.5	<6.25E-05	>99.94
1,2-Dichloroethane	<100	<1.04E-03	<0.3	<3.75E-05	NA
Benzene	1900	1.57E-02	<0.5	<4.93E-05	>99.97
Toluene	18000	1.75E-01	0.6	6.98E-05	100.00
o-Xylene	3700	4.15E-02	<0.5	<6.71E-05	>99.99
Acetonitrile	<5100	<2.21E-02	<13.0	<6.74E-04	NA
1,2-Dibromoethane	<420	<8.33E-03	<1.0	<2.37E-04	NA
Benzyl Chloride	<420	<5.61E-03	<1.1	<1.76E-04	NA
m+p-Xylene	9900	1.11E-01	<1.1	<1.48E-04	>99.99

**EMISSION TESTS ON THE RESEARCH
FLARE AT PUENTE HILLS LANDFILL,
OCTOBER 19, 1995**

Prepared For:

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whitter, California

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California

Prepared By:

Craig H. Fry

CARNOT
Tustin, California

NOVEMBER 1995

**TABLE 4-1
GENERAL RESULTS
RESEARCH FLARE
OCTOBER 19, 1995**

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	5.55	5.00	5.28	13.22	13.09	13.16
CO ₂ , %	27.8	28.1	28.0	6.64	6.77	6.71
N ₂ , %	29.6	28.0	28.8	80.1	80.1	80.1
H ₂ O, %	4.0	6.1	5.1	9.6	9.8	9.7
Flow Rate, dscfm	5,667	5,284	5475	65,394	61,673	63,534
Temperature, °F	129	136	132	1,622	1,623	1,623
NO _x :						
ppm				8.2	8.6	8.4
ppm @ 3% O ₂				19.2	19.7	19.4
lb/hr (as NO _x)				3.91	3.85	3.88
lb/MM Btu (as NO _x)				0.032	0.032	0.032
CO:						
ppm				0.0	0.4	0.2
ppm @ 3% O ₂				0.0	0.8	0.4
lb/hr				0.00	0.10	0.05
HC:						
CH ₄ ppm	394,000	416,000	405,000	ND < 1	ND < 1	ND < 1
TGNMO ppm	3,130	3,470	3,300	1.30	2.70	2.00
TGNMO ppm @ 3% O ₂	—	—	—	3.03	6.19	4.61
TGNMO lb/hr (as CH ₄)	44.87	46.38	45.62	0.22	0.42	0.32
Destruction Eff. %	—	—	—	99.52	99.09	99.31
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0045	0.0055	0.0050
Total Particulate gr/dscf				0.0045	0.0055	0.0050
gr/dscf @ 3% O ₂				0.0104	0.0126	0.0115
gr/dscf @ 12% CO ₂				0.0081	0.0098	0.0089
lb/hr				2.50	2.91	2.71
Sulfur Compounds:						
H ₂ S, ppm	72	78	75			
Methyl Mercaptan, ppm	1.3	1.4	1.4			
Ethyl Mercaptan, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Sulfide, ppm	1.6	1.8	1.7			
Carbonyl Sulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Carbon Disulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	74.9	81.2	78.1			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 1
RESEARCH FLARE
OCTOBER 19, 1995

Flow rate, Inlet dscfm		5,667		Flow rate, Exhaust dscfm		65,394			
Species	Inlet			Exhaust				Destruction Efficiency, %	
Methylene Chloride:		1500 ppb	ND <	0.5 ppb					
lb/hr		1.14×10^{-1}	<	4.39×10^{-4}				>99.62	
Chloroform:	ND <	100 ppb	ND <	0.5 ppb					
lb/hr	<	1.07×10^{-2}	<	6.17×10^{-4}				NA	
1,1,1 Trichloroethane:	ND <	200 ppb	ND <	0.5 ppb					
lb/hr	<	2.39×10^{-2}	<	6.90×10^{-4}				NA	
Carbon Tetrachloride:	ND <	100 ppb	ND <	0.5 ppb					
lb/hr	<	1.38×10^{-2}	<	7.95×10^{-4}				NA	
1,1-Dichloroethene:	ND <	210 ppb	ND <	0.5 ppb					
lb/hr	<	1.82×10^{-2}	<	5.01×10^{-4}				NA	
Trichloroethylene:		550 ppb	ND <	0.5 ppb					
lb/hr		6.47×10^{-2}	<	6.79×10^{-4}				>98.95	
Tetrachloroethylene:		1200 ppb	ND <	0.5 ppb					
lb/hr		1.78×10^{-1}	<	8.57×10^{-4}				>99.52	
Chlorobenzene:	ND <	420 ppb	ND <	0.5 ppb					
lb/hr	<	4.24×10^{-2}	<	5.82×10^{-4}				NA	
Vinyl Chloride:		1100	ND <	1.0 ppb					
lb/hr		6.16×10^{-2}	<	6.46×10^{-4}				>98.95	
m-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb					
lb/hr	<	5.53×10^{-2}	<	1.67×10^{-3}				NA	
o-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb					
lb/hr	<	5.53×10^{-2}	<	1.69×10^{-3}				NA	
p-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb					
lb/hr	<	5.53×10^{-2}	<	1.67×10^{-3}				NA	
1,1-Dichloroethane:		670 ppb	ND <	0.5 ppb					
lb/hr		5.94×10^{-2}	<	5.12×10^{-4}				>99.14	
1,2-Dichloroethane:	ND <	210 ppb	ND <	0.5 ppb					
lb/hr	<	1.86×10^{-2}	<	5.12×10^{-4}				NA	
Benzene:		2200 ppb	ND <	0.5 ppb					
lb/hr		1.54×10^{-1}	<	4.04×10^{-4}				>99.74	
Toluene:		16000 ppb	ND <	0.5 ppb					
lb/hr		1.32×10^0	<	4.76×10^{-4}				>99.96	
Acetonitrile:	ND <	5100 ppb	ND <	13 ppb					
lb/hr	<	1.88×10^{-1}	<	5.52×10^{-3}				NA	
o-Xylenes:		3000 ppb	ND <	0.5 ppb					
lb/hr		2.85×10^{-1}	<	5.49×10^{-4}				>99.81	
m+p Xylenes:		8100 ppb	ND <	1.1 ppb					
lb/hr		7.70×10^{-1}	<	1.21×10^{-3}				>99.84	
1,2-Dibromoethane:	ND <	420 ppb	ND <	2.6 ppb					
lb/hr	<	7.07×10^{-2}	<	5.05×10^{-3}				NA	
Benzyl Chloride:	ND <	420 ppb	ND <	2.7 ppb					
lb/hr	<	4.76×10^{-2}	<	3.53×10^{-3}				NA	

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 2
RESEARCH FLARE
OCTOBER 19, 1995

Flow rate, Inlet dscfm		5,284	
Flow rate, Exhaust dscfm		61,673	
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	1600 ppb	ND <	0.5 ppb
lb/hr	1.14×10^{-1}	<	4.14×10^{-4}
			>99.64
Chloroform:	ND < 100 ppb	ND <	0.5 ppb
lb/hr	< 9.97×10^{-3}	<	5.82×10^{-4}
			NA
1,1,1 Trichloroethane:	ND < 200 ppb	ND <	0.5 ppb
lb/hr	< 2.23×10^{-2}	<	6.50×10^{-4}
			NA
Carbon Tetrachloride:	ND < 100 ppb	ND <	0.5 ppb
lb/hr	< 1.29×10^{-2}	<	7.50×10^{-4}
			NA
1,1-Dichloroethene:	ND < 210 ppb	ND <	0.5 ppb
lb/hr	< 1.70×10^{-2}	<	4.73×10^{-4}
			NA
Trichloroethylene:	650 ppb	ND <	0.5 ppb
lb/hr	7.14×10^{-2}	<	6.41×10^{-4}
			>99.10
Tetrachloroethylene:	1500 ppb	ND <	0.5 ppb
lb/hr	2.08×10^{-1}	<	8.09×10^{-4}
			>99.61
Chlorobenzene:	ND < 420 ppb	ND <	0.5 ppb
lb/hr	< 3.95×10^{-2}	<	5.49×10^{-4}
			NA
Vinyl Chloride:	1100 ppb	ND <	1.0 ppb
lb/hr	5.74×10^{-2}	<	6.09×10^{-4}
			>98.94
m-Dichlorobenzene:	ND < 420 ppb	ND <	1.1 ppb
lb/hr	< 5.16×10^{-2}	<	1.58×10^{-3}
			NA
o-Dichlorobenzene:	ND < 420 ppb	ND <	1.1 ppb
lb/hr	< 5.16×10^{-2}	<	1.58×10^{-3}
			NA
p-Dichlorobenzene:	ND < 420 ppb	ND <	1.1 ppb
lb/hr	< 5.16×10^{-2}	<	1.58×10^{-3}
			NA
1,1-Dichloroethane:	780 ppb	ND <	0.5 ppb
lb/hr	6.45×10^{-2}	<	4.82×10^{-4}
			>99.25
1,2-Dichloroethane:	ND < 210 ppb	ND <	0.5 ppb
lb/hr	< 1.74×10^{-2}	<	4.82×10^{-4}
			NA
Benzene:	2500 ppb	ND <	0.5 ppb
lb/hr	1.63×10^{-1}	<	3.81×10^{-4}
			>99.77
Toluene:	19000 ppb	ND <	0.5 ppb
lb/hr	1.46×10^0	<	4.49×10^{-4}
			>99.97
Acetonitrile:	ND < 5100 ppb	ND <	13 ppb
lb/hr	< 1.75×10^{-1}	<	5.20×10^{-3}
			NA
o-Xylenes:	3600 ppb	ND <	0.5 ppb
lb/hr	3.19×10^{-1}	<	5.18×10^{-4}
			>99.84
m+p Xylenes:	9800 ppb	ND <	1.1 ppb
lb/hr	8.69×10^{-1}	<	1.14×10^{-3}
			>99.87
1,2-Dibromoethane:	ND < 420 ppb	ND <	2.6 ppb
lb/hr	< 6.59×10^{-2}	<	4.76×10^{-3}
			NA
Benzyl Chloride:	ND < 420 ppb	ND <	2.7 ppb
lb/hr	< 4.44×10^{-2}	<	3.33×10^{-3}
			NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

**EMISSIONS TESTS ON FOUR FLARES
(FLARE NOS. 11, 13, 14, AND 15) AT
PUENTE HILLS LANDFILL
FEBRUARY, 1996**

Prepared for:

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California

for Submittal to:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California

Prepared by:

Craig H. Fry

CARNOT
Tustin, California

April 1996

RESULTS

SECTION 4.0

P.H. FLARES 2-96

TABLE 4-1
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE No. 11
FEBRUARY 12, 1996

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	5.38	4.76	5.07	12.20	12.61	12.40
CO ₂ , %	29.5	30.4	30.0	8.02	7.64	7.83
N ₂ , %	26.4	24.5	25.5	79.8	79.8	79.8
H ₂ O, %	4.6	4.4	4.5	10.3	10.1	10.2
Flow Rate, dscfm	1,038	1,093	1066	8,310	8,156	8,233
Temperature, °F	101	101	101	1,620	1,592	1,606
NO _x :						
ppm				17.1	15.4	16.3
ppm @ 3% O ₂				35.2	33.3	34.3
lb/hr (as NO ₂)				1.03	0.91	0.97
CO:						
ppm				2.9	2.6	2.8
ppm @ 3% O ₂				6.0	5.6	5.8
lb/hr				0.11	0.09	0.10
SO ₂ :						
ppm				12.1	12.0	12.1
ppm @ 3% O ₂				24.8	26.0	25.4
lb/hr (as SO ₂)				1.01	0.99	1.00
HC:						
CH ₄ ppm	395,000	404,000	399,500	1.59	1.16	1.38
TGNMO ppm	3,380	3,290	3,335	1.44	3.22	2.33
TGNMO ppm @ 3% O ₂	—	—	—	2.96	6.95	4.96
TGNMO lb/hr (as CH ₄)	8.88	9.10	8.99	0.03	0.07	0.05
Destruction Eff. %	—	—	—	99.66	99.27	99.46
Particulate:						
Organic fraction gr/dscf				0.0001	0.0001	0.0001
Inorganic fraction gr/dscf				0.0019	0.0020	0.0020
Total Particulate gr/dscf				0.0020	0.0021	0.0020
gr/dscf @ 3% O ₂				0.0041	0.0045	0.0043
gr/dscf @ 12% CO ₂				0.0029	0.0031	0.0030
lb/hr				0.136	0.139	0.138
Sulfur Compounds:						
H ₂ S, ppm	87	94	91			
Methyl Mercaptan, ppm	1.5	1.5	1.5			
Ethyl Mercaptan, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Dimethyl Sulfide, ppm	1.6	1.7	1.7			
Carbonyl Sulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Carbon Disulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Dimethyl Disulfide, ppm	ND< 1.0	ND< 1.0	ND< 1.0			
Total Sulfur Compounds, ppm	90.1	97.2	93.7			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 1
PUENTE HILLS LANDFILL FLARE No. 11
FEBRUARY 12, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		1,038 8,310			
Species		Inlet	Exhaust	Destruction Efficiency, %	
Methylene Chloride:		3400 ppb	ND<	1.0 ppb	
lb/hr		4.74E-02	<	1.12E-04	>99.76
Chloroform:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	4.11E-03	<	7.84E-05	NA
1,1,1 Trichloroethane:		260 ppb	ND<	0.5 ppb	
lb/hr		5.69E-03	<	8.76E-05	>98.46
Carbon Tetrachloride:	ND<	420 ppb	ND<	1.0 ppb	
lb/hr	<	1.06E-02	<	2.02E-04	NA
1,1-Dichloroethene:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	3.34E-03	<	6.37E-05	NA
Trichloroethylene:		690 ppb	ND<	0.5 ppb	
lb/hr		1.49E-02	<	8.63E-05	>99.42
Tetrachloroethylene:		1100 ppb	ND<	0.5 ppb	
lb/hr		2.99E-02	<	1.09E-04	>99.64
Chlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	7.76E-03	<	1.63E-04	NA
Vinyl Chloride:		730	ND<	1.0 ppb	
lb/hr		7.49E-03	<	8.21E-05	>98.90
o-Dichlorobenzene:	ND<	1100 ppb	ND<	2.6 ppb	
lb/hr	<	2.65E-02	<	5.02E-04	NA
m-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.65E-02	<	5.22E-04	NA
p-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.65E-02	<	5.22E-04	NA
1,1-Dichloroethane:		430 ppb	ND<	0.5 ppb	
lb/hr		6.98E-03	<	6.50E-05	>99.07
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	3.41E-03	<	6.50E-05	NA
Benzene:		3100 ppb	ND<	0.3 ppb	
lb/hr		3.97E-02	<	3.08E-05	>99.92
Toluene:		17000 ppb	ND<	1.1 ppb	
lb/hr		2.57E-01	<	1.33E-04	>99.95
Ethyl Benzene:		6200	ND<	0.5	
lb/hr		1.08E-01	<	6.97E-05	>99.94
o-Xylenes:		3700 ppb	ND<	0.5 ppb	
lb/hr		6.45E-02	<	8.71E-06	>99.99
Methyl-Tert-Butyl-Ether:		320 ppb	ND<	0.5 ppb	
lb/hr		4.63E-03	<	5.79E-05	>98.75
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb	
lb/hr	<	3.44E-02	<	7.01E-04	NA
Freon 11 (CCL3F):	ND<	410 ppb	ND<	1.0 ppb	
lb/hr	<	9.24E-03	<	1.81E-04	NA
1,2-Dibromoethane:	ND<	1000 ppb	ND<	2.6 ppb	
lb/hr	<	3.08E-02	<	6.42E-04	NA
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb	
lb/hr	<	1.78E-03	<	3.55E-05	NA
cis-1,2-Dichloroethylene:		1200 ppb	ND<	0.5 ppb	
lb/hr		1.91E-02	<	6.37E-05	>99.67
Benzyl Chloride:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.29E-02	<	4.49E-04	NA
m+p-Xylene:		9500 ppb	ND<	1.1 ppb	
lb/hr		1.66E-01	<	1.53E-04	>99.91

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 2
PUENTE HILLS LANDFILL FLARE No. 11
FEBRUARY 12, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		1,093 8,156			
Species	Inlet	Exhaust	Destruction Efficiency, %		
Methylene Chloride:		2600 ppb	ND<	1.0 ppb	
lb/hr		3.82E-02	<	1.10E-04	>99.71
Chloroform:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	4.33E-03	<	7.70E-05	NA
1,1,1 Trichloroethane:		230 ppb	ND<	0.5 ppb	
lb/hr		5.30E-03	<	8.60E-05	>98.38
Carbon Tetrachloride:	ND<	420 ppb	ND<	1.0 ppb	
lb/hr	<	1.12E-02	<	1.98E-04	NA
1,1-Dichloroethene:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	3.52E-03	<	6.25E-05	NA
Trichloroethylene:		670 ppb	ND<	0.5 ppb	
lb/hr		1.52E-02	<	8.47E-05	>99.44
Tetrachloroethylene:		1400 ppb	ND<	0.5 ppb	
lb/hr		4.01E-02	<	1.07E-04	>99.73
Chlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	8.17E-03	<	1.60E-04	NA
Vinyl Chloride:		610	ND<	1.0 ppb	
lb/hr		6.59E-03	<	8.06E-05	>98.78
o-Dichlorobenzene:	ND<	1100 ppb	ND<	2.6 ppb	
lb/hr	<	2.80E-02	<	4.93E-04	NA
m-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.80E-02	<	5.12E-04	NA
p-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.80E-02	<	5.12E-04	NA
1,1-Dichloroethane:		350 ppb	ND<	0.5 ppb	
lb/hr		5.99E-03	<	6.38E-05	>98.93
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	3.59E-03	<	6.38E-05	NA
Benzene:		3600 ppb		0.8 ppb	
lb/hr		4.86E-02		8.06E-05	99.83
Toluene:		21000 ppb		2.2 ppb	
lb/hr		3.34E-01		2.61E-04	99.92
Ethyl Benzene:		7600	ND<	0.5	
lb/hr		1.39E-01	<	6.84E-05	>99.95
o-Xylenes:		4800 ppb	ND<	0.5 ppb	
lb/hr		8.81E-02	<	9.18E-06	>99.99
Methyl-Tert-Butyl-Ether:		680 ppb		3.0 ppb	
lb/hr		1.04E-02		3.41E-04	96.71
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb	
lb/hr	<	3.62E-02	<	6.88E-04	NA
Freon 11 (CCL3F):	ND<	410 ppb	ND<	1.0 ppb	
lb/hr	<	9.74E-03	<	1.77E-04	NA
1,2-Dibromoethane:	ND<	1000 ppb	ND<	2.6 ppb	
lb/hr	<	3.25E-02	<	6.30E-04	NA
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb	
lb/hr	<	1.87E-03	<	3.49E-05	NA
cis-1,2-Dichloroethylene:		1200 ppb	ND<	0.5 ppb	
lb/hr		2.01E-02	<	6.25E-05	>99.69
Benzyl Chloride:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.41E-02	<	4.41E-04	NA
m+p-Xylene:		12000 ppb		1.2 ppb	
lb/hr		2.20E-01		1.64E-04	99.93

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

**TABLE 4-4
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE No. 13
FEBRUARY 13, 1996**

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	5.20	4.40	4.80	12.58	12.80	12.69
CO ₂ , %	29.3	31.2	30.3	7.68	7.45	7.56
N ₂ , %	26.6	24.2	25.4	79.7	79.8	79.7
H ₂ O, %	3.9	5.0	4.4	9.7	9.0	9.4
Flow Rate, dscfm	909	892	901	8,748	9,753	9,250
Temperature, °F	92	103	98	1,607	1,595	1,601
NO _x : ppm				16.6	15.6	16.1
ppm @ 3% O ₂				35.7	34.5	35.1
lb/hr (as NO ₂)				1.06	1.11	1.08
CO: ppm				2.0	1.8	1.9
ppm @ 3% O ₂				4.3	3.9	4.1
lb/hr				0.08	0.08	0.08
SO _x : ppm				11.8	10.7	11.3
ppm @ 3% O ₂				25.4	23.7	24.6
lb/hr (as SO ₂)				1.05	1.06	1.05
HC:						
CH ₄ ppm	393,000	411,000	402,000	ND<1.00	ND<1.00	ND<1.00
TGNMO ppm	3,430	3,840	3,635	1.58	ND<1.00	<1.29
TGNMO ppm @ 3% O ₂	-	-	-	3.40	<2.21	<2.80
TGNMO lb/hr (as CH ₄)	7.89	8.67	8.28	0.03	<0.02	<0.03
Destruction Eff. %	-	-	-	99.56	>99.72	>99.64
Particulate:						
Organic fraction gr/dscf				0.0000	0.0001	0.0000
Inorganic fraction gr/dscf				0.0013	0.0018	0.0016
Total Particulate gr/dscf				0.0013	0.0019	0.0016
gr/dscf @3% O ₂				0.0029	0.0043	0.0036
gr/dscf @12% CO ₂				0.0021	0.0030	0.0025
lb/hr				0.100	0.153	0.126
Sulfur Compounds:						
H ₂ S, ppm	94	93	94			
Methyl Mercaptan, ppm	1.5	1.5	1.5			
Ethyl Mercaptan, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Dimethyl Sulfide, ppm	1.7	1.8	1.8			
Carbonyl Sulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Carbon Disulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Dimethyl Disulfide, ppm	ND< 1.0	ND< 1.0	ND< 1.0			
Total Sulfur Compounds, ppm	97.2	96.3	96.8			

TABLE 4-5
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 1
PUENTE HILLS LANDFILL FLARE No. 13
FEBRUARY 13, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm	909 8,748		Exhaust		Destruction Efficiency, %
Species	Inlet		Exhaust		
Methylene Chloride:		2400 ppb	ND<	1.0 ppb	
lb/hr		2.93E-02	<	1.17E-04	>99.60
Chloroform:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	3.60E-03	<	8.26E-05	NA
1,1,1 Trichloroethane:		210 ppb	ND<	0.5 ppb	
lb/hr		4.03E-03	<	9.23E-05	>97.71
Carbon Tetrachloride:	ND<	420 ppb	ND<	1.0 ppb	
lb/hr	<	9.29E-03	<	2.13E-04	NA
1,1-Dichloroethene:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	2.93E-03	<	6.70E-05	NA
Trichloroethylene:		480 ppb	ND<	0.5 ppb	
lb/hr		9.07E-03	<	9.09E-05	>99.00
Tetrachloroethylene:		1000 ppb	ND<	0.5 ppb	
lb/hr		2.38E-02	<	1.15E-04	>99.52
Chlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	6.80E-03	<	1.71E-04	NA
Vinyl Chloride:		960	ND<	1.0 ppb	
lb/hr		8.63E-03	<	8.64E-05	>99.00
o-Dichlorobenzene:	ND<	1100 ppb	ND<	2.6 ppb	
lb/hr	<	2.32E-02	<	5.29E-04	NA
m-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.32E-02	<	5.49E-04	NA
p-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.32E-02	<	5.49E-04	NA
1,1-Dichloroethane:		370 ppb	ND<	0.5 ppb	
lb/hr		5.26E-03	<	6.84E-05	>98.70
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	2.99E-03	<	6.84E-05	NA
Benzene:		3300 ppb	ND<	0.3 ppb	
lb/hr		3.71E-02	<	3.24E-05	>99.91
Toluene:		16000 ppb	ND<	1.1 ppb	
lb/hr		2.12E-01	<	1.40E-04	>99.93
Ethyl Benzene:		6000	ND<	0.5	
lb/hr		9.16E-02	<	7.34E-05	>99.92
o-Xylenes:		3400 ppb	ND<	0.5 ppb	
lb/hr		5.19E-02	<	7.63E-06	>99.99
Methyl-Tert-Butyl-Ether:		310 ppb	ND<	0.5 ppb	
lb/hr		3.93E-03	<	6.10E-05	>98.45
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb	
lb/hr	<	3.01E-02	<	7.38E-04	NA
Freon 11 (CCL3F):	ND<	410 ppb	ND<	1.0 ppb	
lb/hr	<	8.10E-03	<	1.90E-04	NA
1,2-Dibromoethane:	ND<	1000 ppb	ND<	2.6 ppb	
lb/hr	<	2.70E-02	<	6.76E-04	NA
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb	
lb/hr	<	1.56E-03	<	3.74E-05	NA
cis-1,2-Dichloroethylene:		1100 ppb	ND<	0.5 ppb	
lb/hr		1.53E-02	<	6.70E-05	>99.56
Benzyl Chloride:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.00E-02	<	4.73E-04	NA
m+p-Xylene:		9000 ppb	ND<	1.1 ppb	
lb/hr		1.37E-01	<	1.62E-04	>99.88

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-6
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 2
PUENTE HILLS LANDFILL FLARE No. 13
FEBRUARY 13, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		892 9,753			
Species		Inlet	Exhaust		Destruction Efficiency, %
Methylene Chloride:		2400 ppb	ND<	1.0 ppb	
lb/hr		2.88E-02	<	1.31E-04	>99.54
Chloroform:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	3.54E-03	<	9.20E-05	NA
1,1,1 Trichloroethane:		240 ppb	ND<	0.5 ppb	
lb/hr		4.52E-03	<	1.03E-04	>97.72
Carbon Tetrachloride:	ND<	420 ppb	ND<	1.0 ppb	
lb/hr	<	9.12E-03	<	2.37E-04	NA
1,1-Dichloroethene:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	2.87E-03	<	7.47E-05	NA
Trichloroethylene:		460 ppb	ND<	0.5 ppb	
lb/hr		8.53E-03	<	1.01E-04	>98.81
Tetrachloroethylene:		1000 ppb	ND<	0.5 ppb	
lb/hr		2.34E-02	<	1.28E-04	>99.45
Chlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	
lb/hr	<	6.67E-03	<	1.91E-04	NA
Vinyl Chloride:		820	ND<	1.0 ppb	
lb/hr		7.23E-03	<	9.64E-05	>98.67
o-Dichlorobenzene:	ND<	1100 ppb	ND<	2.6 ppb	
lb/hr	<	2.28E-02	<	5.89E-04	NA
m-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.28E-02	<	6.12E-04	NA
p-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	2.28E-02	<	6.12E-04	NA
1,1-Dichloroethane:		360 ppb	ND<	0.5 ppb	
lb/hr		5.03E-03	<	7.63E-05	>98.48
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb	
lb/hr	<	2.93E-03	<	7.63E-05	NA
Benzene:		3400 ppb	ND<	0.3 ppb	
lb/hr		3.75E-02	<	3.61E-05	>99.90
Toluene:		16000 ppb	ND<	1.1 ppb	
lb/hr		2.08E-01	<	1.56E-04	>99.92
Ethyl Benzene:		5300	ND<	0.5	
lb/hr		7.94E-02	<	8.18E-05	>99.90
o-Xylenes:		2800 ppb	ND<	0.5 ppb	
lb/hr		4.19E-02	<	7.49E-06	>99.98
Methyl-Tert-Butyl-Ether:		340 ppb	ND<	0.5 ppb	
lb/hr		4.23E-03	<	6.80E-05	>98.39
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb	
lb/hr	<	2.95E-02	<	8.23E-04	NA
Freon 11 (CCL3F):	ND<	410 ppb	ND<	1.0 ppb	
lb/hr	<	7.95E-03	<	2.12E-04	NA
1,2-Dibromoethane:	ND<	1000 ppb	ND<	2.6 ppb	
lb/hr	<	2.65E-02	<	7.53E-04	NA
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb	
lb/hr	<	1.53E-03	<	4.17E-05	NA
cis-1,2-Dichloroethylene:		1100 ppb	ND<	0.5 ppb	
lb/hr		1.50E-02	<	7.47E-05	>99.50
Benzyl Chloride:	ND<	1100 ppb	ND<	2.7 ppb	
lb/hr	<	1.96E-02	<	5.27E-04	NA
m+p-Xylene:		8000 ppb	ND<	1.1 ppb	
lb/hr		1.20E-01	<	1.80E-04	>99.85

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-7
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE No. 14
FEBRUARY 15, 1996

Parameter	INLET			EXHAUST		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	5.05	4.60	4.83	13.27	12.81	13.04
CO ₂ , %	30.1	30.6	30.4	6.99	7.47	7.23
N ₂ , %	26.6	24.7	25.7	79.7	79.7	79.7
H ₂ O, %	3.3	4.5	3.9	9.3	9.6	9.5
Flow Rate, dscfm	993	993	1150	10,351	10,823	10,587
Temperature, °F	76	87	82	1,547	1,598	1,573
NO _x :						
ppm				13.8	14.4	14.1
ppm @ 3% O ₂				32.4	32.0	32.2
lb/hr (as NO ₂)				1.04	1.14	1.09
CO:						
ppm				2.6	1.7	2.1
ppm @ 3% O ₂				6.0	3.8	4.9
lb/hr				0.12	0.08	0.10
SO _x :						
ppm				12.1	12.6	12.4
ppm @ 3% O ₂				28.4	27.9	28.2
lb/hr (as SO ₂)				1.27	1.38	1.32
HC:						
CH ₄ ppm	395,000	405,000	400,000	ND<1.00	ND<1.00	ND<1.00
TGNMO ppm	3,060	3,060	3,060	ND<1.00	ND<1.00	ND<1.00
TGNMO ppm @ 3% O ₂	—	—	—	<2.35	<2.21	<2.28
TGNMO lb/hr (as CH ₄)	7.69	7.68	8.91	<0.03	<0.03	<0.03
Destruction Eff. %	—	—	—	>99.66	>99.64	>99.65
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0013	0.0017	0.0015
Total Particulate gr/dscf				0.0013	0.0017	0.0015
gr/dscf @3% O ₂				0.0031	0.0038	0.0035
gr/dscf @12% CO ₂				0.0023	0.0028	0.0025
lb/hr				0.119	0.161	0.140
Sulfur Compounds:						
H ₂ S, ppm	70	75	73			
Methyl Mercaptan, ppm	1.3	1.4	1.4			
Ethyl Mercaptan, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Dimethyl Sulfide, ppm	1.7	1.8	1.8			
Carbonyl Sulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Carbon Disulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Dimethyl Disulfide, ppm	ND< 1.0	ND< 1.0	ND< 1.0			
Total Sulfur Compounds, ppm	73.0	78.2	75.6			

TABLE 4-8
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 1
PUENTE HILLS LANDFILL FLARE No. 14
FEBRUARY 15, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		993 10,351				
Species		Inlet		Exhaust		Destruction Efficiency, %
Methylene Chloride:			2200 ppb	ND<	1.0 ppb	
	lb/hr		2.93E-02	<	1.39E-04	>99.53
Chloroform:		ND<	210 ppb	ND<	0.5 ppb	
	lb/hr	<	3.93E-03	<	9.77E-05	NA
1,1,1 Trichloroethane:		ND<	200 ppb	ND<	0.5 ppb	
	lb/hr	<	4.19E-03	<	1.09E-04	NA
Carbon Tetrachloride:		ND<	420 ppb	ND<	1.0 ppb	
	lb/hr	<	1.01E-02	<	2.52E-04	NA
1,1-Dichloroethene:		ND<	210 ppb	ND<	0.5 ppb	
	lb/hr	<	3.19E-03	<	7.93E-05	NA
Trichloroethylene:			410 ppb	ND<	0.5 ppb	
	lb/hr		8.45E-03	<	1.08E-04	>98.73
Tetrachloroethylene:			900 ppb	ND<	0.5 ppb	
	lb/hr		2.34E-02	<	1.36E-04	>99.42
Chlorobenzene:		ND<	420 ppb	ND<	1.1 ppb	
	lb/hr	<	7.42E-03	<	2.03E-04	NA
Vinyl Chloride:			540	ND<	1.0 ppb	
	lb/hr		5.30E-03	<	1.02E-04	>98.07
o-Dichlorobenzene:		ND<	1100 ppb	ND<	2.6 ppb	
	lb/hr	<	2.54E-02	<	6.26E-04	NA
m-Dichlorobenzene:		ND<	1100 ppb	ND<	2.7 ppb	
	lb/hr	<	2.54E-02	<	6.50E-04	NA
p-Dichlorobenzene:		ND<	1100 ppb	ND<	2.7 ppb	
	lb/hr	<	2.54E-02	<	6.50E-04	NA
1,1-Dichloroethane:			290 ppb	ND<	0.5 ppb	
	lb/hr		4.50E-03	<	8.10E-05	>98.20
1,2-Dichloroethane:		ND<	210 ppb	ND<	0.5 ppb	
	lb/hr	<	3.26E-03	<	8.10E-05	NA
Benzene:			3000 ppb	ND<	0.3 ppb	
	lb/hr		3.68E-02	<	3.83E-05	>99.90
Toluene:			17000 ppb	ND<	1.1 ppb	
	lb/hr		2.46E-01	<	1.66E-04	>99.93
Ethyl Benzene:			6100	ND<	0.5	
	lb/hr		1.02E-01	<	8.69E-05	>99.91
o-Xylenes:			3500 ppb	ND<	0.5 ppb	
	lb/hr		5.83E-02	<	1.10E-05	>99.99
Methyl-Tert-Butyl-Ether:			240 ppb	ND<	0.5 ppb	
	lb/hr		3.32E-03	<	7.21E-05	>97.83
Acetonitrile:		ND<	5100 ppb	ND<	13 ppb	
	lb/hr	<	3.29E-02	<	8.73E-04	NA
Freon 11 (CCL3F):		ND<	410 ppb	ND<	1.0 ppb	
	lb/hr	<	8.84E-03	<	2.25E-04	NA
1,2-Dibromoethane:		ND<	1000 ppb	ND<	2.6 ppb	
	lb/hr	<	2.95E-02	<	7.99E-04	NA
1,3-Butadiene:		ND<	200 ppb	ND<	0.5 ppb	
	lb/hr	<	1.70E-03	<	4.43E-05	NA
cis-1,2-Dichloroethylene:			990 ppb	ND<	0.5 ppb	
	lb/hr		1.51E-02	<	7.93E-05	>99.47
Benzyl Chloride:		ND<	1100 ppb	ND<	2.7 ppb	
	lb/hr	<	2.19E-02	<	5.59E-04	NA
m+p-Xylene:			9300 ppb	ND<	1.1 ppb	
	lb/hr		1.55E-01	<	1.91E-04	>99.88

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-9
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 2
PUENTE HILLS LANDFILL FLARE No. 14
FEBRUARY 15, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		993 10,823			
Species	Inlet	Exhaust	Destruction Efficiency, %		
Methylene Chloride:		2400 ppb	ND<	1.0 ppb	
lb/hr		3.20E-02	<	1.45E-04	
Chloroform:	ND<	210 ppb	ND<	0.5 ppb	>99.55
lb/hr	<	3.94E-03	<	1.02E-04	
1,1,1 Trichloroethane:	ND<	200 ppb	ND<	0.5 ppb	NA
lb/hr	<	4.19E-03	<	1.14E-04	
Carbon Tetrachloride:	ND<	420 ppb	ND<	1.0 ppb	NA
lb/hr	<	1.01E-02	<	2.63E-04	
1,1-Dichloroethene:	ND<	210 ppb	ND<	0.5 ppb	NA
lb/hr	<	3.20E-03	<	8.29E-05	
Trichloroethylene:		450 ppb	ND<	0.5 ppb	NA
lb/hr		9.28E-03	<	1.12E-04	
Tetrachloroethylene:		910 ppb	ND<	0.5 ppb	>98.79
lb/hr		2.37E-02	<	1.42E-04	
Chlorobenzene:	ND<	420 ppb	ND<	1.1 ppb	>99.40
lb/hr	<	7.42E-03	<	2.12E-04	
Vinyl Chloride:		630	ND<	1.0 ppb	NA
lb/hr		6.18E-03	<	1.07E-04	
o-Dichlorobenzene:	ND<	1100 ppb	ND<	2.6 ppb	>98.27
lb/hr	<	2.54E-02	<	6.54E-04	
m-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	NA
lb/hr	<	2.54E-02	<	6.79E-04	
p-Dichlorobenzene:	ND<	1100 ppb	ND<	2.7 ppb	NA
lb/hr	<	2.54E-02	<	6.79E-04	
1,1-Dichloroethane:		310 ppb	ND<	0.5 ppb	NA
lb/hr		4.81E-03	<	8.47E-05	
1,2-Dichloroethane:	ND<	210 ppb	ND<	0.5 ppb	>98.24
lb/hr	<	3.26E-03	<	8.47E-05	
Benzene:		3300 ppb	ND<	0.3 ppb	NA
lb/hr		4.05E-02	<	4.01E-05	
Toluene:		16000 ppb	ND<	1.1 ppb	>99.90
lb/hr		2.31E-01	<	1.73E-04	
Ethyl Benzene:		5900	ND<	0.5	>99.93
lb/hr		9.83E-02	<	9.08E-05	
o-Xylenes:		3500 ppb	ND<	0.5 ppb	>99.91
lb/hr		5.83E-02	<	8.33E-06	
Methyl-Tert-Butyl-Ether:	ND<	200 ppb	ND<	0.5 ppb	>99.99
lb/hr	<	2.77E-03	<	7.54E-05	
Acetonitrile:	ND<	5100 ppb	ND<	13 ppb	NA
lb/hr	<	3.29E-02	<	9.13E-04	
Freon 11 (CCL3F):		430 ppb	ND<	1.0 ppb	NA
lb/hr		9.27E-03	<	2.35E-04	
1,2-Dibromoethane:	ND<	1000 ppb	ND<	2.6 ppb	>97.46
lb/hr	<	2.95E-02	<	8.36E-04	
1,3-Butadiene:	ND<	200 ppb	ND<	0.5 ppb	NA
lb/hr	<	1.70E-03	<	4.63E-05	
cis-1,2-Dichloroethylene:		990 ppb	ND<	0.5 ppb	NA
lb/hr		1.51E-02	<	8.30E-05	
Benzyl Chloride:	ND<	1100 ppb	ND<	2.7 ppb	>99.45
lb/hr	<	2.19E-02	<	5.85E-04	
m+p-Xylene:		8900 ppb	ND<	1.1 ppb	NA
lb/hr		1.48E-01	<	2.00E-04	
					>99.87

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

**TABLE 4-10
GENERAL RESULTS
PUENTE HILLS LANDFILL FLARE No. 15
FEBRUARY 14, 1996**

Parameter	INLET			EXHAUST		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	5.02	4.08	4.55	12.99	12.35	12.67
CO ₂ , %	29.9	32.1	31.0	7.26	7.91	7.59
N ₂ , %	25.9	22.9	24.4	79.8	79.7	79.7
H ₂ O, %	3.2	4.8	4.0	9.6	9.6	9.6
Flow Rate, dscfm	755	890	822	9,967	10,211	10,089
Temperature, °F	79	99	89	1,599	1,632	1,616
NO _x : ppm				15.1	16.0	15.5
ppm @ 3% O ₂				34.0	33.5	33.8
lb/hr (as NO ₂)				1.09	1.19	1.14
CO: ppm				2.3	5.2	3.8
ppm @ 3% O ₂				5.2	11.0	8.1
lb/hr				0.10	0.24	0.17
SO _x : ppm				11.2	11.4	11.3
ppm @ 3% O ₂				25.3	23.9	24.6
lb/hr (as SO ₂)				1.13	1.18	1.15
HC:						
CH ₄ ppm	393,000	349,000	371,000	ND<1.00	ND<1.00	ND<1.00
TGNMO ppm	3,190	3,230	3,210	ND<1.00	ND<1.00	ND<1.00
TGNMO ppm @ 3% O ₂	—	—	—	<2.26	<2.09	<2.18
TGNMO lb/hr (as CH ₄)	6.09	7.27	6.68	<0.03	<0.03	<0.03
Destruction Eff. %	—	—	—	>99.59	>99.64	>99.62
Particulate:						
Organic fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic fraction gr/dscf				0.0014	0.0016	0.0015
Total Particulate gr/dscf				0.0014	0.0016	0.0015
gr/dscf @3% O ₂				0.0031	0.0033	0.0032
gr/dscf @12% CO ₂				0.0023	0.0024	0.0023
lb/hr				0.117	0.139	0.128
Sulfur Compounds:						
H ₂ S, ppm	90	88	89			
Methyl Mercaptan, ppm	1.4	1.5	1.5			
Ethyl Mercaptan, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Dimethyl Sulfide, ppm	1.7	1.8	1.8			
Carbonyl Sulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Carbon Disulfide, ppm	ND< 1.1	ND< 1.1	ND< 1.1			
Dimethyl Disulfide, ppm	ND< 1.0	ND< 1.0	ND< 1.0			
Total Sulfur Compounds, ppm	93.1	91.3	92.2			

TABLE 4-11
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 1
PUEENTE HILLS LANDFILL FLARE No. 15
FEBRUARY 14, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		755 9,967				Destruction Efficiency, %
Species		Inlet		Exhaust		
Methylene Chloride:		2500 ppb	ND<	1.0 ppb		
lb/hr		2.54E-02	<	1.34E-04		>99.47
Chloroform:		210 ppb	ND<	0.5 ppb		
lb/hr	ND<	2.99E-03	<	9.41E-05		NA
1,1,1 Trichloroethane:		210 ppb	ND<	0.5 ppb		
lb/hr	<	3.35E-03	<	1.05E-04		>96.86
Carbon Tetrachloride:		420 ppb	ND<	1.0 ppb		
lb/hr	ND<	7.71E-03	<	2.42E-04		NA
1,1-Dichloroethene:		210 ppb	ND<	0.5 ppb		
lb/hr	ND<	2.43E-03	<	7.64E-05		NA
Trichloroethylene:		500 ppb	ND<	0.5 ppb		
lb/hr	<	7.84E-03	<	1.04E-04		>98.68
Tetrachloroethylene:		970 ppb	ND<	0.5 ppb		
lb/hr		1.92E-02	<	1.31E-04		>99.32
Chlorobenzene:		420 ppb	ND<	1.1 ppb		
lb/hr	ND<	5.64E-03	<	1.95E-04		NA
Vinyl Chloride:		870	ND<	1.0 ppb		
lb/hr	<	6.49E-03	<	9.85E-05		>98.48
o-Dichlorobenzene:		1100 ppb	ND<	2.6 ppb		
lb/hr	ND<	1.93E-02	<	6.02E-04		NA
m-Dichlorobenzene:		1100 ppb	ND<	2.7 ppb		
lb/hr	ND<	1.93E-02	<	6.26E-04		NA
p-Dichlorobenzene:		1100 ppb	ND<	2.7 ppb		
lb/hr	ND<	1.93E-02	<	6.26E-04		NA
1,1-Dichloroethane:		510 ppb	ND<	0.5 ppb		
lb/hr		6.03E-03	<	7.80E-05		>98.71
1,2-Dichloroethane:		210 ppb	ND<	0.5 ppb		
lb/hr	ND<	2.48E-03	<	7.80E-05		NA
Benzene:		3200 ppb	ND<	0.3 ppb		
lb/hr	<	2.98E-02	<	3.69E-05		>99.88
Toluene:		17000 ppb	ND<	1.1 ppb		
lb/hr		1.87E-01	<	1.60E-04		>99.91
Ethyl Benzene:		5500	ND<	0.5		
lb/hr		6.97E-02	<	8.36E-05		>99.88
o-Xylenes:		3000 ppb	ND<	0.5 ppb		
lb/hr		3.80E-02	<	6.34E-06		>99.98
Methyl-Tert-Butyl-Ether:		360 ppb	ND<	0.5 ppb		
lb/hr		3.79E-03	<	6.95E-05		>98.17
Acetonitrile:		5100 ppb	ND<	13 ppb		
lb/hr	ND<	2.50E-02	<	8.41E-04		NA
Freon 11 (CCL3F):		410 ppb	ND<	1.0 ppb		
lb/hr	ND<	6.73E-03	<	2.16E-04		NA
1,2-Dibromoethane:		1000 ppb	ND<	2.6 ppb		
lb/hr	ND<	2.24E-02	<	7.70E-04		NA
1,3-Butadiene:		200 ppb	ND<	0.5 ppb		
lb/hr	ND<	1.29E-03	<	4.26E-05		NA
cis-1,2-Dichloroethylene:		1100 ppb	ND<	0.5 ppb		
lb/hr		1.27E-02	<	7.64E-05		>99.40
Benzyl Chloride:		1100 ppb	ND<	2.7 ppb		
lb/hr	ND<	1.66E-02	<	5.39E-04		NA
m+p-Xylene:		8300 ppb	ND<	1.1 ppb		
lb/hr	<	1.05E-01	<	1.84E-04		>99.83

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-12
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS, TEST 2
PUENTE HILLS LANDFILL FLARE No. 15
FEBRUARY 14, 1996

Flow rate, Inlet dscfm Flow rate, Exhaust dscfm		890 10,211			
Species		Inlet	Exhaust		Destruction Efficiency, %
Methylene Chloride:					
lb/hr		2600 ppb	ND<	1.0 ppb	
		3.11E-02	<	1.37E-04	>99.56
Chloroform:					
lb/hr	ND<	210 ppb	ND<	0.5 ppb	
	<	3.53E-03	<	9.64E-05	NA
1,1,1 Trichloroethane:					
lb/hr		250 ppb	ND<	0.5 ppb	
		4.69E-03	<	1.08E-04	>97.70
Carbon Tetrachloride:					
lb/hr	ND<	420 ppb	ND<	1.0 ppb	
	<	9.09E-03	<	2.48E-04	NA
1,1-Dichloroethene:					
lb/hr	ND<	210 ppb	ND<	0.5 ppb	
	<	2.86E-03	<	7.82E-05	NA
Trichloroethylene:					
lb/hr		500 ppb	ND<	0.5 ppb	
		9.24E-03	<	1.06E-04	>98.85
Tetrachloroethylene:					
lb/hr		910 ppb	ND<	0.5 ppb	
		2.12E-02	<	1.34E-04	>99.37
Chlorobenzene:					
lb/hr	ND<	420 ppb	ND<	1.1 ppb	
	<	6.65E-03	<	2.00E-04	NA
Vinyl Chloride:					
lb/hr		730	ND<	1.0 ppb	
		6.42E-03	<	1.01E-04	>98.43
o-Dichlorobenzene:					
lb/hr	ND<	1100 ppb	ND<	2.6 ppb	
	<	2.27E-02	<	6.17E-04	NA
m-Dichlorobenzene:					
lb/hr	ND<	1100 ppb	ND<	2.7 ppb	
	<	2.27E-02	<	6.41E-04	NA
p-Dichlorobenzene:					
lb/hr	ND<	1100 ppb	ND<	2.7 ppb	
	<	2.27E-02	<	6.41E-04	NA
1,1-Dichloroethane:					
lb/hr		420 ppb	ND<	0.5 ppb	
		5.85E-03	<	7.99E-05	>98.63
1,2-Dichloroethane:					
lb/hr	ND<	210 ppb	ND<	0.5 ppb	
	<	2.92E-03	<	7.99E-05	NA
Benzene:					
lb/hr		3500 ppb	ND<	0.3 ppb	
		3.85E-02	<	3.78E-05	>99.90
Toluene:					
lb/hr		19000 ppb	ND<	1.1 ppb	
		2.46E-01	<	1.64E-04	>99.93
Ethyl Benzene:					
lb/hr		6500	ND<	0.5	
		9.71E-02	<	8.57E-05	>99.91
o-Xylenes:					
lb/hr		3600 ppb	ND<	0.5 ppb	
		5.38E-02	<	7.47E-06	>99.99
Methyl-Tert-Butyl-Ether:					
lb/hr		320 ppb	ND<	0.5 ppb	
		3.97E-03	<	7.12E-05	>98.21
Acetonitrile:					
lb/hr	ND<	5100 ppb	ND<	13 ppb	
	<	2.94E-02	<	8.62E-04	NA
Freon 11 (CCL3F):					
lb/hr	ND<	410 ppb	ND<	1.0 ppb	
	<	7.92E-03	<	2.22E-04	NA
1,2-Dibromoethane:					
lb/hr	ND<	1000 ppb	ND<	2.6 ppb	
	<	2.64E-02	<	7.89E-04	NA
1,3-Butadiene:					
lb/hr	ND<	200 ppb	ND<	0.5 ppb	
	<	1.52E-03	<	4.37E-05	NA
cis-1,2-Dichloroethylene:					
lb/hr		1100 ppb	ND<	0.5 ppb	
		1.50E-02	<	7.83E-05	>99.48
Benzyl Chloride:					
lb/hr	ND<	1100 ppb	ND<	2.7 ppb	
	<	1.96E-02	<	5.52E-04	NA
m+p-Xylene:					
lb/hr		9800 ppb	ND<	1.1 ppb	
		1.46E-01	<	1.89E-04	>99.87

ND< - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

10. Chung, M

3112-109-10



AIR MEASUREMENT SERVICES, INC

L01-005-FR

**EMISSIONS TESTS ON FLARES NO. 3, NO. 5, NO. 7 and No. 9
AT THE PUENTE HILLS LANDFILL**

MAY 1994

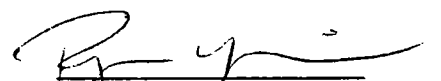
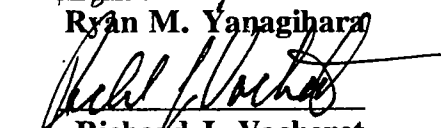
Prepared for:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Post Office Box 4998
Whittier, California 90607**

Prepared by:

**HORIZON AIR MEASUREMENT SERVICES, INC.
996 Lawrence Drive, Suite 108
Newbury Park, California 91320**

94 JUL 5 AM 9:55


Ryan M. Yanagihara

Richard J. Vacherot

MARTIN
Chung
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TABLE 5-1
Summary of Results - Flare No. 3
Puente Hills Landfill
May 9, 1994

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	132	130	131	1545	1529	1537
Moisture (%)	6.1	6.2	6.2	7.5	7.3	7.4
Flow Rate (acfm)*	1084	1283	1184	39212	37954	38583
(dscfm)	882	1046	964	9245	9030	9138
Fixed Gases						
Oxygen (%)	3.9	4.1	4.0	12.5	13.2	12.9
Carbon Dioxide (%)	32.5	32.2	32.4	7.3	6.7	7.0
EMISSIONS						
Oxides of Nitrogen						
ppm	---	---	---	14.8	13.1	14.0
ppm @ 3% O ₂	---	---	---	31.5	30.5	31.0
lb/hr	---	---	---	0.981	0.848	0.915
Carbon Monoxide						
ppm	---	---	---	0.6	1.3	1.0
ppm @ 3% O ₂	---	---	---	1.3	3.0	2.2
lb/hr	---	---	---	0.024	0.051	0.038
Particulate Matter						
organic fraction gr/dscf	---	---	---	0.0000	0.0000	0.0000
inorganic fraction, gr/dscf	---	---	---	0.0030	0.0016	0.0023
total, gr/dscf	---	---	---	0.0030	0.0016	0.0023
total, gr/dscf @ 3% O ₂	---	---	---	0.0064	0.0037	0.0051
Total, lb/hr	---	---	---	0.24	0.121	0.18
Hydrocarbons						
methane, ppm	441000	443000	442000	**	<1	<1
TNMHC, ppm (as CH ₄)	3340	3580	3460	**	4.36	4.36
TNMHC, lb/hr (as CH ₄)	7.45	9.47	8.46	**	0.100	0.100
destruction efficiency					98.9	98.9
Sulfur Compounds						
hydrogen sulfide (ppm)	65.0	68.0	66.5	---	---	---
total sulfur compounds (ppm as H ₂ S)	68.9	70.3	69.6	---	---	---
Oxides of Sulfur						
ppm	---	---	---	6.37	6.15	6.26
ppm @ 3% O ₂	---	---	---	11.88	12.65	12.27
lb/hr (as SO ₂)	---	---	---	0.559	0.528	0.544

* The inlet flow rate measurements have an accuracy of $\pm 10\%$ due to flow distribution at the sample location.
 ** For Flare #3, Run #1, the exhaust Tedlar bag sample was received flat by the laboratory.

TABLE 5-3
Summary of Results - Flare No. 7
Puente Hills Landfill
May 11, 1994

	LANDFILL GAS			FLARE EXHAUST		
	Run #1	Run #2	Avg.	Run #1	Run #2	Avg.
STACK GAS CHARACTERISTICS						
Temperature (°F)	194	120	120	1533	1594	1564
Moisture (%)	5.0	8.1	6.6	8.0	7.6	7.8
Flow Rate (acfm)*	840	852	846	31210	35200	33205
(dscfm)	707	692	700	7360	8089	7725
Fixed Gases						
Oxygen (%)	4.1	4.2	4.2	13.2	11.9	12.6
Carbon Dioxide (%)	32.7	32.0	32.4	6.6	7.7	7.2
EMISSIONS						
Oxides of Nitrogen						
ppm	---	---	---	13.4	16.0	14.7
ppm @ 3% O ₂	---	---	---	31.2	31.8	31.5
lb/hr	---	---	---	0.717	0.941	0.829
Carbon Monoxide						
ppm	---	---	---	1.4	1.8	1.6
ppm @ 3% O ₂	---	---	---	3.3	3.6	3.5
lb/hr	---	---	---	0.046	0.064	0.055
Particulate Matter						
organic fraction gr/dscf	---	---	---	0.0000	0.0000	0.0000
insoluble, gr/dscf	---	---	---	0.0008	0.0005	0.0007
total, gr/dscf	---	---	---	0.0008	0.0005	0.0007
total, gr/dscf @ 3% O ₂	---	---	---	0.0019	0.0010	0.0015
Total, lb/hr	---	---	---	0.05	0.04	0.05
Hydrocarbons						
methane, ppm	410000	434000	422000	<1	<1	<1
TNMHC, ppm (as CH ₄)	3170	3190	3180	4.60	8.70	6.7
TNMHC, lb/hr (as CH ₄)	5.67	5.59	5.63	0.086	0.178	0.132
destruction efficiency				98.5	96.8	97.7
Sulfur Compounds						
hydrogen sulfide (ppm)	74.0	73.0	73.5	---	---	---
total sulfur compounds (ppm as H ₂ S)	77.8	76.6	77.2	---	---	---
Oxides of Sulfur						
ppm	---	---	---	4.11	4.42	4.27
ppm @ 3% O ₂	---	---	---	9.55	8.79	9.17
lb/hr (as SO ₂)	---	---	---	0.287	0.340	0.314

* The inlet flow rate measurements have an accuracy of $\pm 10\%$ due to flow distribution at the sample location.

Table 5-5
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #3 - Run #1
May 9, 1994

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)			
Acetonitrile	< 5700	< 3.26E-02	< 5.7	< 3.41E-04	NA		
Benzene	3100	3.37E-02	< 0.1	< 1.14E-05	> 99.97		
Benzylchloride	< 2000	< 3.54E-02	< 2.0	< 3.71E-04	NA		
Chlorobenzene	< 220	< 3.47E-03	< 0.2	< 3.30E-05	NA		
Dichlorobenzenes	< 230	< 4.71E-03	< 0.2	< 4.29E-05	NA		
1,1-dichloroethane	830	1.15E-02	< 0.1	< 1.45E-05	> 99.87		
1,2-dichloroethane	< 210	< 2.90E-03	< 0.2	< 2.89E-05	NA		
1,1-dichloroethylene	180	2.43E-03	< 0.1	< 1.42E-05	> 99.42		
Dichloromethane	3000	3.56E-02	< 0.1	< 1.24E-05	> 99.97		
Perchloroethene	830	2.74E-02	< 0.2	< 6.92E-05	> 99.75		
Carbon tetrachloride	< 170	< 3.65E-03	< 0.2	< 4.50E-05	NA		
Toluene	23000	2.95E-01	0.7	9.41E-05	99.97		
1,1,1-trichloroethane	210	3.89E-03	< 0.1	< 2.72E-05	> 99.30		
Trichloroethene	480	8.77E-03	< 0.2	< 3.83E-05	> 99.56		
Chloroform	< 100	< 1.66E-03	< 0.1	< 1.74E-05	NA		
Vinyl Chloride	< 380	< 3.31E-03	< 0.4	< 3.65E-05	NA		
m xylenes	8400	1.24E-01	< 0.2	< 3.10E-05	> 99.98		
o+p xylene	6000	8.87E-02	< 0.2	< 3.10E-05	> 99.97		
TNMHC	3340000	7.45E+00	*	0.00E+00	*		

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

* Tedlar bag leaked on route to the laboratory.

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-7
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #5 - Run #1
May 10, 1994

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)		Concentration (ppb)	Emission Rate (lb/hr)		
Acetonitrile	< 5700	< 3.26E-02		< 5.7	< 3.41E-04		NA
Benzene	3700	4.02E-02		< 0.1	< 1.14E-05	>	99.97
Benzylchloride	< 2000	< 3.54E-02		< 0.0	< 0.00E+00		NA
Chlorobenzene	< 200	< 3.15E-03		< 0.2	< 3.30E-05		NA
Dichlorobenzenes	< 230	< 4.71E-03		< 0.2	< 4.29E-05		NA
1,1-dichloroethane	1000	1.38E-02		< 0.1	< 1.45E-05	>	99.90
1,2-dichloroethane	< 210	< 2.90E-03		< 0.2	< 2.89E-05		NA
1,1-dichloroethylene	< 110	< 1.49E-03		< 0.1	< 1.42E-05		NA
Dichloromethane	3700	4.39E-02		< 0.1	< 1.24E-05	>	99.97
Perchloroethene	1500	4.96E-02		< 0.2	< 6.92E-05	>	99.86
Carbon tetrachloride	< 170	< 3.65E-03		< 0.2	< 4.50E-05		NA
Toluene	32000	4.10E-01		1.1	1.48E-04		99.96
1,1,1-trichloroethane	290	5.38E-03		< 0.1	< 2.72E-05	>	99.49
Trichloroethene	530	9.68E-03		< 0.2	< 3.83E-05	>	99.60
Chloroform	< 100	< 1.66E-03		< 0.1	< 1.74E-05		NA
Vinyl Chloride	1000	8.71E-03		< 0.4	< 3.65E-05	>	98.90
m xylenes	13000	1.92E-01		< 0.2	< 3.10E-05	>	99.98
o+p xylene	10000	1.48E-01		< 0.2	< 3.10E-05	>	99.98
TNMHC	3300000	7.36E+00		6320.0	1.48E-01		98.72

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit

Table 5-9
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #7 - Run #1
May 11, 1994

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)		Concentration (ppb)	Emission Rate (lb/hr)		
Acetonitrile	< 5700	< 3.26E-02		< 5.7	< 3.41E-04		NA
Benzene	3800	4.13E-02		< 0.1	< 1.14E-05	>	99.97
Benzylchloride	0	0.00E+00		< 2.0	< 3.71E-04		NA
Chlorobenzene	< 220	< 3.47E-03		< 0.2	< 3.30E-05		NA
Dichlorobenzenes	< 230	< 4.71E-03		< 0.2	< 4.29E-05		NA
1,1-dichloroethane	1100	1.52E-02		< 0.1	< 1.45E-05	>	99.90
1,2-dichloroethane	< 210	< 2.90E-03		< 0.2	< 2.89E-05		NA
1,1-dichloroethylene	< 110	< 1.49E-03		< 0.1	< 1.42E-05		NA
Dichloromethane	3100	3.67E-02		< 0.1	< 1.24E-05	>	99.97
Perchloroethene	1300	4.30E-02		< 0.2	< 6.92E-05	>	99.84
Carbon tetrachloride	< 170	< 3.65E-03		< 0.2	< 4.50E-05		NA
Toluene	31000	3.98E-01		< 0.5	< 6.72E-05	>	99.98
1,1,1-trichloroethane	280	5.19E-03		< 0.1	< 2.72E-05	>	99.48
Trichloroethene	540	9.86E-03		< 0.2	< 3.83E-05	>	99.61
Chloroform	< 100	< 1.66E-03		< 0.1	< 1.74E-05		NA
Vinyl Chloride	480	4.18E-03		< 0.4	< 3.65E-05	>	99.13
m xylenes	12000	1.77E-01		< 0.2	< 3.10E-05	>	99.98
o+p xylene	8500	1.26E-01		< 0.2	< 3.10E-05	>	99.98
TNMHC	3170000	7.07E+00		4600.0	1.07E-01		98.72

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values

NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.

Table 5-11
Trace Organic Species Destruction Efficiency Results
LACSD - Puente Hills
Flare #9 - Run #1
May 12, 1994

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Acetonitrile	< 5700	< 3.26E-02	< 5.7	< 3.41E-04	NA
Benzene	2600	2.83E-02	0.5	5.70E-05	99.80
Benzylchloride	< 2000	< 3.54E-02	< 2.0	< 3.71E-04	NA
Chlorobenzene	< 440	< 6.93E-03	< 0.2	< 3.30E-05	NA
Dichlorobenzenes	< 230	< 4.71E-03	< 0.2	< 4.29E-05	NA
1,1-dichloroethane	1300	1.79E-02	< 0.1	< 1.45E-05	> 99.92
1,2-dichloroethane	< 210	< 2.90E-03	< 0.2	< 2.89E-05	NA
1,1-dichloroethylene	< 110	< 1.49E-03	< 0.1	< 1.42E-05	NA
Dichloromethane	3300	3.91E-02	< 0.1	< 1.24E-05	> 99.97
Perchloroethene	1300	4.30E-02	< 0.2	< 6.92E-05	> 99.84
Carbon tetrachloride	< 84	< 1.80E-03	< 0.2	< 4.50E-05	NA
Toluene	19000	2.44E-01	< 0.5	< 6.72E-05	> 99.97
1,1,1-trichloroethane	260	4.82E-03	< 0.1	< 2.72E-05	> 99.44
Trichloroethene	620	1.13E-02	< 0.2	< 3.83E-05	> 99.66
Chloroform	< 100	< 1.66E-03	< 0.1	< 1.74E-05	NA
Vinyl Chloride	1100	9.59E-03	< 0.4	< 3.65E-05	> 99.62
m xylenes	9300	1.37E-01	0.7	1.08E-04	99.92
o+p xylene	3200	4.73E-02	< 0.2	< 3.10E-05	> 99.93
TNMHC	3160000	7.05E+00	5850.0	1.37E-01	98.06

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values
NA: Not applicable-destruction efficiency cannot be calculated since both inlet and outlet are below the detection limit.



**EMISSIONS TESTING AT
PUENTE HILLS ENERGY RECOVERY
FROM LANDFILL GAS FACILITY**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICT
Whittier, California**

Prepared By:

S. M. Haythornthwaite

**ENERGY SYSTEMS ASSOCIATES
Tustin, California**

JANUARY 1990

ESR 47400-1182

PERG

Boiler

1/90

TABLE 4-1
COMPARISON OF RESULTS WITH PERMIT LIMITS

Parameter	Permit Limit	Boiler 300 Average	Boiler 400 Average
NO _x	24 ppm @ 3% O ₂ 288 lb/day	13.3 123.3	17.2 178.2
Hydrocarbons (Total NMHC as methane)	22 lb/day	29.9*	20.8*
CO	275 lb/day	13.3	64.8
SO ₂	179 lb/day	109.4	122.0
Particulate	240 lb/day	69.5	--

* HC values are from Table 4-9, "TCA Results: Tedlar Bags". These values were measured at the detection limit of the test, thus results were uncertain. Refer to discussion in Section 4.0.

TABLE 4-2
BOILER 300 STACK TEST RESULTS

Test No.	3-1	3-2	3-3	Average
Date	9/28/89	9/28/89	9/29/89	
Time	1830/1945	2120/2235	1005/1125	
Stack Gas:				
Flow rate, dscfm	59,616	58,121	61,138	59,625
Temperature, °F	356	348	377	360
H ₂ O, %	15.4	15.3	15.1	15.3
O ₂ , %	4.94	4.46	5.54	4.98
CO ₂ , %	14.6	15.0	14.0	14.5
N ₂ , % (by difference)	65.1	65.2	65.4	65.2
Total Particulate:				
gr/dscf	0.0108	0.0039	0.0023	0.0057
gr/dscf @ 3% O ₂	0.0121	0.0043	0.0026	0.0063
lb/day	132.5	46.8	29.0	69.4
NO _x ppm				
ppm @ 3% O ₂	13.7	12.2	9.7	11.9
lb/day	15.4	13.3	11.3	13.3
	142.6	123.8	103.5	123.3
CO ppm				
ppm @ 3% O ₂	2.2	2.3	1.8	2.1
lb/day	2.5	2.5	2.1	2.4
	13.9	14.2	11.7	13.3
SO ₂ ppm				
ppm @ 3% O ₂	8.0	7.8	6.9	7.6
lb/day	9.0	8.5	8.0	8.5
	115.8	110.1	102.4	109.4
HCl ppm				
ppm @ 3% O ₂	16.2	16.5	16.3	16.3
lb/day	18.2	18.0	19.0	18.4
	133.8	132.8	138.0	134.9

TABLE 4-3
BOILER 400 STACK TEST RESULTS

Test No.	4-1	4-2	4-3	Average
Date	9/28/89	9/28/89	9/28/89	
Time	1045/1145	1220/1320	1415/1515	
Stack Gas:				
Flow rate, dscfm	69,311	69,008	67,314	68,544
Temperature, °F	292	299	299	297
H ₂ O, %	15.2	15.1	16.9	15.7
O ₂ , %	5.40	5.40	5.48	5.44
CO ₂ , %	14.0	14.0	14.0	14.0
N ₂ , % (by difference)	65.4	65.6	63.6	64.8
NO _x ppm	13.9	15.0	15.8	14.9
ppm @ 3% O ₂	16.1	17.3	18.3	17.2
lb/day	168.2	180.7	185.6	178.2
CO ppm	7.8	9.8	9.1	8.9
ppm @ 3% O ₂	9.0	11.3	10.6	10.3
lb/day	57.4	71.9	65.1	64.8
SO ₂ ppm	7.2	7.2	7.6	7.3
ppm @ 3% O ₂	8.3	8.3	8.8	8.6
lb/day	121.2	120.7	124.2	122.0
HCl ppm	0.12*	5.3	12.3	8.8
ppm @ 3% O ₂	0.14	6.1	14.3	10.2
lb/day	1.2	50.7	114.7	82.7

* 4-1 HCl not included in averages due to sampling problems - see discussion in text

TABLE 4-4
TRACE ORGANICS HYDROCARBON RESULTS
October Results: Higher Detection Limits

Species	Inlet Gas ppb	Boiler 300 Stack ppb	Boiler 400 Stack ppb
Vinyl Chloride	1,500	ND <6	ND <6
Chloroethane	ND <2,500	ND <10	ND <10
1,1 Dichloroethane	7,800	ND <5	ND <5
Methylene Chloride (Dichloromethane)	12,500	46.5 ⁺	34 ⁺
1,1 Dichloroethane	2,650	ND <6	ND <6
1,2 Dichloroethane	ND <1,000	ND <5	ND <5
Chloroform (Trichloromethane)	ND <1,000	ND <5	ND <5
1,1,1 Trichloroethane	<1,100*	<6.3*	ND <5
Carbon Tetrachloride (Tetrachloromethane)	ND <1,000	ND <5	ND <5
Benzene	2,550	ND <7.5	ND <7.5
Trichloroethene (Trichloroethylene)	2,700	ND <6	ND <6
Toluene	67,000	73	44.5
1,1,2 Trichloroethane	ND <1,500	ND <7.5	ND <7.5
Tetrachloroethene (Tetrachloroethylene)	7,550	ND <7.5	ND <7.5
Dibromochloromethane	ND <1,550	ND <7.5	ND <7.5
Bromodichloromethane**	ND <1,000	ND <5	ND <5
1,2 Dibromoethane	ND <1,000	ND <5	ND <5
Chlorobenzene	ND <1,250	ND <6	ND <6
1,4- and 1,3-(p,m) Xylene	30,500	ND <10	<10.5*
1,2-(o) Xylene	7,850	ND <5	ND <5
Bromoform	ND <1,000	ND <5	ND <5
1,1,2,2 Tetrachloroethane	ND <2,000	ND <10	ND <10
Benzyl Chloride	ND <1,000	ND <5	ND <5
1,3-Dichlorobenzene	ND <1,500	ND <7.5	ND <7.5
1,4-Dichlorobenzene	ND <2,000	ND <10	ND <10
1,2-Dichlorobenzene	ND <2,500	ND <10	ND <10
Acetonitrile	ND <100	ND <100	ND <100

* This species was not detected in one of the samples. The number shown is the average of the detected value and the detection limit.

** Bromodichloromethane is reported in place of Dichlorobromoethane, which was requested in LACSD's RFP. The latter species is a typographical error, as discussed with Richard Koskela of LACSD.

⁺ Suspected contamination - see Section 4.0 for discussion.

TABLE 4-5
SUMMARY OF TRACE ORGANIC SPECIES
December Results: Lower Detection Limits

Species	Inlet Gas ppb	Boiler 300 Stack ppb	Boiler 400 Stack ppb
Vinyl Chloride	1,000	ND <0.4	ND <0.4
1,1 Dichloroethene	ND <200	ND <0.2	ND <0.2
Methylene Chloride (Dichloromethane)	6,000	<0.4*	ND <0.2
1,1 Dichloroethane	ND <200	ND <0.2	ND <0.2
1,2 Dichloroethane	ND <200	ND <0.2	ND <0.2
Chloroform (Trichloromethane)	ND <200	ND <0.2	ND <0.2
1,1,1 Trichloroethane	450	<0.5*	ND <0.2
Carbon Tetrachloride (Tetrachloromethane)	ND <400	ND <0.4	ND <0.4
Benzene	1,800	1.9	0.95
Trichloroethene (Trichloroethylene)	1,600	ND <0.2	ND <0.2
Toluene	40,000	5.0	2.8
Tetrachloroethene (Tetrachloroethylene)	3,850	ND <0.2	ND <0.2
1,2 Dibromoethane	ND <2,000	ND <2.0	ND <2.0
Chlorobenzene	ND <200	ND <0.2	ND <0.2
1,2- and 1,4- Xylene	7,950	ND <0.4	<1.5*
1,3- Xylene	9,750	ND <0.4	ND <0.4
Benzyl Chloride	ND <5,000	ND <5.0	ND <5.0
1,3-Dichlorobenzene	ND <400	ND <0.4	ND <0.4
1,2-and 1,4-Dichlorobenzene	ND <400	ND <0.4	ND <0.4
Acetonitrile	ND <5,000	9.5	<5.2*

* This species was not detected in one of the samples. The number shown is the average of the detected value and the detection limit.

TABLE 4-6
PARTICULATE LESS THAN 10 MICRONS IN DIAMETER (BOILER #300)

Test No.	3-4	3-5	3-6	Average
Date	9/29/89	9/29/89	10/1/89	
Time	1510/1830	1950/2250	1000/1300	
Stack Gas:				
Flow rate, dscfm	59,987	58,466	63,385	60,613
Temperature, °F	365	359	351	358
H ₂ O, %	14.8	13.3	14.9	14.3
CO ₂ , %	13.7	14.0	14.9	14.2
O ₂ , %	5.59	5.44	4.52	5.18
Particulate <10 microns in diameter				
Cutoff diameter, microns	12.30	12.64	12.13	12.36
gr/dscf	ND <.0006	ND <.0006	ND <.0006	ND <.0006
lb/day	ND <7.44	ND <7.20	ND <7.92	ND <7.52

TABLE 4-7
TRACE SULFUR SPECIES RESULTS

Compound	Inlet ppm	Boiler 300 Stack ppm	Boiler 400 Stack ppm
Hydrogen Sulfide	5.6	ND <.5	ND <.5
Methyl Mercaptan	1.15	ND <.5	ND <.5
Dimethyl Sulfide	3.1	ND <.5	ND <.5
Dimethyl Disulfide	---	ND <.5	ND <.5

*Not analyzed for.

TABLE 4-8
TCA RESULTS: TANKS AND TRAPS
(SCAQMD METHOD 25.1)

	Volatile HC ppm	Condensible HC ppm	CH ₄ ppm	CO ppm	CO ₂ %	O ₂ %
Boiler 300 Stack	4	99.5	4.5	3	12.4	6.4
Boiler 400 Stack*	30	122	2	2.5	10.5	7.8

* One sample only, other tank shows apparent contamination from previous inlet sample

TABLE 4-9
TCA RESULTS: TEDLAR BAGS
(SCAQMD DRAFT METHOD 25.2)

Date		Volatile HC ppm as methane	Total NMHC as methane lb/day	CH ₄	CO	CO ₂ %	O ₂ %
10/1/89	Inlet Gas	7,560	4,029	44.1%	<0.1%	33.0	3.0
	Boiler 300 Stack	10	36.2	4 ppm	3 ppm	14.4	5.6
	Boiler 400 Stack	5	20.8	2 ppm	2.5 ppm	12.3	7.2
11/6/89	Boiler 300 Stack	7	23.6	5 ppm	2.5 ppm	15.1	4.4

TABLE 4-10
METHANE AND NON-METHANE HYDROCARBONS RESULTS

Species	Inlet Gas ppm	Boiler 300 Stack ppm	Boiler 400 Stack ppm
Ethane	16.9	ND <1	ND <1
Iso-Propane	20.8	ND <1	ND <1
N-Propane	ND <1	ND <1	ND <1
Iso-Pentane	4.9	ND <1	ND <1
N-Pentane	3.7	ND <1	ND <1
Hexanes	4.7	ND <1	ND <1
Heptanes	15.5	ND <1	ND <1
Octanes	26.5	ND <1	ND <1

**EMISSIONS TESTS AT PUENTE HILLS
ENERGY RECOVERY FROM LANDFILL GAS FACILITY
SEPTEMBER, 1990**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

OCTOBER 1990

CR 80300-2221

9/18/90 10/90

TABLE 4-1
GENERAL RESULTS
BOILER NO. 300

PERG

Parameter	Fuel Gas			Stack Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	—	—	5.0	5.7	5.9	5.8
CO ₂ , (% Dry)	—	—	31.0	13.8	13.6	13.7
H ₂ O, (%)	6.3	6.7	6.5	15.2	15.0	15.1
Flow Rate (dscfm)	10,841	10,972	10,907	68,075	69,728	68,902
Temperature (°F)	—	—	—	294	301	298
NO _x :						
ppm	—	—	—	15.9	17.3	16.6
ppm @ 3% O ₂	—	—	—	18.7	20.6	19.7
lb/hr	—	—	—	7.88	8.78	8.33
CO:						
ppm	—	—	10.9	2.1	3.1	2.6
ppm @ 3% O ₂	—	—	—	2.5	3.7	3.1
lb/hr	—	—	—	0.63	0.96	0.80
HC:						
CH ₄ ppm	398,000	381,000	389,500	3.0	3.0	3.0
Total NMHC ppm	5,533	5,180	5,367	<1	<1	<1
as CH ₄						
Total NMHC as	6,784	6,530	6,657	<1	<1	<1
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	151.7	143.8	147.8	<0.17	<0.18	<0.18
Destruction Eff. %				>99.89	>99.88	>99.89
Particulate:						
Organic Fraction grains/DSCF				0.0000	0.0000	0.0000
Inorganic Fraction grains/DSCF				0.0039	0.0029	0.0034
Total Particulate grains/DSCF				0.0039	0.0029	0.0034
Total lb/hr				2.26	1.75	2.01
Sulfur Compounds						
H ₂ S, (ppm)			20			
Methyl Mercaptan (ppm)			1.4			
Ethyl Mercaptan (ppm)			0.2			
Dimethyl Sulfide (ppm)			2.4			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			0.2			

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
BOILER NO. 300

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	7,700 1.13×10^{-0}	ND <0.4 $<3.70 \times 10^{-4}$	>99.97
Chloroform, ppb lb/hr	ND <200 $<4.12 \times 10^{-2}$	ND <0.4 $<5.20 \times 10^{-4}$	N/A
1,1,1 trichloroethane, ppb lb/hr	620 1.43×10^{-1}	ND <0.4 $<5.81 \times 10^{-4}$	>99.59
Carbon Tetrachloride, ppb lb/hr	ND <200 5.31×10^{-2}	ND <0.4 6.70×10^{-4}	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 $<3.34 \times 10^{-2}$	ND <2 $<2.11 \times 10^{-3}$	N/A
Trichloroethylene, ppb lb/hr	1,300 2.95×10^{-1}	ND <0.4 $<5.73 \times 10^{-4}$	>99.81
Tetrachloroethylene, ppb lb/hr	2,900 8.29×10^{-1}	ND <0.4 $<7.23 \times 10^{-4}$	>99.91
Chlorobenzene, ppb lb/hr	ND <200 $<3.88 \times 10^{-2}$	ND <1 $<1.23 \times 10^{-3}$	N/A
Vinyl Chloride, ppb lb/hr	1,100 1.19×10^{-1}	ND <0.4 $<2.72 \times 10^{-4}$	>99.77
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<5.07 \times 10^{-2}$	ND <1 $<1.60 \times 10^{-3}$	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <200 $<5.07 \times 10^{-2}$	ND <1 $<1.60 \times 10^{-3}$	N/A
1,4-dichlorobenzene, ppb lb/hr	ND <200 $<5.07 \times 10^{-2}$	ND <1 $<1.60 \times 10^{-3}$	N/A
1,1-dichloroethane, ppb lb/hr	1,500 2.56×10^{-1}	ND <1 $<1.08 \times 10^{-3}$	>99.58

Continued

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
BOILER NO. 300

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 $<3.41 \times 10^{-2}$	ND <0.4 $<4.31 \times 10^{-4}$	N/A
Benzene, ppb lb/hr	5,300 7.14×10^{-1}	0.7 5.96×10^{-4}	99.92
Toluene, ppb lb/hr	61,000 9.80×10^{-9}	2.5 2.54×10^{-3}	99.97
Acetonitrile, ppb lb/hr	ND <5,000 $<3.54 \times 10^{-1}$	ND <2 $<8.94 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	31,700 5.80×10^{-9}	1.9 2.20×10^{-3}	99.96
1,2-dibromoethane, ppb lb/hr	ND <2,000 $<6.48 \times 10^{-1}$	ND <2 $<4.09 \times 10^{-3}$	N/A
Benzyl Chloride, ppb lb/hr	ND <1,000 $<2.18 \times 10^{-1}$	ND <5 $<6.89 \times 10^{-3}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSIONS TESTS AT PUENTE HILLS
ENERGY RECOVERY FROM LANDFILL GAS
FACILITY APRIL, 1991**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

Prepared By:

Edward J. Filadelfia

**CARNOT
Tustin, California**

APRIL 1991

CR 13900-2440

TABLE 4-1
BOILER NO. 300 RESULTS
LACSD/PERG
APRIL 2, 1991

Parameter	First Replicate	Second Replicate	Third Replicate	Average
O ₂ , (% dry)	6.1	6.0	6.2	6.1
CO ₂ , (% dry)	13.8	13.8	13.4	13.7
H ₂ O, (%)	14.3	13.5	14.4	14.1
Flowrate (dscfm)	65,800	67,800*	68,700	67,400
Temperature (°F)	315	322	329	322
HCl				
ppm	10.3	11.2	10.8	10.8
ppm @ 3% O ₂	12.5	13.5	13.2	13.1
lb/hr	3.8	4.2	4.1	4.0
HC				
CH ₄ ppm	8.8	2.2	2.0	4.3
Total NMHC as CH ₄ ppm	4.2	3.3	6.0	4.5
Total NMHC as CH ₄ ppm @ 3% O ₂	5.1	4.0	7.3	5.5
Total NMHC as CH ₄ lb/hr	0.70	0.57	1.04	0.77

* Average of first and third test results

TABLE 4-2
BOILER NO. 400 RESULTS
LACSD/PERG
APRIL 2, 1991

Parameter	First Replicate	Second Replicate	Third Replicate	Average
O ₂ , (% dry)	5.9	5.9	6.0	5.9
CO ₂ , (% dry)	13.4	13.4	13.3	13.4
H ₂ O, (%)	14.2	13.9	15.6	14.6
Flowrate (dscfm)	61,200	62,800*	63,400	62,500
Temperature (°F)	286	286	286	286
HC				
CH ₄ ppm	2.0	1.7	1.4	1.7
Total NMHC as CH ₄ ppm	9.0	4.1	1.8	5.0
Total NMHC as CH ₄ ppm @ 3% O ₂	10.7	4.9	2.2	5.9
Total NMHC as CH ₄ lb/hr	1.39	0.66	0.29	0.78

* Average of first and third test results

SECTION 5.0

LABORATORY RESULTS

Table 5-1 summarizes the laboratory results from ATMAA and Truesdail for Unit 300 and Unit 400.

TABLE 5-1
LABORATORY RESULTS METHOD 25.2
LACSD/PERG
APRIL 2, 1991

Test No.	Laboratory	Methane	Detection Limit ²	TGNMO ¹	Detection Limit ²
1-HC-300	ATMAA	8.84	0.5	4.23	1.0
2-HC-300	ATMAA	2.24	0.5	3.29	1.0
3-HC-300	Truesdail	2.0	1.0	6.0	3.0
4-HC-400	Truesdail	2.0	1.0	9.0	3.0
5-HC-400	ATMAA	1.71	0.5	4.10	1.0
6-HC-400	ATMAA	1.37	0.5	1.75	1.0

¹ Total gaseous non-methane organics

² Detection limit

**EMISSIONS TESTS ON THE PUENTE HILLS
ENERGY RECOVERY FROM LANDFILL GAS
(PERG) FACILITY-UNIT 400, AUGUST 1991**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

Prepared By:

Craig H. Fry

CARNOT
Tustin, California

SEPTEMBER 1991

DRAFT/19600-2609

8/22/91 9/91

CARNOT

TABLE 4-1
GENERAL RESULTS
PERG UNIT 400

Parameter	Fuel Gas			Exhaust Gas		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	3.9	—	3.9	6.2	6.2	6.2
CO ₂ , % dry	32.7	—	32.7	13.6	13.4	13.5
N ₂ , % dry	20.8	—	20.8	80.2	80.4	80.3
H ₂ O, %				15.3	15.5	15.4
Flow Rate dscfm	9,780	9,700	9,740	66,056	65,388	65,722
Temperature °F				302	317	310
NO _x :						
ppm				13.4	14.7	14.1
ppm @ 3% O ₂				16.3	17.9	17.1
lb/hr				6.44	6.99	6.71
CO:						
ppm				0.0	2.6	1.3
ppm @ 3% O ₂				0.0	3.2	1.6
lb/hr				0.00	0.75	0.38
HC:						
CH ₄ ppm	423,000	427,000	425,000	4.62	3.02	3.82
Total NMHC ppm	4,430	4,100	4,265	6.06	4.44	5.25
as CH ₄						
Total NMHC as	—	—	—	7.36	5.40	6.38
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr	109.60	100.60	105.10	1.01	0.73	0.87
as CH ₄						
NMHC Destruction Eff. %	—	—	—	99.08	99.27	99.17
Particulate:						
Organic Fraction grains/DSCF				0.0004	0.0006	0.0005
Inorganic Fraction grains/DSCF				0.0015	0.0005	0.0010
Total Particulate grains/DSCF				0.0019	0.0011	0.0015
Total lb/hr				1.09	0.62	0.86
Sulfur Compounds:						
H ₂ S, ppm	26	—	26			
Methyl Mercaptan ppm	1.3	—	1.3			
Ethyl Mercaptan ppm	ND<0.4	—	ND<0.4			
Dimethyl Sulfide ppm	1.8	—	1.8			
Carbonyl Sulfide ppm	ND<0.5	—	ND<0.5			
Carbon Disulfide ppm	ND<0.4	—	ND<0.4			

EMISSION RESULTS

TABLE 4-2
EXHAUST TRACE ORGANIC SPECIES RESULTS
PERG UNIT 400

Species	Test 1 Exhaust	Test 2 Exhaust	Average
Methylene Chloride, ppb lb/hr	ND <0.1 <8.87 x 10 ⁻⁵	ND <0.1 <8.87 x 10 ⁻⁵	ND <0.1 <8.87 x 10 ⁻⁵
Chloroform, ppb lb/hr	ND <0.1 <1.25 x 10 ⁻⁴	ND <0.1 <1.25 x 10 ⁻⁴	ND <0.1 <1.25 x 10 ⁻⁴
1,1,1 trichloroethane, ppb lb/hr	ND <0.1 <1.39 x 10 ⁻⁴	ND <0.1 <1.39 x 10 ⁻⁴	ND <0.1 <1.39 x 10 ⁻⁴
Carbon Tetrachloride, ppb lb/hr	ND <0.1 <1.61 x 10 ⁻⁴	ND <0.1 <1.61 x 10 ⁻⁴	ND <0.1 <1.61 x 10 ⁻⁴
1,1-dichloroethene, ppb lb/hr	ND <0.1 <1.01 x 10 ⁻⁴	ND <0.1 <1.01 x 10 ⁻⁴	ND <0.1 <1.01 x 10 ⁻⁴
Trichloroethylene, ppb lb/hr	ND <0.1 <1.37 x 10 ⁻⁴	ND <0.1 <1.37 x 10 ⁻⁴	ND <0.1 <1.37 x 10 ⁻⁴
Tetrachloroethylene, ppb lb/hr	ND <0.1 <1.73 x 10 ⁻⁴	ND <0.1 <1.73 x 10 ⁻⁴	ND <0.1 <1.73 x 10 ⁻⁴
Chlorobenzene, ppb lb/hr	ND <0.1 <1.18 x 10 ⁻⁴	ND <0.1 <1.18 x 10 ⁻⁴	ND <0.1 <1.18 x 10 ⁻⁴
Vinyl Chloride, ppb lb/hr	ND <0.2 <1.31 x 10 ⁻⁴	ND <0.2 <1.31 x 10 ⁻⁴	ND <0.2 <1.31 x 10 ⁻⁴
1,2-dichlorobenzene, ppb lb/hr	ND <0.2 <3.07 x 10 ⁻⁴	ND <0.2 <3.07 x 10 ⁻⁴	ND <0.2 <3.07 x 10 ⁻⁴
1,3 + 1,4-dichlorobenzene lb/hr	ND <0.2 <3.07 x 10 ⁻⁴	ND <0.2 <3.07 x 10 ⁻⁴	ND <0.2 <3.07 x 10 ⁻⁴
1,1-dichloroethane, ppb lb/hr	ND <0.1 <1.03 x 10 ⁻⁴	ND <0.1 <1.03 x 10 ⁻⁴	ND <0.1 <1.03 x 10 ⁻⁴

Continued

TABLE 4-2 (cont)
EXHAUST TRACE ORGANIC SPECIES RESULTS
SPERG

Species	Test 1 Exhaust	Test 2 Exhaust	Average
1,2-dichloroethane, ppb lb/hr	ND <0.1 <1.03 x 10 ⁻⁴	ND <0.1 <1.03 x 10 ⁻⁴	ND <0.1 <1.03 x 10 ⁻⁴
Benzene, ppb lb/hr	0.8 6.53 x 10 ⁻⁴	1.0 8.16 x 10 ⁻⁴	0.9 7.34 x 10 ⁻⁴
Toluene, ppb lb/hr	3.4 3.27 x 10 ⁻³	2.7 2.60 x 10 ⁻³	3.05 2.93 x 10 ⁻³
Acetonitrile, ppb lb/hr	ND <2 <8.57 x 10 ⁻⁴	ND <2 <8.57 x 10 ⁻⁴	ND <2 <8.57 x 10 ⁻⁴
Xylenes, ppb lb/hr	2.3 2.55 x 10 ⁻³	ND <0.6 <6.65 x 10 ⁻⁴	ND <1.45 <1.61 x 10 ⁻³
1,2-dibromoethane, ppb lb/hr	ND <0.4 <7.85 x 10 ⁻⁴	ND <0.4 <7.85 x 10 ⁻⁴	ND <0.4 <7.85 x 10 ⁻⁴
Benzyl Chloride, ppb lb/hr	ND <1 <1.32 x 10 ⁻³	ND <1 <1.32 x 10 ⁻³	ND <1 <1.32 x 10 ⁻³

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
TRACE HYDROCARBON DESTRUCTION EFFICIENCY

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	4,500 5.91×10^{-1}	ND <0.1 $<8.87 \times 10^{-5}$	>99.98
Chloroform, ppb lb/hr	ND <100 $<1.85 \times 10^{-2}$	ND <0.1 $<1.25 \times 10^{-4}$	N/A
1,1,1 trichloroethane, ppb lb/hr	300 6.19×10^{-2}	ND <0.1 $<1.39 \times 10^{-4}$	>99.77
Carbon Tetrachloride, ppb lb/hr	ND <100 $<2.38 \times 10^{-2}$	ND <0.1 $<1.61 \times 10^{-4}$	N/A
1,1-dichloroethene, ppb lb/hr	100 1.50×10^{-2}	ND <0.1 $<1.01 \times 10^{-4}$	N/A
Trichloroethylene, ppb lb/hr	1,500 3.05×10^{-1}	ND <0.1 $<1.37 \times 10^{-4}$	>99.95
Tetrachloroethylene, ppb lb/hr	2,200 5.64×10^{-1}	ND <0.1 $<1.73 \times 10^{-4}$	>99.97
Chlorobenzene, ppb lb/hr	200 3.48×10^{-2}	ND <0.1 $<1.18 \times 10^{-4}$	>99.66
Vinyl Chloride, ppb lb/hr	700 6.76×10^{-2}	ND <0.2 $<1.31 \times 10^{-4}$	>99.81
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<4.55 \times 10^{-2}$	ND <0.2 $<3.07 \times 10^{-4}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	200 $<4.55 \times 10^{-2}$	ND <0.2 $<3.07 \times 10^{-4}$	N/A
1,1-dichloroethane, ppb lb/hr	1,400 2.14×10^{-1}	ND <0.1 $<1.03 \times 10^{-4}$	>99.95

Continued

TABLE 4-3 (cont)
TRACE HYDROCARBON DESTRUCTION EFFICIENCY

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND < 100 < 1.53×10^{-2}	ND < 0.1 < 1.03×10^{-4}	N/A
Benzene, ppb lb/hr	4,300 5.19×10^{-1}	0.9 7.34×10^{-4}	99.86
Toluene, ppb lb/hr	44,000 6.27	3.1 2.98×10^{-3}	99.95
Acetonitrile, ppb lb/hr	ND < 2,000 < 1.27×10^{-1}	ND < 2 < 8.57×10^{-4}	N/A
Xylenes, ppb lb/hr	28,000 4.60	< 1.5 < 1.66×10^{-3}	> 99.96
1,2-dibromoethane, ppb lb/hr	ND < 400 < 1.16×10^{-1}	ND < 0.2 < 3.92×10^{-4}	N/A
Benzyl Chloride, ppb lb/hr	ND < 1,000 < 1.96×10^{-1}	ND < 1 < 1.32×10^{-3}	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**PRELIMINARY HYDROCARBON
MEASUREMENT COMPARISON TESTING AT
PUENTE HILLS ENERGY RECOVERY FROM
LANDFILL GAS FACILITY**

Prepared For:

LOS ANGELES COUNTY SANITATION DISTRICT
Whittier, California

Prepared By:

Craig H. Fry

CARNOT
Tustin, California

JULY 1992

TABLE 4-1
PRELIMINARY HYDROCARBON TEST RESULTS
PERG UNIT 300
JUNE 11 1992

Sampling Method	CH ₄ ppm	TGNMO ppm	Condensible NMO ppm	Total NMO ppm	Total NMO lb/hr
Stainless Steel Tanks					
Test 1	2.88	3.22	--	3.22	0.59
Test 2	3.70	6.20	--	6.20	1.13
Average	3.29	4.71	--	4.71	0.86
Stainless Steel Tanks with H ₂ O Knock Out					
Test 1	3.22	5.47	24.1	29.6	5.39
Test 2	3.17	5.64	23.4	29.0	5.29
Average	3.21	5.56	23.8	29.3	5.34
Stainless Steel Tanks and Traps (SCAQMD Method 25.1)					
Test 1	3.22	2.93	184	186.9	34.1
Test 2	3.19	3.65	170	173.7	31.7
Average	3.20	3.29	177	180.3	32.9
Tedlar Bags (SCAQMD Method 25.2)					
Test 1	2.84	2.64	--	2.64	0.48
Test 2	2.88	2.66	--	2.66	0.48
Average	2.86	2.65	--	2.65	0.48

Note: All nonmethane organics are calculated as methane.
TGNMO = Total gaseous nonmethane organics.
NMO = Nonmethane organics

TABLE 4-2
GENERAL EMISSION TEST RESULTS
PERG UNIT 300
JUNE 11, 1992

Parameter	Results
O ₂ , %	6.0
CO ₂ , %	13.6
H ₂ O, %	14.9
Stack Temperature, °F	295
Stack Flow Rate, dscfm	72052

**HYDROCARBON MEASUREMENT
COMPARISON TESTING AT PUENTE HILLS
ENERGY RECOVERY FROM LANDFILL GAS
FACILITY**

Prepared For:

LOS ANGELES COUNTY SANITATION DISTRICT
Whittier, California

Prepared By:

Craig H. Fry

CARNOT
Tustin, California

August 1992

TABLE 4-1
HYDROCARBON RESULTS
LACSD/PERG 300
JUNE 29-JULY 1, 1992

Test No.	Description	CH ₄ ppm	Volatile TGNMO ppm	Condensable TGNMO ppm	TGNMO ppm	TGNMO lb/hr
Test 1	Tank alone	1.72	26.9	---	26.9	3.96
Test 1	Tank w/H ₂ O knockout	1.79	40.2	29.1	69.3	10.2
Test 2	Tank alone	1.72	40.8	---	40.8	6.01
Test 2	Tank w/H ₂ O knockout	1.84	32.2	28.1	60.3	8.88
Test 3	Tank alone	1.74	24.5	---	24.5	3.61
Test 3	Tank w/H ₂ O knockout	1.73	36.5	33.9	70.4	10.4
Test 4	Tedlar bag	1.50	21.0	---	21.0	3.05
Test 4	Tank alone	1.59	34.3	---	34.3	4.98
Test 5	Tedlar bag	1.57	18.0	---	18.0	2.62
Test 5	Tank alone	1.73	28.1	---	28.1	4.08
Test 6	Tedlar bag	1.55	21.0	---	21.0	3.05
Test 6	Tank alone	1.94	29.2	---	29.2	4.24
Test 7	Tedlar bag	1.65	24.0	---	24.0	3.52
Test 7	Tank alone	1.66	25.8	---	25.8	3.78
Test 7	Tank w/H ₂ O knockout	1.60	28.4	32.6	61.0	8.95
Test 7	Tank and trap	1.68	9.14	250	259	38.0
Test 8	Tedlar bag	1.64	26.4	---	26.4	3.87
Test 8	Tank alone	1.58	25.0	---	25.0	3.67
Test 8	Tank w/H ₂ O knockout	1.52	28.9	28.5	57.4	8.42
Test 8	Tank and trap	1.62	11.3	113	124	18.2

Test numbers 1 through 6 were simultaneous with the SCAQMD.

All nonmethane organics are calculated as methane and use the average test date flow rate results.

TGNMO = Total gaseous nonmethane organics.

TABLE 4-2
INTERLABORATORY SAMPLE ANALYSIS
LACSD/PERG 300
JUNE 29, 1992

<u>SCAQMD's Sample</u>				
Test No.	Description	CH ₄ ppm	TGNMO ppm	H ₂ O* ug C/ml
Test 1	Tank alone	<1	9.95	
Test 1	Tank w/H ₂ O knockout	7.36	23.9	3.1
Test 2	Tank alone	<1	16.5	
Test 2	Tank w/H ₂ O knockout	<1	11.6	5.1

Note: The SCAQMD samples analyzed by AtmAA Inc. were analyzed two-and one-half months after the samples were taken.

*The total condensible organic carbon for these samples cannot be determined because the sample volume is not known.

TABLE 4-3
FLOW RATE MEASUREMENT RESULTS
LACSD/PERG 300
JUNE 29-JULY 1, 1992

Test No.	Hydrocarbon Test No.	Time	Date	O ₂ %	CO ₂ %	H ₂ O%	Flow Rate dscfm
1-H ₂ O		1125/1205	6/29/92	5.05	14.20	16.8	56910
2-H ₂ O		1630/1700	6/29/92	5.20	14.05	15.0	59550
Avg.	1,2,3		6/29/92	5.13	14.13	15.9	58230
3-H ₂ O		1015/1047	6/30/92	4.75	14.20	15.7	57470
4-H ₂ O		1420/1451	6/30/92	4.67	13.91	20.1	57430
Avg.	4,5,6		6/30/92	4.71	14.06	17.9	57450
5-H ₂ O		0835/0910	7/1/92	5.27	14.42	14.7	58060
6-H ₂ O		1525/1555	7/1/92	5.10	13.99	18.2	57890
Avg.	7,8		7/1/92	5.19	14.21	16.5	57980

The TGNMO lb/hr calculation use the average flow rate measurement for the day the hydrocarbon Test No. was conducts.

TABLE 4-1
GENERAL RESULTS
PERG BOILER UNIT 300
AUGUST 7, 1992

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.3	3.7	4.0	6.01	5.98	6.00
CO ₂ , % dry	30.7	30.3	30.5	13.53	13.63	13.58
N ₂ , % dry	23.8	21.6	22.7	80.46	80.39	80.43
H ₂ O, %	9.8	8.4	9.1	17.4	17.1	17.3
Flow Rate, dscfm	9646	9793	9720	66060	68920	67490
Temperature, °F				256	260	258
NO _x :						
ppm						
ppm at 3% O ₂				10.7	10.7	10.7
lb/hr (as NO ₂)				12.9	12.8	12.9
				5.14	5.36	5.25
CO:						
ppm						
ppm @ 3% O ₂				0.04	0.02	0.03
lb/hr				0.05	0.02	0.04
				0.012	0.006	0.009
HC:						
CH ₄ ppm	429000	432000	430500	1.55	1.66	1.61
Tot NMHC ppm (as CH ₄)	8300	3500	5900	7.27	8.47	7.87
Tot NMHC (as CH ₄) @ 3% O ₂	--	--	--	8.74	10.16	9.45
NMHC lb/hr (as CH ₄)	202.53	86.70	144.62	1.21	1.48	1.35
Destruction Eff. %	--	--	--	99.40	98.30	98.85
Particulate:						
Organic fraction gr/dscf				0.0000	0.0001	0.0001
Inorganic fraction gr/dscf				0.0035	0.0039	0.0037
Total Particulate gr/dscf				0.0035	0.0040	0.0038
gr/dscf @ 3% O ₂				0.0042	0.0048	0.0045
lb/hr				1.97	2.37	2.17
Sulfur Compounds:						
H ₂ S, ppm	40	41	40.5			
Methyl Mercaptan, ppm	ND<1.0	ND<1.0	ND<1.0			
Ethyl Mercaptan, ppm	ND<1.0	ND<1.0	ND<1.0			
Dimethyl Sulfide, ppm	2.0	2.3	2.2			
Carbonyl Sulfide, ppm	ND<1.0	ND<1.0	ND<1.0			
Carbon Disulfide, ppm	ND<1.0	ND<1.0	ND<1.0			
Total Sulfur Compounds, ppm	< 47.0	< 48.3	< 47.7			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT #300 TEST 1, AUGUST 7, 1992

Flow rate, inlet dscfm 9646			
Flow rate, exhaust dscfm 66060			
Species	Inlet	Exhaust	Destruction Efficiency,
methylene chloride:	5800 ppb	1.2 ppb	99.86
lb/hr	7.51×10^{-1}	1.06×10^{-3}	
chloroform:	ND < 400 ppb	ND < 0.4 ppb	NA
lb/hr	$< 7.28 \times 10^{-2}$	$< 4.99 \times 10^{-4}$	
1,1,1 trichloroethane:	600 ppb	0.4 ppb	99.54
lb/hr	1.22×10^{-1}	5.57×10^{-4}	
carbon tetrachloride:	ND < 200 ppb	ND < 0.2 ppb	NA
lb/hr	$< 4.69 \times 10^{-2}$	$< 3.21 \times 10^{-4}$	
1,1-dichloroethene:	ND < 200 ppb	ND < 0.2 ppb	NA
lb/hr	$< 2.96 \times 10^{-2}$	$< 2.02 \times 10^{-4}$	
trichloroethylene:	1200 ppb	ND < 0.2 ppb	> 99.89
lb/hr	2.40×10^{-1}	$< 2.74 \times 10^{-4}$	
tetrachloroethylene:	2300 ppb	ND < 0.2 ppb	> 99.94
lb/hr	5.82×10^{-1}	$< 3.46 \times 10^{-4}$	
chlorobenzene:	ND < 400 ppb	ND < 0.4 ppb	NA
lb/hr	$< 6.87 \times 10^{-2}$	$< 4.70 \times 10^{-4}$	
vinyl chloride:	1100 ppb	ND < 0.4 ppb	> 99.75
lb/hr	1.05×10^{-1}	$< 2.61 \times 10^{-4}$	
1,2-dichlorobenzene:	ND < 200 ppb	ND < 0.2 ppb	NA
lb/hr	$< 4.48 \times 10^{-2}$	$< 3.07 \times 10^{-4}$	
1,3+1,4-dichlorobenzene:	400 ppb	ND < 0.2 ppb	> 99.66
lb/hr	8.97×10^{-2}	$< 3.07 \times 10^{-4}$	
1,1-dichloroethane:	1600 ppb	ND < 0.2 ppb	> 99.91
lb/hr	2.41×10^{-1}	$< 2.07 \times 10^{-4}$	
1,2-dichloroethane:	ND < 200 ppb	ND < 0.2 ppb	NA
lb/hr	$< 3.02 \times 10^{-2}$	$< 2.07 \times 10^{-4}$	
benzene:	6600 ppb	0.5 ppb	99.95
lb/hr	7.86×10^{-1}	4.08×10^{-4}	
toluene:	37000 ppb	2.2 ppb	99.96
lb/hr	5.20×10^0	2.12×10^{-3}	
acetonitrile:	ND < 2000 ppb	ND < 2.0 ppb	NA
lb/hr	$< 1.25 \times 10^{-1}$	$< 8.57 \times 10^{-4}$	
xylenes:	27000 ppb	ND < 0.4 ppb	> 99.99
lb/hr	4.37×10^0	$< 4.44 \times 10^{-4}$	
1,2-dibromoethane:	ND < 7000 ppb	ND < 7.0 ppb	NA
lb/hr	$< 2.01 \times 10^0$	$< 1.37 \times 10^{-2}$	
benzyl chloride:	ND < 5000 ppb	ND < 5.0 ppb	NA
lb/hr	$< 9.65 \times 10^{-1}$	$< 6.61 \times 10^{-3}$	

ND < indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT #300 TEST 2, AUGUST 7, 1992

Flow rate, inlet dscfm 9646			
Flow rate, exhaust dscfm 66060			
Species	Inlet	Exhaust	Destruction Efficiency
methylene chloride:	6300 ppb	ND < 0.2 ppb	
lb/hr	8.16×10^{-1}	$< 1.77 \times 10^{-4}$	
chloroform:	ND < 400 ppb	ND < 0.4 ppb	> 99.98
lb/hr	$< 7.28 \times 10^{-2}$	$< 4.99 \times 10^{-4}$	
1,1,1 trichloroethane:	600 ppb	0.3 ppb	NA
lb/hr	1.22×10^{-1}	4.18×10^{-4}	
carbon tetrachloride:	ND < 200 ppb	ND < 0.2 ppb	99.66
lb/hr	4.69×10^{-2}	$< 3.21 \times 10^{-4}$	
1,1-dichloroethene:	ND < 200 ppb	ND < 0.2 ppb	NA
lb/hr	$< 2.96 \times 10^{-2}$	$< 2.02 \times 10^{-4}$	
trichloroethylene:	1300 ppb	ND < 0.2 ppb	NA
lb/hr	2.61×10^{-1}	$< 2.74 \times 10^{-4}$	
tetrachloroethylene:	2500 ppb	ND < 0.2 ppb	> 99.89
lb/hr	6.32×10^{-1}	$< 3.46 \times 10^{-4}$	
chlorobenzene:	ND < 400 ppb	ND < 0.4 ppb	> 99.95
lb/hr	$< 6.87 \times 10^{-2}$	$< 4.70 \times 10^{-4}$	
vinyl chloride:	880 ppb	ND < 0.4 ppb	NA
lb/hr	8.39×10^{-2}	$< 2.61 \times 10^{-4}$	
1,2-dichlorobenzene:	ND < 200 ppb	ND < 0.2 ppb	> 99.69
lb/hr	$< 4.48 \times 10^{-2}$	$< 3.07 \times 10^{-4}$	
1,3+1,4-dichlorobenzene:	600 ppb	ND < 0.2 ppb	NA
lb/hr	$< 1.35 \times 10^{-1}$	$< 3.07 \times 10^{-4}$	
1,1-dichloroethane:	1800 ppb	ND < 0.2 ppb	> 99.77
lb/hr	2.72×10^{-1}	$< 2.07 \times 10^{-4}$	
1,2-dichloroethane:	ND < 200 ppb	ND < 0.2 ppb	> 99.92
lb/hr	$< 3.02 \times 10^{-2}$	$< 2.07 \times 10^{-4}$	
benzene:	6800 ppb	0.5 ppb	NA
lb/hr	8.10×10^{-1}	4.08×10^{-4}	
toluene:	41000 ppb	1.5 ppb	99.95
lb/hr	5.76×10^0	1.44×10^{-3}	
acetonitrile:	ND < 2000 ppb	ND < 2.0 ppb	99.97
lb/hr	$< 1.25 \times 10^{-1}$	$< 8.57 \times 10^{-4}$	
xylenes:	30000 ppb	< 0.5 ppb	NA
lb/hr	4.86×10^0	$< 5.54 \times 10^{-4}$	
1,2-dibromoethane:	ND < 7000 ppb	ND < 7.0 ppb	> 99.99
lb/hr	$< 2.01 \times 10^0$	$< 1.37 \times 10^{-2}$	
benzyl chloride:	ND < 5000 ppb	ND < 5.0 ppb	NA
lb/hr	$< 9.65 \times 10^{-1}$	$< 6.61 \times 10^{-3}$	

ND < indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

**EMISSION TESTS ON THE PUENTE HILLS
ENERGY FROM LANDFILL GAS (PERG)
FACILITY - UNIT 400, SEPTEMBER 1993**

Prepared For:

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

CARNOT
Tustin, California

NOVEMBER 1993

TABLE 4-1
GENERAL RESULTS - PERG UNIT NO. 400
SEPTEMBER 29, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.03	3.79	3.91	5.22	5.12	5.17
CO ₂ , % dry	31.6	31.8	31.7	14.11	14.17	14.14
N ₂ , % dry	23.2	22.4	22.8	80.7	80.7	80.7
H ₂ O, %	6.0	7.4	6.7	15.9	16.1	16.0
Flow Rate, dscfm	11,000	10,740	10,870	69,460	70,080	69,770
Temperature, °F				319	326	323
NO _x :						
ppm				17.8	16.7	17.3
ppm @ 3% O ₂				20.3	18.9	19.6
lb/hr (as NO ₂)				8.99	8.51	8.75
CO:						
ppm				10.9	8.2	9.6
ppm @ 3% O ₂				12.4	9.3	10.9
lb/hr				3.35	2.54	2.95
SO ₂ :						
ppm				16.4	15.0	15.7
ppm @ 3% O ₂				18.7	17.0	17.9
lb/hr (as SO ₂)				11.5	10.6	11.1
HC:						
CH ₄ , ppm	429,000	432,000	430,500	1.13	1.04	1.09
TGNMO ppm	5,940	6,450	6,195	ND<2	ND<2	ND<2
TGNMO @ 3% O ₂	--	--	--	<2.3	<2.3	<2.3
TGNMO lb/hr (as CH ₄)	165.29	175.24	170.26	<0.35	<0.35	<0.35
Destruction Eff. %	--	--	--	>99.8	>99.8	>99.8
Particulate:						
Organic Fraction gr/dscf				0.0001	0.0003	0.0002
Inorganic Fraction gr/dscf				0.0078	0.0044	0.0061
Total Particulate gr/dscf				0.0079	0.0047	0.0063
gr/dscf @ 3% O ₂				0.0090	0.0053	0.0072
lb/hr				4.72	2.83	3.78
Sulfur Compounds:						
H ₂ S, ppm	64	63	64			
Methyl Mercaptan, ppm	1.7	1.8	1.8			
Ethyl Mercaptan, ppm	ND>0.96	ND>0.96	ND>0.96			
Dimethyl Sulfide, ppm	1.8	1.8	1.8			
Carbonyl Sulfide, ppm	ND<0.77	ND<0.77	ND<0.77			
Carbon Disulfide, ppm	ND<0.96	ND<0.96	ND<0.96			
Dimethyl Disulfide, ppm	ND<0.98	ND<0.98	ND<0.98			
Total Sulfur Compounds, ppm	<73.11	<72.21	<72.66			

Handwritten notes:
 Inlet
 Exhaust
 500 ppm
 13 ppm
 6% O₂
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TABLE 4-2
SCAQMD MODIFIED METHOD 25.1 TEST RESULTS
PERG BOILER EXHAUST
SEPTEMBER 29, 1993

Parameter	First Run	Second Run	Average
Flow Rate, dscfm	69,470	70,080	69,775
HYDROCARBONS, VOLATILE:			
CH ₄ , ppm	1.13	1.04	1.09
TANK TGNMO, ppm	ND < 2	ND < 2	ND < 2
TGNMO lb/hr (as CH ₄)	0.00	0.00	0.00
TANK VOL. liters	9.670	9.671	
INITIAL PRESS. mm Hg	523	502	
BAROMETRIC PRESS. mm Hg	737.5	737.5	
CORR. TANK VOL cu ft.	0.2421	0.2324	
H ₂ O KNOCK-OUT ANALYSIS RESULTS			
Sample Vol. ml			
VOC µg/ml	18.2	21	
IC µg/ml	0.00	0.34	0.17
TC µg/ml	25.52	15.49	20.51
	26.08	15.83	20.96
H ₂ O KNOCK-OUT EXHAUST CONCENTRATION			
VOC ppm	0.0	2.1	1.07
IC ppm	133.6	97.5	115.6
TC ppm	136.5	99.6	118.1

Note: TC = VOC + IC

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TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT NO. 400, TEST NO. 1
SEPTEMBER 29, 1993

Flow rate, Inlet dscfm	11,000		
Flow rate, Exhaust dscfm	69,640		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	5400 ppb 7.98×10^{-1}	0.3 ppb 2.81×10^{-4}	99.96
Chloroform: lb/hr	ND < 100 ppb $< 2.08 \times 10^{-2}$	ND < 0.1 ppb $< 1.31 \times 10^{-4}$	NA
1,1,1-Trichloroethane: lb/hr	340 ppb 7.89×10^{-2}	ND < 0.1 ppb $< 1.47 \times 10^{-4}$	> 99.81
Carbon Tetrachloride: lb/hr	ND < 100 ppb $< 2.68 \times 10^{-2}$	ND < 0.1 ppb $< 1.69 \times 10^{-4}$	NA
1,1-Dichloroethene: lb/hr	ND < 210 ppb $< 3.54 \times 10^{-2}$	ND < 0.2 ppb $< 2.13 \times 10^{-4}$	NA
Trichloroethylene: lb/hr	700 ppb 1.60×10^{-1}	ND < 0.1 ppb $< 1.45 \times 10^{-4}$	> 99.91
Tetrachloroethylene: lb/hr	1700 ppb 4.90×10^{-1}	ND < 0.2 ppb $< 3.65 \times 10^{-4}$	> 99.93
Chlorobenzene: lb/hr	ND < 220 ppb $< 4.31 \times 10^{-2}$	ND < 0.2 ppb $< 2.48 \times 10^{-4}$	NA
Vinyl Chloride: lb/hr	ND < 500 ppb $< 5.43 \times 10^{-2}$	ND < 0.4 ppb $< 2.75 \times 10^{-4}$	> 99.49
m-Dichlorobenzene: lb/hr	ND < 230 ppb $< 5.88 \times 10^{-2}$	ND < 0.2 ppb $< 3.24 \times 10^{-4}$	NA
o+p Dichlorobenzene: lb/hr	500 ppb 1.28×10^{-1}	ND < 0.2 ppb $< 3.24 \times 10^{-4}$	> 99.75
1,1-Dichloroethane: lb/hr	1300 ppb 2.24×10^{-1}	ND < 0.1 ppb $< 1.09 \times 10^{-4}$	> 99.95
1,2-Dichloroethane: lb/hr	ND < 110 ppb $< 1.89 \times 10^{-2}$	ND < 0.1 ppb $< 1.09 \times 10^{-4}$	NA
Benzene: lb/hr	4600 ppb 6.25×10^{-1}	1.5 ppb 1.29×10^{-3}	99.79

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(continued)

TABLE 4-3 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT NO. 400, TEST NO. 1
SEPTEMBER 29, 1993

Flow rate, Inlet dscfm	11,000			
Flow rate, Exhaust dscfm	69,640			
Species	Inlet	Exhaust	Destruction Efficiency, %	
Toluene:	33000 ppb	3.7 ppb		
lb/hr	5.29×10	3.75×10^{-3}	99.93	
Acetonitrile:	ND < 2300 ppb	ND < 2.3 ppb		
lb/hr	$< 1.64 \times 10^{-1}$	$< 1.04 \times 10^{-3}$	NA	
m-Xylenes:	15000 ppb	0.9 ppb		
lb/hr	2.77×10	1.05×10^{-3}	99.96	
o+p Xylenes:	12000 ppb	0.9 ppb		
lb/hr	2.22×10	1.05×10^{-3}	99.95	
1,2-Dibromoethane:	ND < 2900 ppb	ND < 2.9 ppb		
lb/hr	$< 9.48 \times 10^{-1}$	$< 6.00 \times 10^{-3}$	NA	
Benzyl Chloride:	ND < 1000 ppb	ND < 1.0 ppb		
lb/hr	$< 2.20 \times 10^{-1}$	$< 1.39 \times 10^{-3}$	NA	

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-4
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT NO. 400, TEST NO. 2
SEPTEMBER 29, 1993

Flow rate, Inlet dscfm	11,000		
Flow rate, Exhaust dscfm	69,640		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	5800 ppb	0.3 ppb	
lb/hr	8.57×10^{-1}	2.81×10^{-4}	99.97
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 2.08 \times 10^{-2}$	$< 1.31 \times 10^{-4}$	NA
1,1,1-trichloroethane:	360 ppb	ND < 0.1 ppb	
lb/hr	8.35×10^{-2}	$< 1.47 \times 10^{-4}$	> 99.82
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 2.68 \times 10^{-2}$	$< 1.69 \times 10^{-4}$	NA
1,1-dichloroethene:	ND < 210 ppb	ND < 0.2 ppb	
lb/hr	$< 3.54 \times 10^{-2}$	$< 2.13 \times 10^{-4}$	NA
Trichloroethylene:	670 ppb	ND < 0.1 ppb	
lb/hr	1.53×10^{-1}	$< 1.45 \times 10^{-4}$	> 99.91
Tetrachloroethylene:	1600 ppb	ND < 0.2 ppb	
lb/hr	4.61×10^{-1}	$< 3.65 \times 10^{-4}$	> 99.92
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 4.31 \times 10^{-2}$	$< 2.48 \times 10^{-4}$	NA
Vinyl Chloride:	560 ppb	ND < 0.4 ppb	
lb/hr	6.09×10^{-2}	$< 2.75 \times 10^{-4}$	> 99.55
m-dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	
lb/hr	$< 5.88 \times 10^{-2}$	$< 3.24 \times 10^{-4}$	NA
o+p dichlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 5.62 \times 10^{-2}$	$< 3.24 \times 10^{-4}$	NA
1,1-dichloroethane:	1300 ppb	ND < 0.1 ppb	
lb/hr	2.24×10^{-1}	$< 1.09 \times 10^{-4}$	> 99.95
1,2-dichloroethane:	ND < 110 ppb	ND < 0.1 ppb	
lb/hr	$< 1.89 \times 10^{-2}$	$< 1.09 \times 10^{-4}$	NA
Benzene:	4200 ppb	2.0 ppb	
lb/hr	5.71×10^{-1}	1.72×10^{-3}	99.70

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

(continued)

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-4 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT NO. 400, TEST NO. 2
SEPTEMBER 29, 1993

Flow rate, Inlet dscfm	11,000		
Flow rate, Exhaust dscfm	69,640		
Species	Inlet	Exhaust	Destruction Efficiency, %
Toluene:	30000 ppb	3.9 ppb	
lb/hr	4.81×10	3.96×10^{-3}	99.92
Acetonitrile:	ND < 2300 ppb	ND < 2.3 ppb	
lb/hr	$< 1.64 \times 10^{-1}$	$< 1.04 \times 10^{-3}$	NA
m-xylenes:	13000 ppb	ND < 0.2 ppb	
lb/hr	2.40×10	$< 2.34 \times 10^{-4}$	> 99.99
o+p xylenes:	11000 ppb	0.7 ppb	
lb/hr	2.03×10	8.18×10^{-4}	99.96
1,2-dibromoethane:	ND < 2900 ppb	ND < 2.9 ppb	
lb/hr	$< 9.48 \times 10^{-1}$	$< 6.00 \times 10^{-3}$	NA
Benzyl Chloride:	ND < 1000 ppb	ND < 1.0 ppb	
lb/hr	$< 2.20 \times 10^{-1}$	$< 1.39 \times 10^{-3}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSION TESTS ON THE PUENTE HILLS
ENERGY FROM LANDFILL GAS (PERG)
FACILITY - UNIT 300, NOVEMBER 1994**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

DECEMBER 1994

TABLE 4-1
GENERAL RESULTS - PERG UNIT NO. 300
NOVEMBER 17, 1994

Parameter	First Run	INLET		Average	EXHAUST GAS		
		Second Run			First Run	Second Run	Average
O ₂ , % dry	5.41	5.56		5.49	6.09	6.12	6.11
CO ₂ , % dry	28.8	28.2		28.5	13.41	13.38	13.40
N ₂ , % dry	27.6	28.1		27.9	80.5	80.5	80.5
H ₂ O, %	4.3	4.7		4.5	13.3	12.2	12.8
Flow Rate, dscfm	11530	11240		11390	74840	79540	77190
Temperature, °F					302	301	302
NO _x :							
ppm					16.2	15.3	15.8
ppm @ 3% O ₂					19.6	18.5	19.1
lb/hr (as NO _x)					8.82	8.85	8.83
CO:							
ppm					0.1	0.1	0.1
ppm @ 3% O ₂					0.1	0.1	0.1
lb/hr					0.03	0.04	0.03
SO _x :							
ppm					13.6	4.2	8.9
ppm @ 3% O ₂					16.4	5.1	10.8
lb/hr (as SO _x)					10.30	3.38	6.84
HC:							
CH ₄ ppm	418,000	428,000		423,000	1.64	1.66	1.65
Condensable Organics, ppm					1.34	19.1	10.2
TGNMO ppm (Tank Portion)	4,220	4,310		4,265	9.10	5.56	7.33
TGNMO lb/hr (as CH ₄)	123.06	122.60		122.83	1.72	1.12	1.42
Destruction Eff. %	—	—		—	98.6	99.1	98.8
Particulate:							
Organic Fraction gr/dscf					0.0000	0.0000	0.0000
Inorganic Fraction gr/dscf					0.0020	0.0044	0.0032
Total Particulate gr/dscf					0.0020	0.0044	0.0032
gr/dscf @ 3% O ₂					0.0024	0.0053	0.0039
lb/hr					1.276	3.006	2.141
Sulfur Compounds:							
H ₂ S, ppm	73	72		73			
Methyl Mercaptan, ppm	1.3	1.4		1.4			
Ethyl Mercaptan, ppm	ND < 1.1	ND < 1.1		ND < 1.1			
Dimethyl Sulfide, ppm	1.7	1.7		1.7			
Carbonyl Sulfide, ppm	ND < 1.1	ND < 1.1		ND < 1.1			
Carbon Disulfide, ppm	ND < 1.1	ND < 1.1		ND < 1.1			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0		ND < 1.0			
Total Sulfur Compounds, ppm	< 82.4	< 81.5		< 82.0			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT NO. 300, TEST NO. 1
NOVEMBER 17, 1994

Flow rate, Inlet dscfm	11,528		
Flow rate, Exhaust dscfm	74,840		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	2600 ppb	ND < 0.4 ppb	
lb/hr	4.03×10^{-1}	$< 4.02 \times 10^{-4}$	99.90
Chloroform:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	$< 2.18 \times 10^{-2}$	$< 2.83 \times 10^{-4}$	NA
1,1,1-Trichloroethane:	270 ppb	ND < 0.2 ppb	
lb/hr	6.57×10^{-2}	$< 3.16 \times 10^{-4}$	> 99.52
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	$< 2.80 \times 10^{-2}$	$< 3.64 \times 10^{-4}$	NA
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.4 ppb	
lb/hr	$< 3.71 \times 10^{-2}$	$< 4.59 \times 10^{-4}$	NA
Trichloroethylene:	510 ppb	ND < 0.2 ppb	
lb/hr	1.22×10^{-1}	$< 3.11 \times 10^{-4}$	> 99.75
Tetrachloroethylene:	1300 ppb	ND < 0.4 ppb	
lb/hr	3.93×10^{-1}	$< 7.85 \times 10^{-4}$	> 99.80
Chlorobenzene:	250 ppb	ND < 0.4 ppb	
lb/hr	5.13×10^{-2}	$< 5.33 \times 10^{-4}$	> 98.96
Vinyl Chloride:	780 ppb	ND < 0.4 ppb	
lb/hr	8.89×10^{-2}	$< 2.96 \times 10^{-4}$	> 99.67
o-Dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 1.13 \times 10^{-1}$	$< 1.39 \times 10^{-3}$	NA
m-Dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 1.13 \times 10^{-1}$	$< 1.39 \times 10^{-3}$	NA
p-Dichlorobenzene:	440 ppb	ND < 0.8 ppb	
lb/hr	1.18×10^{-1}	$< 1.39 \times 10^{-3}$	> 98.82
1,1-Dichloroethane:	860 ppb	ND < 0.4 ppb	
lb/hr	1.55×10^{-1}	$< 4.86 \times 10^{-4}$	> 99.70
1,2-Dichloroethane:	ND < 210 ppb	ND < 0.4 ppb	
lb/hr	$< 3.79 \times 10^{-2}$	$< 4.68 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(continued)

TEST RESULTS

TABLE 4-2 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT NO. 300, TEST NO. 1
NOVEMBER 17, 1994

Flow rate, Inlet dscfm	11,528			
Flow rate, Exhaust dscfm	74,840			
Species		Inlet	Exhaust	Destruction Efficiency, %
Benzene:		3500 ppb	ND < 0.4 ppb	
lb/hr		4.98×10^{-1}	$< 3.70 \times 10^{-4}$	99.93
Toluene:		26000 ppb	ND < 0.8 ppb	
lb/hr		4.37	$< 8.72 \times 10^{-4}$	99.98
Acetonitrile:		ND < 5100 ppb	ND < 5.1 ppb	
lb/hr		$< 3.82 \times 10^{-1}$	$< 2.48 \times 10^{-3}$	NA
o-Xylenes:		6100 ppb	ND < 0.4 ppb	
lb/hr		1.18	$< 5.02 \times 10^{-4}$	99.96
m+p Xylenes:		15000 ppb	ND < 0.8 ppb	
lb/hr		2.90	$< 1.00 \times 10^{-3}$	99.97
1,2-Dibromoethane:		ND < 210 ppb	ND < 0.4 ppb	
lb/hr		$< 7.19 \times 10^{-2}$	$< 8.89 \times 10^{-4}$	NA
Benzyl Chloride:		ND < 420 ppb	ND < 0.8 ppb	
lb/hr		$< 9.69 \times 10^{-2}$	$< 1.20 \times 10^{-3}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT NO. 300, TEST NO. 2
NOVEMBER 17, 1994

Flow rate, Inlet dscfm	11,245		
Flow rate, Exhaust dscfm	79,540		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	2500 ppb	ND < 0.4 ppb	
lb/hr	3.78×10^{-1}	$< 4.27 \times 10^{-4}$	99.89
Chloroform:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	$< 2.12 \times 10^{-2}$	$< 3.00 \times 10^{-4}$	NA
1,1,1-trichloroethane:	270 ppb	0.2 ppb	
lb/hr	6.40×10^{-2}	3.36×10^{-4}	> 99.48
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	$< 2.74 \times 10^{-2}$	$< 3.87 \times 10^{-4}$	NA
1,1-dichloroethene:	ND < 210 ppb	ND < 0.4 ppb	
lb/hr	$< 3.62 \times 10^{-2}$	$< 4.88 \times 10^{-4}$	NA
Trichloroethylene:	510 ppb	ND < 0.2 ppb	
lb/hr	1.19×10^{-1}	$< 3.30 \times 10^{-4}$	> 99.72
Tetrachloroethylene:	1100 ppb	ND < 0.4 ppb	
lb/hr	3.24×10^{-1}	$< 8.34 \times 10^{-4}$	> 99.74
Chlorobenzene:	210 ppb	ND < 0.4 ppb	
lb/hr	4.20×10^{-2}	$< 5.66 \times 10^{-4}$	> 98.65
Vinyl Chloride:	820 ppb	ND < 0.4 ppb	
lb/hr	9.11×10^{-2}	$< 3.14 \times 10^{-4}$	> 99.65
o-dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 1.10 \times 10^{-1}$	$< 1.48 \times 10^{-3}$	NA
m-dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 1.10 \times 10^{-1}$	$< 1.48 \times 10^{-3}$	NA
p-dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	$< 1.10 \times 10^{-1}$	$< 1.48 \times 10^{-3}$	NA
1,1-dichloroethane:	830 ppb	ND < 0.4 ppb	
lb/hr	1.46×10^{-1}	$< 4.98 \times 10^{-4}$	> 99.66
1,2-dichloroethane:	ND < 210 ppb	ND < 0.4 ppb	
lb/hr	$< 3.69 \times 10^{-2}$	$< 4.98 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

(continued)

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT NO. 300, TEST NO. 2
NOVEMBER 17, 1994

Flow rate, Inlet dscfm	11,245			
Flow rate, Exhaust dscfm	79,540			
Species	Inlet	Exhaust	Destruction Efficiency, %	
Benzene:	3200 ppb	ND < 0.4 ppb		
lb/hr	4.44×10^{-1}	< 3.93×10^{-4}	> 99.91	
Toluene:	22000 ppb	ND < 0.8 ppb		
lb/hr	3.60	< 9.27×10^{-4}	> 99.97	
Acetonitrile:	ND < 5100 ppb	ND < 5.1 ppb		
lb/hr	< 3.72×10^{-1}	< 2.63×10^{-3}	NA	
o-xylenes:	4700 ppb	ND < 0.4 ppb		
lb/hr	8.87×10^{-1}	< 5.34×10^{-4}	> 99.94	
m+p xylenes:	13000 ppb	ND < 0.8 ppb		
lb/hr	2.45	< 1.07×10^{-3}	> 99.96	
1,2-dibromoethane:	ND < 210 ppb	ND < 0.4 ppb		
lb/hr	< 7.01×10^{-2}	< 9.45×10^{-4}	NA	
Benzyl Chloride:	ND < 420 ppb	ND < 0.8 ppb		
lb/hr	< 9.45×10^{-2}	< 1.27×10^{-3}	NA	

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSION TEST RESULTS ON THE
PUENTE HILLS ENERGY FROM
LANDFILL GAS (PERG) FACILITY -
UNIT 300, NOVEMBER 20, 1995**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California**

Prepared By:

**Craig H. Fry
John A. Furlong, R.E.A.**

**CARNOT
Tustin, California**

JANUARY 1996

PERG 11-95

**TABLE 4-1
GENERAL TEST RESULTS
PERG UNIT 300
NOVEMBER 20, 1995**

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	5.09	4.48	4.79	5.52	5.58	5.55
CO ₂ , % dry	28.5	29.6	29.1	13.63	13.60	13.62
N ₂ , % dry	27.5	25.4	26.4	80.8	80.8	80.8
H ₂ O, %	4.1	6.1	5.1	15.2	15.5	15.3
Flow Rate, dscfm	10,845	10,614	10,755	64,847	67,122	65,984
Temperature, °F				303	313	308
NO _x :						
ppm						
ppm @ 3% O ₂				17.1	16.3	16.7
lb/hr (as NO ₂)				19.9	19.1	19.5
				8.06	7.97	8.01
CO:						
ppm						
ppm @ 3% O ₂				7.1	7.0	7.0
lb/hr				8.2	8.1	8.2
				2.03	2.07	2.05
HC:						
CH ₄ ppm	409,000	337,000	373,000	ND < 1.0	ND < 1.0	ND < 1.0
TGNMO ppm	3,350	3,020	3,185	1.54	ND < 1.3	< 1.42
TGNMO ppm @ 3% O ₂	—	—	—	1.79	< 1.52	< 1.66
TGNMO lb/hr (as CH ₄)	92.33	81.09	86.71	0.25	< 0.22	< 0.24
Destruction Eff. %	—	—	—	99.73	> 99.73	> 99.73
Particulate:						
Organic Fraction gr/dscf				0.0001	0.0000	0.0000
Inorganic Fraction gr/dscf				0.0051	0.0037	0.0044
Total Particulate gr/dscf				0.0052	0.0037	0.0045
gr/dscf @ 3% O ₂				0.0061	0.0043	0.0052
gr/dscf @ 12% CO ₂				0.0045	0.0033	0.0039
lb/hr				2.863	2.133	2.498
Sulfur Compounds:						
H ₂ S, ppm	100	120	110			
Methyl Mercaptan, ppm	1.6	1.7	1.7			
Ethyl Mercaptan, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Sulfide, ppm	1.4	1.5	1.5			
Carbonyl Sulfide, ppm	1.2	1.1	1.2			
Carbon Disulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	104.2	124.3	114.4			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT 300, TEST NO. 1
NOVEMBER 20, 1995

Flow rate, Inlet dscfm		10,895	
Flow rate, Exhaust dscfm		64,847	
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	1600 ppb	1.6 ppb	
lb/hr	2.34×10^{-1}	1.39×10^{-3}	99.40
Chloroform:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	$< 4.32 \times 10^{-2}$	$< 6.12 \times 10^{-4}$	NA
1,1,1 Trichloroethane:	ND < 410 ppb	ND < 1.0 ppb	
lb/hr	$< 9.42 \times 10^{-2}$	$< 1.37 \times 10^{-3}$	N/A
Carbon Tetrachloride:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	$< 5.57 \times 10^{-2}$	$< 7.89 \times 10^{-4}$	NA
1,1-Dichloroethene:	ND < 410 ppb	ND < 1.0 ppb	
lb/hr	$< 6.85 \times 10^{-2}$	$< 9.94 \times 10^{-4}$	NA
Trichloroethylene:	610 ppb	ND < 1.1 ppb	
lb/hr	1.38×10^{-1}	$< 1.48 \times 10^{-3}$	> 98.93
Tetrachloroethylene:	1600 ppb	ND < 0.5 ppb	
lb/hr	4.57×10^{-1}	$< 8.50 \times 10^{-4}$	> 99.81
Chlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 8.14 \times 10^{-2}$	$< 1.27 \times 10^{-3}$	NA
Vinyl Chloride:	730	ND < 1.0 ppb	
lb/hr	7.86×10^{-2}	$< 6.41 \times 10^{-4}$	> 99.18
m-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 1.06 \times 10^{-1}$	$< 1.66 \times 10^{-3}$	NA
o- Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 1.06 \times 10^{-1}$	$< 1.66 \times 10^{-3}$	NA
p-Dichlorobenzene:	ND < 420 ppb	ND < 1.1 ppb	
lb/hr	$< 1.06 \times 10^{-1}$	$< 1.66 \times 10^{-3}$	NA
1,1-Dichloroethane:	440 ppb	ND < 1.0 ppb	
lb/hr	7.50×10^{-2}	$< 1.01 \times 10^{-3}$	> 98.65
1,2-Dichloroethane:	ND < 210 ppb	ND < 0.5 ppb	
lb/hr	$< 3.58 \times 10^{-2}$	$< 5.07 \times 10^{-4}$	> 98.58

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-2 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT 300, TEST NO. 1
NOVEMBER 20, 1995

Flow rate, Inlet dscfm		10,895		
Flow rate, Exhaust dscfm		64,847		
Species		Inlet	Exhaust	Destruction Efficiency, %
Benzene:		3300 ppb	0.8 ppb	
	lb/hr	4.44×10^{-1}	6.41×10^{-4}	99.86
Toluene:		16000 ppb	2.6 ppb	
	lb/hr	$2.54 \times 10^{+0}$	2.46×10^{-3}	99.90
Acetonitrile:	ND <	5100 ppb	ND < 12 ppb	
	lb/hr	< 3.61×10^{-1}	< 5.05×10^{-3}	NA
o-Xylenes:		5300 ppb	ND < 0.5 ppb	
	lb/hr	9.69×10^{-1}	< 5.44×10^{-4}	> 99.94
m + p Xylenes:		12000 ppb	ND < 1.1 ppb	
	lb/hr	$2.19 \times 10^{+0}$	< 1.20×10^{-3}	> 99.95
1,2-Dibromoethane:	ND <	2100 ppb	ND < 5.2 ppb	
	lb/hr	< 6.80×10^{-1}	< 1.00×10^{-2}	NA
Benzyl Chloride:	ND <	1100 ppb	ND < 2.7 ppb	
	lb/hr	< 2.40×10^{-1}	< 3.50×10^{-3}	NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT 300, TEST NO. 2
NOVEMBER 20, 1995

Flow rate, Inlet dscfm		10,614		
Flow rate, Exhaust dscfm		67,122		
Species		Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:		1400 ppb	ND <	1.0 ppb
lb/hr		2.00×10^{-1}	<	9.01×10^{-4}
Chloroform:	ND <	210 ppb	ND <	0.5 ppb
lb/hr	<	4.21×10^{-2}	<	6.33×10^{-4}
1,1,1 Trichloroethane:	ND <	410 ppb	ND <	1.0 ppb
lb/hr	<	9.18×10^{-2}	<	1.42×10^{-3}
Carbon Tetrachloride:	ND <	210 ppb	ND <	0.5 ppb
lb/hr	<	5.42×10^{-2}	<	8.16×10^{-4}
1,1-Dichloroethene:	ND <	410 ppb	ND <	1.0 ppb
lb/hr	<	6.67×10^{-2}	<	1.03×10^{-3}
Trichloroethylene:		510 ppb	ND <	1.1 ppb
lb/hr		1.12×10^{-1}	<	1.53×10^{-3}
Tetrachloroethylene:		1200 ppb	ND <	0.5 ppb
lb/hr		3.34×10^{-1}	<	8.80×10^{-4}
Chlorobenzene:	ND <	420 ppb	ND <	1.1 ppb
lb/hr	<	7.93×10^{-2}	<	1.31×10^{-3}
Vinyl Chloride:		930 ppb	ND <	1.0 ppb
lb/hr		9.75×10^{-2}	<	6.63×10^{-4}
m-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb
lb/hr	<	1.04×10^{-1}	<	1.72×10^{-3}
o-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb
lb/hr	<	1.04×10^{-1}	<	1.72×10^{-3}
p-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb
lb/hr	<	1.04×10^{-1}	<	1.72×10^{-3}
1,1-Dichloroethane:	ND <	400 ppb	ND <	1.0 ppb
lb/hr	<	6.64×10^{-2}	<	1.05×10^{-3}
1,2-Dichloroethane:	ND <	210 ppb	ND <	0.5 ppb
lb/hr	<	3.49×10^{-2}	<	5.25×10^{-4}

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-3 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
PERG UNIT 300, TEST NO. 2
NOVEMBER 20, 1995

Flow rate, Inlet dscfm		10,614			
Flow rate, Exhaust dscfm		67,122			
Species		Inlet		Exhaust	Destruction Efficiency, %
Benzene:		2800 ppb		0.8 ppb	
lb/hr		3.67×10^{-1}		6.63×10^{-4}	99.82
Toluene:		14000 ppb		1.9 ppb	
lb/hr		$2.16 \times 10^{+0}$		1.86×10^{-3}	99.91
Acetonitrile:	ND <	5100 ppb	ND <	12 ppb	
lb/hr	<	3.51×10^{-1}	<	5.23×10^{-3}	NA
o-Xylenes:		4000 ppb	ND <	0.5 ppb	
lb/hr		7.13×10^{-1}	<	5.63×10^{-4}	> 99.92
m+p Xylenes:		9900 ppb	ND <	1.1 ppb	
lb/hr		$1.76 \times 10^{+0}$	<	1.24×10^{-3}	> 99.93
1,2-Dibromoethane:	ND <	2100 ppb	ND <	5.2 ppb	
lb/hr	<	6.62×10^{-1}	<	1.04×10^{-2}	NA
Benzyl Chloride:	ND <	1100 ppb	ND <	2.7 ppb	
lb/hr	<	2.34×10^{-1}	<	3.63×10^{-3}	NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

07/90

TABLE 4-1
GENERAL RESULTS
NATCO TURBINE

PH
July 90

Parameter	Fuel Gas	Flare Exhaust		
		Replicate	Replicate	Average
O ₂ , (% Dry)	4.6	15.9	15.6	15.8
CO ₂ , (% Dry)	31.4	4.5	4.5	4.5
H ₂ O, (%)	--	7.4	5.6	6.5
Flow Rate (dscfm)	1,398	20,213	20,617	20,415
Temperature (°F)	--	972	981	977
NO _x :				
ppm	--	10.8	10.4	10.6
ppm @ 3% O ₂	--	40.6	38.4	39.5
lb/hr	--	1.59	1.56	1.58
CO:				
ppm	19.6	433	442	438
ppm @ 3% O ₂	--	1,520	1,466	1,493
lb/hr	--	38.74	40.34	39.54
HC:				
CH ₄ ppm	438,000	23.8	23.6	23.7
Total NMHC ppm	40,148	6.3	3.1	4.7
as CH ₄				
Total NMHC as	44,089	22.6	10.5	16.6
CH ₄ ppm @ 3% O ₂				
Total NMHC lb/hr as CH ₄	142.0	0.32	0.16	0.24
Destruction Eff. %				99.82
Particulate:				
Organic Fraction grains/DSCF	--	0.0000	0.0000	0.0000
Inorganic Fraction grains/DSCF	--	0.0038	0.0040	0.0039
Total Particulate grains/DSCF	--	0.0038	0.0040	0.0039
Total lb/hr	--	0.66	0.71	0.69
Sulfur Compounds				
H ₂ S, (ppm)	2.4			
Methyl Mercaptan (ppm)	1.2			
Ethyl Mercaptan (ppm)	0.2			
Dimethyl Sulfide (ppm)	1.6			
Carbonyl Sulfide (ppm)	0.2			
Carbon Disulfide (ppm)	0.2			

Condensibles
Included
from
Proportion

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	5,100 5.13×10^{-2}	ND <0.2 2.37×10^{-5}	>99.95
Chloroform, ppb lb/hr	ND <200 2.83×10^{-3}	ND <0.2 3.33×10^{-5}	N/A
1,1,1 trichloroethane, ppb lb/hr	900 1.42×10^{-2}	ND <0.2 3.72×10^{-5}	>99.74
Carbon Tetrachloride, ppb lb/hr	ND <200 3.64×10^{-3}	ND <0.2 4.29×10^{-5}	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 2.30×10^{-3}	ND <0.4 5.40×10^{-5}	>98.65
Trichloroethylene, ppb lb/hr	2,300 3.58×10^{-2}	ND <0.2 3.66×10^{-5}	>99.90
Tetrachloroethylene, ppb lb/hr	4,100 8.05×10^{-2}	ND <0.3 6.93×10^{-5}	99.91
Chlorobenzene, ppb lb/hr	ND <400 5.33×10^{-3}	ND <0.4 6.27×10^{-4}	N/A
Vinyl Chloride, ppb lb/hr	2,400 1.78×10^{-2}	ND <0.2 1.74×10^{-5}	>99.90
1,2-dichlorobenzene, ppb lb/hr	ND <400 6.96×10^{-3}	ND <0.2 4.10×10^{-5}	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <400 6.96×10^{-3}	ND <0.2 4.10×10^{-5}	N/A
1,4-dichlorobenzene, ppb lb/hr	1,300 2.26×10^{-2}	ND <0.2 4.10×10^{-5}	>99.82
1,1-dichloroethane, ppb lb/hr	1,700 1.99×10^{-2}	ND <0.2 2.76×10^{-5}	>99.86

Continued

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 2.34×10^{-3}	ND <0.2 5.76×10^{-5}	N/A
Benzene, ppb lb/hr	2,200 2.03×10^{-2}	4.7 5.12×10^{-4}	(97.49) 96.8
Toluene, ppb lb/hr	4,200 4.63×10^{-2}	2.7 3.50×10^{-4}	(99.24) 99.06
Acetonitrile, ppb lb/hr	ND <5,000 2.43×10^{-2}	ND <5 2.86×10^{-4}	N/A
Xylenes, ppb lb/hr	29,000 3.65×10^{-1}	1.3 1.92×10^{-4}	(99.95) 99.93
1,2-dibromoethane, ppb lb/hr	ND <1,000 2.22×10^{-2}	ND <1 2.62×10^{-4}	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 3.00×10^{-2}	ND <2 3.53×10^{-4}	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because both inlet and outlet concentration is below detection limits.

AF FIVE

**EMISSION TESTS ON THE
SOLAR TURBINE AT PUENTE HILLS LANDFILL
DECEMBER 1990**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICT
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

FEBRUARY 1991

CR 85100-2357

TABLE 4-1
GENERAL RESULTS
SOLAR TURBINE

12/90

PH

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	4.3	4.8	4.6	16.4	16.4	16.4
CO ₂ , (% Dry)	31.0	32.0	31.5	4.2	4.2	4.2
H ₂ O, (%)	—	—	—	5.2	5.3	5.3
Flow Rate (dscfm)	1,751	—	1,751	30,160	29,863	30,012
Temperature (°F)	—	—	—	810	817	814
NO _x :						
ppm	—	—	—	20.4	20.2	20.3
ppm @ 3% O ₂	—	—	—	81.1	80.4	80.7
lb/hr	—	—	—	4.47	4.39	4.43
CO:						
ppm	—	—	—	31.3	30.5	30.9
ppm @ 3% O ₂	—	—	—	124.5	121.3	122.9
lb/hr	—	—	—	4.18	4.03	4.11
HC:						
CH ₄ ppm	410,000	400,000	405,000	2.0	2.0	2.0
Total NMHC ppm as CH ₄	3,700	2,500	3,100	10.0	9.0	9.5
Total NMHC as CH ₄ ppm @ 3% O ₂	—	—	—	39.8	35.8	37.8
Total NMHC lb/hr as CH ₄	16.39	11.07	13.73	0.76	0.68	0.72
Destruction Eff. %				95.4	93.9	94.7
Particulate:						
Inorganic Fraction grains/DSCF				0.0025	0.0008	0.0017
Organic Fraction grains/DSCF				0.0000	0.0000	0.0000
Total Particulate grains/DSCF				0.0025	0.0008	0.0017
Total lb/hr				0.65	0.20	0.43
Sulfur Compounds						
H ₂ S, (ppm)			18			
Methyl Mercaptan (ppm)			1.2			
Ethyl Mercaptan (ppm)			0.2			
Dimethyl Sulfide (ppm)			2.0			
Carbonyl Sulfide (ppm)			0.3			
Carbon Disulfide (ppm)			0.4			

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	4,500 1.06×10^{-1}	ND <0.1 $<4.03 \times 10^{-5}$	>99.96
Chloroform, ppb lb/hr	ND <100 $<3.30 \times 10^{-3}$	ND <0.1 $<5.66 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	300 1.11×10^{-2}	ND <0.1 $<6.33 \times 10^{-5}$	>99.43
Carbon Tetrachloride, ppb lb/hr	ND <100 4.26×10^{-3}	ND <0.1 $<7.30 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <100 $<2.68 \times 10^{-3}$	ND <0.1 $<4.60 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	1,500 5.46×10^{-2}	ND <0.1 $<6.23 \times 10^{-5}$	>99.89
Tetrachloroethylene, ppb lb/hr	2,900 1.33×10^{-1}	ND <0.1 $<7.87 \times 10^{-5}$	>99.94
Chlorobenzene, ppb lb/hr	200 6.23×10^{-3}	ND <0.2 $<1.07 \times 10^{-4}$	>98.29
Vinyl Chloride, ppb lb/hr	1,000 1.73×10^{-2}	ND <0.2 $<5.93 \times 10^{-5}$	>99.66
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<8.14 \times 10^{-3}$	ND <0.2 $<1.40 \times 10^{-4}$	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <200 $<8.14 \times 10^{-3}$	ND <0.2 $<1.40 \times 10^{-4}$	N/A
1,4-dichlorobenzene, ppb lb/hr	ND <200 $<8.14 \times 10^{-3}$	ND <0.2 $<1.40 \times 10^{-4}$	N/A
1,1-dichloroethane, ppb lb/hr	1,400 3.84×10^{-2}	ND <0.1 $<4.70 \times 10^{-5}$	>99.88

Continued

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <100 <2.74 x 10 ⁻³	ND <0.1 <4.70 x 10 ⁻⁵	N/A
Benzene, ppb lb/hr	4,500 9.73 x 10 ⁻²	0.9 3.34 x 10 ⁻⁴	99.66
Toluene, ppb lb/hr	43,000 1.10	2.1 9.18 x 10 ⁻⁴	99.92
Acetonitrile, ppb lb/hr	ND <2,000 <2.27 x 10 ⁻²	ND <2 <3.90 x 10 ⁻⁴	N/A
Xylenes, ppb lb/hr	25,000 7.35 x 10 ⁻¹	ND <0.6 <3.02 x 10 ⁻⁴	>99.96
1,2-dibromoethane, ppb lb/hr	ND <200 <1.04 x 10 ⁻²	ND <0.2 <1.78 x 10 ⁻⁴	N/A
Benzyl Chlorides, ppb lb/hr	ND <400 <1.40 x 10 ⁻²	ND <0.4 <2.40 x 10 ⁻⁴	N/A

ND indicates that the species was not detected. Values in parenthesis indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSIONS TESTS ON THE SOLAR TURBINE
AT THE PUENTE HILLS LANDFILL
AUGUST 1991**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

NOVEMBER 1991

CR 19500-2590

CARNOT

TABLE 4-1
GENERAL RESULTS
SOLAR TURBINE

8/91

PH SOLAR

Test Date 8/21/91 Parameter	Fuel Gas			Exhaust Gas		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , % dry	4.3	—	4.3	16.7	16.1	16.4
CO ₂ , % dry	33.6	—	33.6	4.2	3.9	4.1
N ₂ , % dry	22.4	—	22.4	79.1	80.0	79.6
H ₂ O, %				6.3	6.3	6.3
Flow Rate dscfm	1,195	1,195	1,195	29,182	28,186	28,684
Temperature °F				811	811	811
NO _x :						
ppm				21.7	21.9	21.8
ppm @ 3% O ₂				92.5	81.7	87.1
lb/hr				4.61	4.49	4.55
CO:						
ppm				25.8	25.8	25.8
ppm @ 3% O ₂				110.0	96.2	103.1
lb/hr				3.33	3.22	3.28
HC:						
CH ₄ ppm	427,000	424,000	425,500	1.79	1.4	1.6
Total NMHC ppm	4,660	4,760	4,710	5.64	7.04	6.34
as CH ₄						
Total NMHC as	—	—	—	24.04	26.25	25.15
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	14.09	14.39	14.24	0.42	0.50	0.46
NMHC Destruction Eff. %	—	—	—	97.04	96.51	96.78
Particulate:						
Organic Fraction grains/DSCF				0.0003	0.0002	0.0003
Inorganic Fraction grains/DSCF				0.0020	0.0021	0.0021
Total Particulate grains/DSCF				0.0023	0.0023	0.0023
Total lb/hr				0.57	0.55	0.56
Sulfur Compounds:						
H ₂ S, ppm	39	—	39			
Methyl Mercaptan ppm	1.7	—	1.7			
Ethyl Mercaptan ppm	ND <0.4	—	ND <0.4			
Dimethyl Sulfide ppm	1.9	—	1.9			
Carbonyl Sulfide ppm	ND <0.5	—	ND <0.5			
Carbon Disulfide ppm	ND <0.4	—	ND <0.4			

TABLE 4-2
EXHAUST TRACE ORGANIC RESULTS
SOLAR TURBINE

Species	Test 1	Test 2	Average
Methylene Chloride, ppb lb/hr	ND <0.1 <3.92 x 10 ⁻⁵	ND <0.1 <3.92 x 10 ⁻⁵	ND <0.1 <3.92 x 10 ⁻⁵
Chloroform, ppb lb/hr	ND <0.1 <5.51 x 10 ⁻⁵	ND <0.1 <5.51 x 10 ⁻⁵	ND <0.1 <5.51 x 10 ⁻⁵
1,1,1 trichloroethane, ppb lb/hr	ND <0.1 <6.16 x 10 ⁻⁵	ND <0.1 <6.16 x 10 ⁻⁵	ND <0.1 <6.16 x 10 ⁻⁵
Carbon Tetrachloride, ppb lb/hr	ND <0.1 <7.10 x 10 ⁻⁵	ND <0.1 <7.10 x 10 ⁻⁵	ND <0.1 <7.10 x 10 ⁻⁵
1,1-dichloroethene, ppb lb/hr	ND <0.1 <4.47 x 10 ⁻⁵	ND <0.1 <4.47 x 10 ⁻⁵	ND <0.1 <4.47 x 10 ⁻⁵
Trichloroethylene, ppb lb/hr	ND <0.1 <6.06 x 10 ⁻⁵	ND <0.1 <6.06 x 10 ⁻⁵	ND <0.1 <6.06 x 10 ⁻⁵
Tetrachloroethylene, ppb lb/hr	ND <0.1 <7.65 x 10 ⁻⁵	ND <0.1 <7.65 x 10 ⁻⁵	ND <0.1 <7.65 x 10 ⁻⁵
Chlorobenzene, ppb lb/hr	ND <0.1 <5.19 x 10 ⁻⁵	ND <0.1 <5.19 x 10 ⁻⁵	ND <0.1 <5.19 x 10 ⁻⁵
Vinyl Chloride, ppb lb/hr	ND <0.2 <5.77 x 10 ⁻⁵	ND <0.2 <5.77 x 10 ⁻⁵	ND <0.2 <5.77 x 10 ⁻⁵
1,2-dichlorobenzene, ppb lb/hr	ND <0.2 <1.36 x 10 ⁻⁴	ND <0.2 <1.36 x 10 ⁻⁴	ND <0.2 <1.36 x 10 ⁻⁴
1,3 + 1,4-dichlorobenzene lb/hr	ND <0.2 <1.36 x 10 ⁻⁴	ND <0.2 <1.36 x 10 ⁻⁴	ND <0.2 <1.36 x 10 ⁻⁴
1,1-dichloroethane, ppb lb/hr	ND <0.1 <4.57 x 10 ⁻⁵	ND <0.1 <4.57 x 10 ⁻⁵	ND <0.1 <4.57 x 10 ⁻⁵

Continued

TABLE 4-2 (cont)
EXHAUST TRACE ORGANIC SPECIES RESULTS
SOLAR TURBINE

Species	Test 1	Test 2	Average
1,2-dichloroethane, ppb lb/hr	ND <0.1 <4.57 x 10 ⁻⁵	ND <0.1 <4.57 x 10 ⁻⁵	ND <0.1 <4.57 x 10 ⁻⁵
Benzene, ppb lb/hr	0.5 1.80 x 10 ⁻⁴	0.8 2.88 x 10 ⁻⁴	0.65 2.34 x 10 ⁻⁴
Toluene, ppb lb/hr	1.7 7.23 x 10 ⁻⁴	2.2 9.35 x 10 ⁻⁴	1.95 8.29 x 10 ⁻⁴
Acetronitrile, ppb lb/hr	2.2 4.17 x 10 ⁻⁴	ND <2 <3.79 x 10 ⁻⁴	<2.1 <3.98 x 10 ⁻⁴
Xylenes, ppb lb/hr	ND <0.6 <2.94 x 10 ⁻⁴	ND <0.6 <2.94 x 10 ⁻⁴	ND <0.6 <2.94 x 10 ⁻⁴
1,2-dibromoethane, ppb lb/hr	ND <0.4 <3.47 x 10 ⁻⁴	ND <0.4 <3.47 x 10 ⁻⁴	ND <0.4 <3.47 x 10 ⁻⁴
Benzyl Chloride, ppb lb/hr	ND <1.0 <5.84 x 10 ⁻⁴	ND <1.0 <5.84 x 10 ⁻⁴	ND <1.0 <5.84 x 10 ⁻⁴

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
TRACE ORGANIC DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	4,500 7.22×10^{-2}	ND <0.1 $<3.92 \times 10^{-5}$	>99.95
Chloroform, ppb lb/hr	ND <100 $<2.26 \times 10^{-3}$	ND <0.1 $<5.51 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	300 7.56×10^{-3}	ND <0.1 $<6.16 \times 10^{-5}$	>99.19
Carbon Tetrachloride, ppb lb/hr	ND <100 $<2.91 \times 10^{-3}$	ND <0.1 $<7.10 \times 10^{-5}$	N/A
1,1-dichloroethene, ppb lb/hr	100 1.83×10^{-3}	ND <0.1 $<4.47 \times 10^{-5}$	>99.56
Trichloroethylene, ppb lb/hr	1,500 3.72×10^{-2}	ND <0.1 $<6.06 \times 10^{-5}$	>99.84
Tetrachloroethylene, ppb lb/hr	2,400 7.52×10^{-2}	ND <0.1 $<7.65 \times 10^{-5}$	>99.90
Chlorobenzene, ppb lb/hr	300 6.38×10^{-3}	ND <0.1 $<5.19 \times 10^{-5}$	>99.19
Vinyl Chloride, ppb lb/hr	900 1.06×10^{-2}	ND <0.2 $<5.77 \times 10^{-5}$	>99.46
1,2-dichlorobenzene, ppb lb/hr	ND <200 $<5.56 \times 10^{-3}$	ND <0.2 $<1.36 \times 10^{-4}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	500 1.39×10^{-2}	ND <0.2 $<1.36 \times 10^{-4}$	>99.02
1,1-dichloroethane, ppb lb/hr	1,500 2.80×10^{-2}	ND <0.1 $<4.57 \times 10^{-5}$	>99.84

Continued

TABLE 4-3 (cont)
TRACE ORGANIC DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <100 $<1.87 \times 10^{-3}$	ND <0.1 $<4.57 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	3,900 5.76×10^{-2}	0.7 2.52×10^{-4}	99.56
Toluene, ppb lb/h	42,000 7.31×10^{-1}	2 8.50×10^{-4}	99.98 <i>99.89</i>
Acetonitrile, ppb lb/hr	ND <2,000 $<1.55 \times 10^{-2}$	<2.1 $<3.98 \times 10^{-4}$	N/A
Xylenes, ppb lb/hr	33,000 6.62×10^{-1}	ND <0.6 $<2.94 \times 10^{-4}$	>99.96
1,2-dibromoethane, ppb lb/hr	ND <400 $<1.42 \times 10^{-2}$	ND <0.4 $<3.47 \times 10^{-4}$	N/A
Benzyl Chloride, ppb lb/hr	ND <1,000 $<2.39 \times 10^{-2}$	ND <1 $<5.84 \times 10^{-4}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

Report PS-91-2567
SCAQMD Contract C91144

Project 7010-91

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
9150 Flair Drive
El Monte, California 91731

SOURCE TEST REPORT
90CST172

Conducted at

Los Angeles County Sanitation District
2800 S. Workman Mill Road
Whittier, California 90601-1548

Gas Turbine #1

Test Date: August 21, 1991

Report Date: October 10, 1991

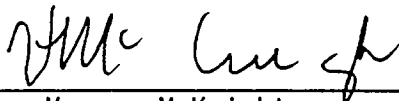
Revision No.: None

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Report Approved by
Steiner Environmental, Inc.



Vernon McKnight
Project Manager

Report Approved by
South Coast Air Quality
Management District



Dipak Bishnu
Source Testing Contracts
Coordinator



Jim Steiner
QA/QC Manager

1.1 L. A. COUNTY SANITATION DISTRICT (GAS TURBINE #1) - RESULTS

TABLE 1-1. TEST CONDITIONS

Process Description	Gas Turbine
Stack Gas Flowrate	406 dscmm (14,332 dscfm)
Rated Kilowatts	3,000 KW
Kilowatts During Test	2,700 KW
Fuel Flowrate	50,677 scfh
Type of Fuel	Landfill Gas

TABLE 1-2. SOURCE TEST RESULTS

Contaminant	Units	Emissions Measured	Emissions Allowed	SCAQMD Applicable Rule
Nitrogen Oxides as NO ₂	ppm lb/hr	22.07 2.30	N/A*	N/A*
Carbon Monoxide	ppm lb/hr	26.59 1.69	2000	407(a)(1)
Hydrogen Sulfide in Fuel	ppm	19.4	800	431.1(b)(4)

*N/A - For informational purposes only; no applicable standard

**TABLE 2. CONTINUOUS MONITOR PERFORMANCE DURING SOURCE TEST
LOS ANGELES COUNTY SANITATION DISTRICT
PUENTE HILLS LANDFILL - WHITTIER, CALIFORNIA
GAS TURBINE #1 - AUGUST 21, 1991**

	NO _x ppm	CO ppm	SO ₂ ppm	O ₂ %	CO ₂ %
Instrument Full Scale (ppm or %)	25	100	---	25	20
Time Between Initial and Final Span (min.)	60	60	---	60	60
Zero Drift (% of Full Scale)	0.00	0.00	---	0.00	0.00
Span Drift - High (% of Full Scale)	---	---	---	---	---
Span Drift - Mid (% of Full Scale)	1.72	0.30	---	-0.52	0.25
Linearity (% of Full Scale)	Zero 0.00 High 0.52	0.00 0.00	---	0.00 -0.80	0.00 1.00
Sample System Bias (% of Full Scale)	- 0.80	0.30	---	-0.24	-0.95
System Response Time (sec.)	33	33	---	33	33

**EMISSIONS TESTS ON THE NATCO TURBINE
AT PUENTE HILLS LANDFILL
NOVEMBER 1991**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

Prepared By:

Craig H. Fry

CARNOT
Tustin, California

DECEMBER 1991

TABLE 4-1
GENERAL RESULTS
NATCO TURBINE

11/91

PH

Test Date 11/21/91

Parameter	Fuel Gas			Exhaust Gas		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.1	—	4.1	15.84	15.60	15.72
CO ₂ , % dry	31.4	—	31.4	4.42	4.61	4.52
N ₂ , % dry	24.0	—	24.0	79.7	79.8	79.8
H ₂ O, %				5.6	6.5	6.1
Flow Rate ^d scfm	1,300	1,302	1,301	23,112*	22,761*	22,937*
Temperature °F				955	984	970
NO _x :						
ppm						
ppm @ 3% O ₂				11.2	11.2	11.2
lb/hr (as NO ₂)				39.6	37.8	38.7
				1.88	1.85	1.87
CO:						
ppm						
ppm @ 3% O ₂				529	524	527
lb/hr				1,871	1,770	1,821
				54.12	52.80	53.46
HC:						
CH ₄ ppm	408,000	410,000	409,500	99.0	95.3	97.2
Total NMHC ppm	4,240	5,650	4,945	34.2	21.7	27.8
as CH ₄						
Total NMHC as	—	—	—	121.0	73.3	97.1
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr	13.94	18.61	16.28	2.00	1.25	1.62
as CH ₄						
NMHC Destruction Eff. %	—	—	—	85.66	93.29	89.47
Particulate:						
Organic Fraction grains/DSCF						
Inorganic Fraction grains/DSCF				0.0000	0.0001	0.0001
Total Particulate grains/DSCF				0.0044	0.0036	0.0040
Total lb/hr				0.0044	0.0037	0.0041
gr/dscf @ 12% CO ₂				0.0119	0.0096	0.0108
lb/hr				0.0119	0.0096	0.0108
				0.87	0.72	0.80
Sulfur Compounds:						
H ₂ S ppm	46	—	46			
Methyl Mercaptan ppm	1.4	—	1.4			
Ethyl Mercaptan ppm	0.5	—	0.5			
Dimethyl Sulfide ppm	2.4	—	2.4			
Carbonyl Sulfide ppm	0.2	—	0.2			
Carbon Disulfide ppm	0.2	—	0.2			
Total Sulfur ppm	50.9	—	50.9			

* dry basis

TABLE 4-2
EXHAUST TRACE ORGANIC SPECIES RESULTS
NATCO TURBINE

Species	Test 1	Test 2	Average
Methylene Chloride, ppb lb/hr	ND <0.2 <6.21 x 10 ⁻⁵	ND <0.2 <6.21 x 10 ⁻⁵	ND <0.2 <6.21 x 10 ⁻⁵
Chloroform, ppb lb/hr	ND <0.2 <8.72 x 10 ⁻⁵	ND <0.2 <8.72 x 10 ⁻⁵	ND <0.2 <8.72 x 10 ⁻⁵
1,1,1 trichloroethane, ppb lb/hr	ND <0.2 <9.75 x 10 ⁻⁵	ND <0.2 <9.75 x 10 ⁻⁵	ND <0.2 <9.75 x 10 ⁻⁵
Carbon Tetrachloride, ppb lb/hr	ND <0.2 <1.12 x 10 ⁻⁴	ND <0.2 <1.12 x 10 ⁻⁴	ND <0.2 <1.12 x 10 ⁻⁴
1,1-dichloroethene, ppb lb/hr	ND <0.2 <7.08 x 10 ⁻⁵	ND <0.2 <7.08 x 10 ⁻⁵	ND <0.2 <7.08 x 10 ⁻⁵
Trichloroethylene, ppb lb/hr	ND <0.2 <9.60 x 10 ⁻⁵	ND <0.2 <9.60 x 10 ⁻⁵	ND <0.2 <9.60 x 10 ⁻⁵
Tetrachloroethylene, ppb lb/hr	ND <0.1 <6.06 x 10 ⁻⁵	ND <0.1 <6.06 x 10 ⁻⁵	ND <0.1 <6.06 x 10 ⁻⁵
Chlorobenzene, ppb lb/hr	ND <0.4 <1.65 x 10 ⁻⁵	ND <0.4 <1.65 x 10 ⁻⁵	ND <0.4 <1.65 x 10 ⁻⁵
Vinyl Chloride, ppb lb/hr	0.5 1.14 x 10 ⁻⁴	0.5 1.14 x 10 ⁻⁴	0.5 1.14 x 10 ⁻⁴
1,2-dichlorobenzene, ppb lb/hr	ND <0.4 <2.15 x 10 ⁻⁴	ND <0.4 <2.15 x 10 ⁻⁴	ND <0.4 <2.15 x 10 ⁻⁴
1,3 + 1,4-dichlorobenzene lb/hr	ND <0.4 <2.15 x 10 ⁻⁴	ND <0.4 <2.15 x 10 ⁻⁴	ND <0.4 <2.15 x 10 ⁻⁴
1,1-dichloroethane, ppb lb/hr	ND <0.2 <7.23 x 10 ⁻⁵	ND <0.2 <7.23 x 10 ⁻⁵	ND <0.2 <7.23 x 10 ⁻⁵

Continued

TABLE 4-2 (cont)
EXHAUST TRACE ORGANIC SPECIES RESULTS
NATCO TURBINE

Species	Test 1	Test 2	Average
1,2-dichloroethane, ppb lb/hr	ND <0.2 <7.23 x 10 ⁻⁵	ND <0.2 <7.23 x 10 ⁻⁵	ND <0.2 <7.23 x 10 ⁻⁵
Benzene, ppb lb/hr	8.2 2.34 x 10 ⁻³	7.8 2.23 x 10 ⁻³	8.0 2.28 x 10 ⁻³
Toluene, ppb lb/hr	4.8 1.62 x 10 ⁻³	4.3 1.45 x 10 ⁻³	4.55 1.53 x 10 ⁻³
Acetronitrile, ppb lb/hr	ND <2.0 <3.00 x 10 ⁻⁴	ND <2.0 <3.00 x 10 ⁻⁴	ND <2.0 <3.00 x 10 ⁻⁴
Xylenes, ppb lb/hr	1.2 4.66 x 10 ⁻⁴	<1.2 <4.66 x 10 ⁻⁴	<1.2 <4.66 x 10 ⁻⁴
1,2-dibromoethane, ppb lb/hr	ND <2.0 <1.37 x 10 ⁻³	ND <2.0 <1.37 x 10 ⁻³	ND <2.0 <1.37 x 10 ⁻³
Benzyl Chloride, ppb lb/hr	ND <2.0 <9.25 x 10 ⁻⁴	ND <2.0 <9.25 x 10 ⁻⁴	ND <2.0 <9.25 x 10 ⁻⁴

ND indicates that the species was not detected. Values indicate the detection limit for these species.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	3,600 6.28×10^{-1}	ND <0.2 $<6.21 \times 10^{-5}$	>99.90
Chloroform, ppb lb/hr	ND <200 $<4.91 \times 10^{-3}$	ND <0.2 $<8.72 \times 10^{-5}$	N/A
1,1,1 trichloroethane, ppb lb/hr	ND <200 $<5.48 \times 10^{-3}$	ND <0.2 $<9.75 \times 10^{-5}$	N/A
Carbon Tetrachloride, ppb lb/hr	ND <200 $<6.32 \times 10^{-3}$	ND <0.2 $<1.12 \times 10^{-4}$	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 $<3.98 \times 10^{-3}$	ND <0.2 $<7.08 \times 10^{-5}$	N/A
Trichloroethylene, ppb lb/hr	1,300 3.51×10^{-2}	ND <0.2 $<9.60 \times 10^{-5}$	>99.73
Tetrachloroethylene, ppb lb/hr	1,800 6.14×10^{-2}	ND <0.1 $<6.06 \times 10^{-5}$	>99.90
Chlorobenzene, ppb lb/hr	ND <400 $<9.25 \times 10^{-3}$	ND <0.4 $<1.65 \times 10^{-4}$	N/A
Vinyl Chloride, ppb lb/hr	1,000 1.28×10^{-2}	0.5 1.14×10^{-4}	99.11
1,2-dichlorobenzene, ppb lb/hr	ND <400 $<1.21 \times 10^{-2}$	ND <0.4 $<2.15 \times 10^{-4}$	N/A
1,3 + 1,4-dichlorobenzene lb/hr	ND <400 $<1.21 \times 10^{-2}$	ND <0.4 $<2.15 \times 10^{-4}$	N/A
1,1-dichloroethane, ppb lb/hr	1,300 2.64×10^{-2}	ND <0.2 $<7.23 \times 10^{-5}$	>99.73

Continued

TABLE 4-3 (cont)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 $<4.07 \times 10^{-3}$	ND <0.2 $<7.23 \times 10^{-5}$	N/A
Benzene, ppb lb/hr	4,100 6.58×10^{-2}	8.0 2.28×10^{-3}	99.53
Toluene, ppb lb/hr	36,000 6.28×10^{-1}	4.55 1.53×10^{-3}	96.56%
Acetonitrile, ppb lb/hr	ND <2,000 $<1.69 \times 10^{-2}$	ND <2 $<3.00 \times 10^{-4}$	99.78
Xylenes, ppb lb/hr	29,000 6.33×10^{-1}	<1.2 $<4.66 \times 10^{-4}$	>99.93
1,2-dibromoethane, ppb lb/hr	ND <2,000 $<7.72 \times 10^{-2}$	ND <0.2 $<1.37 \times 10^{-3}$	N/A
Benzyl Chloride, ppb lb/hr	ND <2,000 $<5.20 \times 10^{-2}$	ND <2.0 $<9.25 \times 10^{-4}$	N/A

ND indicates that the species was not detected. Values indicate the detection limit for these species.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

Do flow rates
from Table 4-1
apply here?

**SULFUR DIOXIDE MEASUREMENT
COMPARISON TESTING ON PUENTE HILLS
LANDFILL GAS**

Prepared For:

**County Sanitation Districts of Los Angeles County
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

MAY 1992

Sulfur Dioxide Measurement
comparison testing on
Puente Hills Landfill Gas.

4/92

PH LFG

SECTION 3.0

RESULTS

The results of the sulfur dioxide testing ^{for the} on landfill gas are presented in Table 3-1. Each method of sampling produced a different result of sulfur dioxide concentration. The results of the total sulfur concentration tests are presented in Table 3-2. A discussion of these results can be found in Section 4.0.

TABLE 3-1
SULFUR DIOXIDE RESULTS
PUENTE HILLS LANDFILL GAS

Sampling Method	SO ₂	SO ₃
SCAQMD 100.1 UV Absorption	17 ppm	
SCAQMD 6.1 Test 1	0.6 ppm	<0.1 ppm
Test 2	0.9 ppm	<0.1 ppm

TABLE 3-2
TOTAL SULFUR CONCENTRATION RESULTS
PUENTE HILLS LANDFILL GAS

Species	Sampling Method		STI Total Sulfur Analyzer
	GC/FPD/ELCD		
	Test 1	Test 2	
Hydrogen Sulfide ppm	47	50	
Methyl Mercaptan ppm	1.0	1.0	
Ethyl Mercaptan ppm	<3.8	<1.9	
Carbonyl Sulfide ppm	<0.8	<0.4	
Carbon Disulfide ppm	<1.1	<0.6	
Dimethyl Sulfide ppm	2.3	2.5	
Dimethyl Disulfide ppm	<0.5	<0.5	
Total Sulfur ppm	<58.1	<58.0	63-64*

*DATA
* - OBSERVED DURING TESTING*

**EMISSIONS TESTS ON SOLAR TURBINE AT
PUENTE HILLS LANDFILL
OCTOBER 1992**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

JANUARY 1993

PH

**TABLE 4-1
GENERAL RESULTS
SOLAR TURBINE
OCTOBER 28, 1992**

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	3.98	5.60	4.79	16.51	16.37	16.44
CO ₂ , % dry	32.2	29.6	30.9	4.10	4.13	4.12
N ₂ , % dry	22.8	28.0	25.4	79.4	79.5	79.4
H ₂ O, %	6.4	5.8	6.1	5.4	5.5	5.5
Flow Rate, cfm	1000	1000	1000	---	---	---
Flow Rate, dscfm	1521	1523	1522	29011	30239	29625
Temperature, °F				773	776	775
NO _x :						
ppm						
ppm @ 15 % O ₂				17.3	18.1	17.7
lb/hr (as NO ₂)				23.3	23.6	23.4
				3.65	3.98	3.82
CO:						
ppm						
ppm @ 15 % O ₂				38.8	35.2	37.0
lb/hr				52.1	45.8	49.0
				4.98	4.71	4.85
HC:						
CH ₄ ppm	426000	432000	429000	3.06	6.57	4.82
TGNMO ppm	4250	4150	4200	8.44	9.42	8.93
TGNMO ppm @ 15 % O ₂	--	--	--	11.3	12.3	11.8
TGNMO lb/hr (as CH ₄)	16.35	15.99	16.17	0.62	0.72	0.67
Destruction Eff. %	--	--	--	96.21	95.49	95.85
Particulate:						
Organic Fraction gr/dscf				0.0002	0.0001	0.0002
Inorganic Fraction gr/dscf				0.0017	0.0019	0.0018
Total Particulate gr/dscf				0.0019	0.0020	0.0020
gr/dscf @ 15 % O ₂				0.0026	0.0026	0.0026
gr/dscf @ 12 % CO ₂				0.0057	0.0058	0.0058
lb/hr				0.48	0.52	0.50
Sulfur Compounds:						
H ₂ S, ppm	40	46	43			
Methyl Mercaptan, ppm	0.9	0.9	0.9			
Ethyl Mercaptan, ppm	*	*	*			
Dimethyl Sulfide, ppm	2.2*	2.2*	2.2*			
Carbonyl Sulfide, ppm	ND<0.3	ND<0.3	ND<0.3			
Carbon Disulfide, ppm	ND<0.4	ND<0.4	ND<0.4			
Dimethyl Disulfide, ppm	ND<0.9	N/A	ND<0.9			
Total Sulfur Compounds, ppm	<46.0	<50.2	<49.0			

* Interference

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 1
OCTOBER 28, 1992

Flow rate, Inlet dscfm	1521		
Flow rate, Exhaust dscfm	29011		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	5200 ppb 1.06×10^{-1}	ND < 0.2 ppb < 7.79×10^{-5}	> 99.93
Chloroform: lb/hr	ND < 200 ppb < 5.74×10^{-3}	ND < 0.2 ppb < 1.10×10^{-4}	NA
1,1,1-trichloroethane: lb/hr	400 ppb 1.28×10^{-2}	ND < 0.2 ppb < 1.22×10^{-4}	> 99.05
Carbon Tetrachloride: lb/hr	ND < 200 ppb < 7.4×10^{-3}	ND < 0.2 ppb < 1.41×10^{-4}	NA
1,1-dichloroethene: lb/hr	ND < 200 ppb < 4.66×10^{-3}	ND < 0.2 ppb < 8.89×10^{-5}	NA
Trichloroethylene: lb/hr	1300 ppb 4.11×10^{-2}	ND < 0.2 ppb < 1.21×10^{-4}	> 99.71
Tetrachloroethylene: lb/hr	2400 ppb 9.57×10^{-2}	ND < 0.2 ppb < 1.52×10^{-4}	> 99.84
Chlorobenzene: lb/hr	ND < 400 ppb < 1.08×10^{-2}	ND < 0.4 ppb < 2.07×10^{-4}	NA
Vinyl Chloride: lb/hr	1200 ppb 1.80×10^{-2}	ND < 0.4 ppb < 1.15×10^{-4}	> 99.36
m-dichlorobenzene: lb/hr	ND < 200 ppb < 7.07×10^{-3}	ND < 0.2 ppb < 1.35×10^{-4}	NA
o+p dichlorobenzene: lb/hr	300 ppb 1.06×10^{-2}	ND < 0.2 ppb < 1.35×10^{-4}	> 98.73
1,1-dichloroethane: lb/hr	1600 ppb 3.81×10^{-2}	ND < 0.2 ppb < 9.08×10^{-5}	> 99.76
1,2-dichloroethane: lb/hr	ND < 200 ppb < 4.76×10^{-3}	ND < 0.2 ppb < 9.08×10^{-5}	NA
Benzene: lb/hr	4100 ppb 7.70×10^{-2}	1.0 ppb 3.58×10^{-4}	99.53
Toluene: lb/hr	33000 ppb 7.31×10^{-1}	2.9 ppb 1.23×10^{-3}	99.83
Acetonitrile: lb/hr	ND < 2000 ppb < 1.97×10^{-2}	ND < 2.0 ppb < 3.77×10^{-4}	NA
m-xylenes: lb/hr	16000 ppb 4.08×10^{-1}	ND < 0.2 ppb < 9.74×10^{-5}	> 99.98
o+p xylenes: lb/hr	13000 ppb 3.32×10^{-1}	0.3 ppb 1.46×10^{-4}	99.96
1,2-dibromoethane: lb/hr	ND < 7000 ppb < 3.16×10^{-1}	ND < 7.0 ppb < 6.03×10^{-3}	NA
Benzyl Chloride: lb/hr	ND < 5000 ppb < 1.52×10^{-1}	ND < 5.0 ppb < 2.90×10^{-3}	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.
NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 2
OCTOBER 28, 1992

Flow rate, Inlet dscfm	1523		
Flow rate, Exhaust dscfm	30239		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride: lb/hr	5100 ppb 1.04×10^{-1}	ND < 0.2 ppb $< 8.12 \times 10^{-5}$	> 99.92
Chloroform: lb/hr	ND < 200 ppb $< 5.75 \times 10^{-3}$	ND < 0.2 ppb $< 1.14 \times 10^{-4}$	NA
1,1,1-trichloroethane: lb/hr	400 ppb 1.29×10^{-2}	ND < 0.2 ppb $< 1.28 \times 10^{-4}$	> 99.01
Carbon Tetrachloride: lb/hr	ND < 200 ppb $< 7.41 \times 10^{-3}$	ND < 0.2 ppb $< 1.47 \times 10^{-4}$	NA
1,1-dichloroethene: lb/hr	ND < 200 ppb $< 4.67 \times 10^{-3}$	ND < 0.2 ppb $< 9.27 \times 10^{-5}$	NA
Trichloroethylene: lb/hr	1300 ppb 4.11×10^{-2}	ND < 0.2 ppb $< 1.26 \times 10^{-4}$	> 99.69
Tetrachloroethylene: lb/hr	2300 ppb 9.19×10^{-2}	ND < 0.2 ppb $< 1.59 \times 10^{-4}$	> 99.83
Chlorobenzene: lb/hr	ND < 400 ppb $< 1.08 \times 10^{-2}$	ND < 0.4 ppb $< 2.15 \times 10^{-4}$	NA
Vinyl Chloride: lb/hr	900 ppb 1.35×10^{-2}	ND < 0.4 ppb $< 1.20 \times 10^{-4}$	> 99.12
m-dichlorobenzene: lb/hr	ND < 200 ppb $< 7.08 \times 10^{-3}$	ND < 0.2 ppb $< 1.41 \times 10^{-4}$	NA
o+p dichlorobenzene: lb/hr	200 ppb 7.08×10^{-3}	ND < 0.2 ppb $< 1.41 \times 10^{-4}$	> 98.01
1,1-dichloroethane: lb/hr	1600 ppb 3.81×10^{-2}	ND < 0.2 ppb $< 9.46 \times 10^{-5}$	> 99.75
1,2-dichloroethane: lb/hr	ND < 200 ppb $< 4.77 \times 10^{-3}$	ND < 0.2 ppb $< 9.46 \times 10^{-5}$	NA
Benzene: lb/hr	3700 ppb 6.96×10^{-2}	0.7 ppb 2.61×10^{-4}	99.62
Toluene: lb/hr	31000 ppb 6.88×10^{-1}	ND < 1.0 ppb 4.40×10^{-4}	> 99.94
Acetonitrile: lb/hr	ND < 2000 ppb $< 1.98 \times 10^{-2}$	ND < 2.0 ppb $< 3.93 \times 10^{-4}$	NA
m-xylenes: lb/hr	14000 ppb 3.58×10^{-1}	ND < 0.2 ppb $< 1.02 \times 10^{-4}$	> 99.97
o+p xylenes: lb/hr	11000 ppb 2.81×10^{-1}	ND < 0.2 ppb $< 1.02 \times 10^{-4}$	> 99.96
1,2-dibromoethane: lb/hr	ND < 7000 ppb $< 3.17 \times 10^{-1}$	ND < 7.0 ppb $< 6.29 \times 10^{-3}$	NA
Benzyl Chloride: lb/hr	ND < 5000 ppb $< 1.52 \times 10^{-1}$	ND < 5.0 ppb $< 3.03 \times 10^{-3}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

Report PS-92-2956
SCAQMD Contract R-C92173

Project 7160-92

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Contracts Department/Source Testing & Engineering Branch
21865 East Copley Drive
Diamond Bar, California 91765-0935

SOURCE TEST REPORT
91CST128

Conducted at

Los Angeles County Sanitation District
2800 South Workman Mill Road
Whittier, California 90601-1548

Gas Turbine #1

Test Date: October 28, 1992

Report Date: November 20, 1992

Revision No.: None

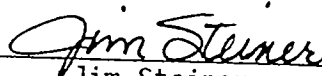
Prepared by

Steiner Environmental, Inc.
4930 Boylan Street
Bakersfield, California 93308

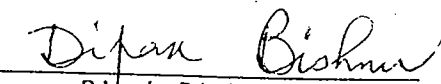
Mr. Vernon McKnight

Report Approved by
Steiner Environmental, Inc.


Vernon McKnight
Project Manager


Jim Steiner
QA/QC Manager

Report Approved by
South Coast Air Quality
Management District


Dipak Bishnu
Source Testing Contracts
Coordinator

Test date 9-27-93

Report date 11/8/93

1.1 LOS ANGELES COUNTY SANITATION DISTRICT (GAS TURBINE #1) - RESULTS

TABLE 1-1. TEST CONDITIONS

Process Description	Gas Turbine
Stack Gas Flowrate	159 dscmm (5,608 dscfm)
Rated Megawatts	3.0 MW
Megawatts During Test	2.4 MW
Fuel Flow	55,500 scfh
Type of Fuel	Landfill Gas

TABLE 1-2. SOURCE TEST RESULTS

Contaminant	Units	Emissions Measured	Emissions Allowed	SCAQMD Applicable Rule
Carbon Monoxide	ppmv lb/hr	28.55 0.71	2000	407(a)(1)
Hydrogen Sulfide Content in Fuel Gas	ppmv	<1.0	800	431.1(b)(4)
Nitrogen Oxides	ppmv lb/hr	20.61 0.84	N/A*	N/A*

*N/A - For informational purposes only, no applicable standard

2800 S. Workman Mill Rd.

Report PS-92-2957
SCAQMD Contract R-C92173

Project 7160-92

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Contracts Department/Source Testing & Engineering Branch
21865 East Copley Drive
Diamond Bar, California 91765-0935

SOURCE TEST REPORT
91CST129

Conducted at

Los Angeles County Sanitation District
2800 South Workman Mill Road
Whittier, California 90601-1548

Gas Turbine #2

Test Date: October 29, 1992

Report Date: November 20, 1992

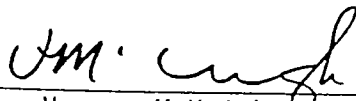
Revision No.: None

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Mr. Vernon McKnight

Report Approved by
Steiner Environmental, Inc.

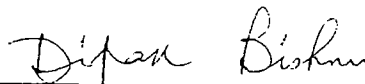


Vernon McKnight
Project Manager



Jim Steiner
QA/QC Manager

Report Approved by
South Coast Air Quality
Management District



Dipak Bishnu
Source Testing Contracts
Coordinator

Gas Turbine # [REDACTED]
2800 S. Worman Mill Rd.

1.1 LOS ANGELES COUNTY SANITATION DISTRICT (GAS TURBINE #2) - RESULTS

TABLE 1-1. TEST CONDITIONS

Process Description	Gas Turbine
Stack Gas Flowrate	257 dscmm (9,075 dscfm)
Rated Megawatts	11.5 MW
Megawatts During Test	10.0 MW
Fuel Flow	63,000 scfh
Type of Fuel	Landfill Gas

TABLE 1-2. SOURCE TEST RESULTS

Contaminant	Units	Emissions Measured	Emissions Allowed	SCAQMD Applicable Rule
Carbon Monoxide	ppmv lb/hr	458 18.41	2000	407(a)(1)
Hydrogen Sulfide Content in Fuel Gas	ppmv	22	800	431.1(b)(4)
Nitrogen Oxides	ppmv lb/hr	11.04 0.73	N/A*	N/A*

*N/A - For informational purposes only, no applicable standard

**EMISSION TESTS ON THE NATCO
TURBINE AT PUENTE HILLS LANDFILL
SEPTEMBER 1993**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

NOVEMBER 1993

PH NATCO TURBINE

TABLE 4-1
GENERAL RESULTS - NATCO TURBINE
SEPTEMBER 28, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	4.04	4.48	4.26	15.82	15.57	15.70
CO ₂ , % dry	31.9	31.3	31.6	4.36	4.62	4.49
N ₂ , % dry	23.5	25.0	24.3	79.8	79.8	79.8
H ₂ O, %	6.5	7.4	7.0	6.4	6.3	6.4
Flow Rate, cfm	1093*	1095*	1094*	---	---	---
Flow Rate, dscfm	1201	1229	1215	20470	19890	20180
Temperature, °F				953	985	969
NO _x :						
ppm				10.7	10.7	10.7
ppm @ 15% O ₂				12.4	11.8	12.1
lb/hr (as NO ₂)				1.59	1.55	1.57
CO:						
ppm				599	538	569
ppm @ 15% O ₂				696	597	646
lb/hr				54.3	47.4	50.8
SO _x :						
ppm				4.9	3.5	4.2
ppm @ 15% O ₂				5.7	3.9	4.8
lb/hr (as SO ₂)				1.01	0.70	0.86
HC:						
CH ₄ ppm	434000	442000	438000	128	96.5	112
TGNMO ppm	2820	2870	2845	11.9	12.2	12.1
TGNMO lb/hr (as CH ₄)	8.57	8.92	8.57	0.62	0.61	0.62
Destruction Eff. %	--	--	--	92.8	93.1	93.0
Particulate:						
Organic Fraction gr/dscf				0.0001	0.0000	0.0001
Inorganic Fraction gr/dscf				0.0096	0.0083	0.0090
Total Particulate gr/dscf				0.0097	0.0083	0.0090
lb/hr				1.70	1.42	1.56
Sulfur Compounds:						
H ₂ S, ppm	68	64	66			
Methyl Mercaptan, ppm	1.8	1.7	1.8			
Ethyl Mercaptan, ppm	ND > 1.0	ND > 1.0	ND > 1.0			
Dimethyl Sulfide, ppm	2.0	1.9	2.0			
Carbonyl Sulfide, ppm	ND < 0.8	ND < 0.8	ND < 0.8			
Carbon Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	< 77.6	< 73.4	< 75.6			

* Inlet flow rate is corrected to dscfm by carbon balance calculation.

→ Switched from TGMHC - Diff. Method?

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE, TEST NO. 1
SEPTEMBER 28, 1993

Flow rate, Inlet dscfm	1201			
Flow rate, Exhaust dscfm	20470			
Species	Inlet	Exhaust	Destruction Efficiency, %	
Methylene Chloride:	5700 ppb	0.3 ppb		
lb/hr	9.19×10^{-2}	8.25×10^{-5}	99.91	
Chloroform:	ND < 100 ppb	ND < 0.1 ppb		
lb/hr	$< 2.27 \times 10^{-3}$	$< 3.86 \times 10^{-5}$	NA	
1,1,1-Trichloroethane:	380 ppb	ND < 0.1 ppb		
lb/hr	9.63×10^{-3}	$< 4.32 \times 10^{-5}$	> 99.55	
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.1 ppb		
lb/hr	$< 2.92 \times 10^{-3}$	$< 4.98 \times 10^{-5}$	NA	
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.2 ppb		
lb/hr	$< 3.87 \times 10^{-3}$	$< 6.27 \times 10^{-5}$	NA	
Trichloroethylene:	750 ppb	ND < 0.1 ppb		
lb/hr	1.87×10^{-2}	$< 4.25 \times 10^{-5}$	> 99.77	
Tetrachloroethylene:	2500 ppb	ND < 0.2 ppb		
lb/hr	7.87×10^{-2}	$< 1.07 \times 10^{-4}$	> 99.86	
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb		
lb/hr	$< 4.70 \times 10^{-3}$	$< 7.29 \times 10^{-5}$	NA	
Vinyl Chloride:	ND < 380 ppb	ND < 0.4 ppb		
lb/hr	$< 4.51 \times 10^{-3}$	$< 8.09 \times 10^{-5}$	NA	
m-Dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb		
lb/hr	$< 6.42 \times 10^{-3}$	$< 9.52 \times 10^{-5}$	NA	
o+p Dichlorobenzene:	830 ppb	ND < 0.2 ppb		
lb/hr	2.32×10^{-2}	$< 9.52 \times 10^{-5}$	> 99.59	
1,1-Dichloroethane:	1400 ppb	ND < 0.1 ppb		
lb/hr	2.63×10^{-2}	$< 3.20 \times 10^{-5}$	> 99.88	
1,2-Dichloroethane:	ND < 110 ppb	ND < 0.1 ppb		
lb/hr	$< 2.07 \times 10^{-3}$	$< 3.20 \times 10^{-5}$	NA	
Benzene:	4000 ppb	5.9 ppb		
lb/hr	5.93×10^{-2}	1.49×10^{-3}	97.49	

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

(continued)

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-2 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE, TEST NO. 1
SEPTEMBER 28, 1993

Flow rate, Inlet dscfm	1201			
Flow rate, Exhaust dscfm	20470			
Species	Inlet	Exhaust	Destruction Efficiency, %	
Toluene:	28000 ppb	4.7 ppb	99.71	
lb/hr	4.90×10^{-1}	1.40×10^{-3}		
Acetonitrile:	ND < 2300 ppb	ND < 2.3 ppb	NA	
lb/hr	$< 1.79 \times 10^{-2}$	$< 3.06 \times 10^{-4}$		
m-Xylenes:	16000 ppb	1.9 ppb	99.80	
lb/hr	3.23×10^{-1}	6.53×10^{-4}		
o+p Xylenes:	13000 ppb	0.5 ppb	99.93	
lb/hr	2.62×10^{-1}	1.72×10^{-4}		
1,2-Dibromoethane:	ND < 2900 ppb	ND < 2.9 ppb	NA	
lb/hr	$< 1.03 \times 10^{-1}$	$< 1.76 \times 10^{-3}$		
Benzyl Chloride:	ND < 1000 ppb	ND < 1.0 ppb	NA	
lb/hr	$< 2.40 \times 10^{-2}$	$< 4.10 \times 10^{-4}$		

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE, TEST NO. 2
SEPTEMBER 28, 1993

Flow rate, Inlet dscfm	1201		
Flow rate, Exhaust dscfm	20470		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	5300 ppb	0.3 ppb	
lb/hr	8.55×10^{-2}	8.25×10^{-5}	99.90
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 2.27 \times 10^{-3}$	$< 3.86 \times 10^{-5}$	NA
1,1,1-trichloroethane:	370 ppb	ND < 0.1 ppb	
lb/hr	9.37×10^{-3}	$< 4.32 \times 10^{-5}$	> 99.54
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 2.92 \times 10^{-3}$	$< 4.98 \times 10^{-5}$	NA
1,1-dichloroethene:	ND < 210 ppb	ND < 0.2 ppb	
lb/hr	$< 3.87 \times 10^{-3}$	$< 6.27 \times 10^{-5}$	NA
Trichloroethylene:	700 ppb	ND < 0.1 ppb	
lb/hr	1.75×10^{-2}	$< 4.25 \times 10^{-5}$	> 99.76
Tetrachloroethylene:	2200 ppb	ND < 0.2 ppb	
lb/hr	6.93×10^{-2}	$< 1.07 \times 10^{-4}$	> 99.85
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 4.70 \times 10^{-3}$	$< 7.29 \times 10^{-5}$	NA
Vinyl Chloride:	ND < 380 ppb	ND < 0.4 ppb	
lb/hr	$< 4.51 \times 10^{-3}$	$< 8.09 \times 10^{-5}$	NA
m-dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	
lb/hr	$< 6.42 \times 10^{-3}$	$< 9.52 \times 10^{-5}$	NA
o+p dichlorobenzene:	440 ppb	ND < 0.2 ppb	
lb/hr	1.23×10^{-2}	$< 9.52 \times 10^{-5}$	> 99.23
1,1-dichloroethane:	1300 ppb	ND < 0.1 ppb	
lb/hr	2.44×10^{-2}	$< 3.20 \times 10^{-5}$	> 99.87
1,2-dichloroethane:	ND < 110 ppb	ND < 0.1 ppb	
lb/hr	$< 2.07 \times 10^{-3}$	$< 3.20 \times 10^{-5}$	NA
Benzene:	3800 ppb	5.2 ppb	
lb/hr	5.64×10^{-2}	1.31×10^{-3}	97.67

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

(continued)

TABLE 4-3 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE, TEST NO. 2
SEPTEMBER 28, 1993

Flow rate, Inlet dscfm	1201		
Flow rate, Exhaust dscfm	20470		
Species	Inlet	Exhaust	Destruction Efficiency, %
Toluene:	27000 ppb	3.9 ppb	
lb/hr	4.72×10^{-1}	1.16×10^{-3}	99.75
Acetonitrile:	ND < 2300 ppb	ND < 2.3 ppb	
lb/hr	$< 1.79 \times 10^{-2}$	$< 3.06 \times 10^{-4}$	NA
m-xylenes:	15000 ppb	ND < 0.2 ppb	
lb/hr	3.02×10^{-1}	$< 6.87 \times 10^{-5}$	> 99.98
o+p xylenes:	12000 ppb	0.5 ppb	
lb/hr	2.42×10^{-1}	1.72×10^{-4}	99.93
1,2-dibromoethane:	ND < 2900 ppb	ND < 2.9 ppb	
lb/hr	$< 1.03 \times 10^{-1}$	$< 1.76 \times 10^{-3}$	NA
Benzyl Chloride:	ND < 1000 ppb	ND < 1.0 ppb	
lb/hr	$< 2.40 \times 10^{-2}$	$< 4.10 \times 10^{-4}$	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSION TESTS ON THE SOLAR
TURBINE AT PUENTE HILLS LANDFILL
SEPTEMBER 1993**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

NOVEMBER 1993

TABLE 4-1
GENERAL RESULTS - SOLAR TURBINE
SEPTEMBER 27, 1993

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	3.40	3.80	3.60	16.25	16.22	16.24
CO ₂ , % dry	32.5	32.2	32.4	4.12	4.10	4.11
N ₂ , % dry	21.5	22.9	22.2	79.6	79.7	79.7
H ₂ O, %	6.4	8.3	7.4	5.5	5.5	5.5
Flow Rate, cfm	950*	900*	925*	—	—	—
Flow Rate, dscfm	1478	1472	1475	27290	27610	27450
Temperature, °F				808	813	811
NO _x :						
ppm				20.1	21.0	20.6
ppm @ 15 % O ₂				25.5	26.5	26.0
lb/hr (as NO ₂)				3.99	4.22	4.10
CO:						
ppm				20.2	27.7	28.6
ppm @ 15 % O ₂				37.0	34.9	36.0
lb/hr				3.53	3.39	3.46
SO _x :						
ppm				5.1	5.2	5.2
ppm @ 15 % O ₂				6.5	6.6	6.5
lb/hr (as SO ₂)				1.42	1.45	1.43
HC:						
CH ₄ , ppm	434000	445000	439500	3.08	1.37	2.23
TGNMO ppm	2670	2700	2685	7.48	5.29	6.39
TGNMO lb/hr (as CH ₄)	9.98	10.05	10.02	0.52	0.37	0.44
Destruction Eff. %	—	—	—	94.8	96.3	95.6
Particulate:						
Organic Fraction gr/dscf				0.0001	0.0000	0.0000
Inorganic Fraction gr/dscf				0.0045	0.0038	0.0042
Total Particulate gr/dscf				0.0046	0.0038	0.0042
lb/hr				1.077	0.903	0.990
Sulfur Compounds:						
H ₂ S, ppm	72	72	72			
Methyl Mercaptan, ppm	1.6	1.6	1.6			
Ethyl Mercaptan, ppm	ND > 1.0	ND > 1.0	ND > 1.0			
Dimethyl Sulfide, ppm	1.6	1.6	1.6			
Carbonyl Sulfide, ppm	ND < 0.82	ND < 0.82	ND < 0.82			
Carbon Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	< 81.0	< 81.0	< 81.0			

* Inlet flow rate corrected to dscfm by carbon balance calculation.

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 1
SEPTEMBER 27, 1993

Flow rate, Inlet dscfm	1478			
Flow rate, Exhaust dscfm	27290			
Species	Inlet	Exhaust	Destruction Efficiency, %	
Methylene Chloride:	4100 ppb	ND < 0.1 ppb		
lb/hr	8.14×10^{-2}	$< 3.66 \times 10^{-4}$	> 99.95	
Chloroform:	ND < 100 ppb	ND < 0.1 ppb		
lb/hr	$< 2.79 \times 10^{-3}$	$< 5.15 \times 10^{-5}$	NA	
1,1,1-Trichloroethane:	430 ppb	ND < 0.1 ppb		
lb/hr	1.34×10^{-3}	$< 5.76 \times 10^{-5}$	> 99.57	
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.1 ppb		
lb/hr	$< 3.59 \times 10^{-3}$	$< 6.64 \times 10^{-5}$	NA	
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.2 ppb		
lb/hr	$< 4.76 \times 10^{-3}$	$< 8.37 \times 10^{-5}$	NA	
Trichloroethylene:	620 ppb	ND < 0.1 ppb		
lb/hr	1.90×10^{-2}	$< 5.67 \times 10^{-5}$	> 99.70	
Tetrachloroethylene:	1600 ppb	ND < 0.2 ppb		
lb/hr	6.20×10^{-2}	$< 1.43 \times 10^{-4}$	> 99.77	
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb		
lb/hr	$< 5.79 \times 10^{-3}$	$< 9.71 \times 10^{-5}$	NA	
Vinyl Chloride:	ND < 380 ppb	ND < 0.4 ppb		
lb/hr	$< 5.55 \times 10^{-3}$	$< 1.08 \times 10^{-4}$	NA	
m-Dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb		
lb/hr	$< 7.90 \times 10^{-3}$	$< 1.27 \times 10^{-4}$	NA	
o+p Dichlorobenzene:	ND < 220 ppb	ND < 0.2 ppb		
lb/hr	$< 7.56 \times 10^{-2}$	$< 1.27 \times 10^{-4}$	NA	
1,1-Dichloroethane:	1300 ppb	ND < 0.1 ppb		
lb/hr	3.01×10^{-2}	$< 4.27 \times 10^{-5}$	> 99.86	
1,2-Dichloroethane:	ND < 110 ppb	ND < 0.1 ppb		
lb/hr	$< 2.54 \times 10^{-3}$	$< 4.27 \times 10^{-5}$	NA	
Benzene:	4900 ppb	0.9 ppb		
lb/hr	8.94×10^{-2}	3.03×10^{-4}	95.66 → 99.66	
Toluene:	3200 ppb	4.7 ppb		
lb/hr	6.89×10^{-1}	1.87×10^{-3}	99.73	
Acetonitrile:	ND < 2300 ppb	ND < 2.3 ppb		
lb/hr	$< 2.21 \times 10^{-2}$	$< 4.07 \times 10^{-4}$	NA	
m-Xylenes:	16000 ppb	0.0 ppb*		
lb/hr	3.97×10^{-1}	$0.00 \times 10^{0*}$	NA	
o+p Xylenes:	13000 ppb	0.0 ppb*		
lb/hr	3.22×10^{-1}	$0.00 \times 10^{0*}$	NA	
1,2-Dibromoethane:	ND < 2900 ppb	ND < 2.9 ppb		
lb/hr	$< 1.27 \times 10^{-1}$	$< 2.35 \times 10^{-3}$	NA	
Benzyl Chloride:	ND < 1000 ppb	ND < 1.0 ppb		
lb/hr	$< 2.96 \times 10^{-2}$	$< 5.46 \times 10^{-4}$	NA	

ND < - indicates that species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.
 NA - indicates that destruction efficiency cannot be calculated because the concentration is below detection limits.

* The detection of xylenes was impaired due to an interfering GC peak.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 2
SEPTEMBER 27, 1993

Flow rate, Inlet dscfm	1478		
Flow rate, Exhaust dscfm	27290		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	5400 ppb	ND < 0.1 ppb	
lb/hr	1.07×10^{-1}	$< 3.66 \times 10^{-5}$	> 99.97
Chloroform:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 2.79 \times 10^{-3}$	$< 5.15 \times 10^{-5}$	NA
1,1,1-trichloroethane:	420 ppb	ND < 0.1 ppb	
lb/hr	1.31×10^{-2}	$< 5.76 \times 10^{-5}$	> 99.56
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.1 ppb	
lb/hr	$< 3.59 \times 10^{-3}$	$< 6.64 \times 10^{-5}$	NA
1,1-dichloroethene:	ND < 210 ppb	ND < 0.2 ppb	
lb/hr	$< 4.76 \times 10^{-3}$	$< 8.37 \times 10^{-5}$	NA
Trichloroethylene:	710 ppb	ND < 0.1 ppb	
lb/hr	2.18×10^{-2}	$< 5.67 \times 10^{-5}$	> 99.74
Tetrachloroethylene:	2000 ppb	ND < 0.2 ppb	
lb/hr	7.75×10^{-2}	$< 1.43 \times 10^{-4}$	> 99.82
Chlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 5.79 \times 10^{-3}$	$< 9.71 \times 10^{-5}$	NA
Vinyl Chloride:	ND < 380 ppb	ND < 0.4 ppb	
lb/hr	5.55×10^{-3}	$< 1.08 \times 10^{-4}$	NA
m-dichlorobenzene:	ND < 230 ppb	ND < 0.2 ppb	
lb/hr	$< 7.90 \times 10^{-3}$	$< 1.27 \times 10^{-4}$	NA
o+p dichlorobenzene:	ND < 220 ppb	ND < 0.2 ppb	
lb/hr	$< 7.56 \times 10^{-3}$	$< 1.27 \times 10^{-4}$	NA
1,1-dichloroethane:	1300 ppb	ND < 0.1 ppb	
lb/hr	3.01×10^{-2}	$< 4.27 \times 10^{-5}$	> 99.86
1,2-dichloroethane:	ND < 110 ppb	ND < 0.1 ppb	
lb/hr	$< 2.54 \times 10^{-3}$	$< 4.27 \times 10^{-5}$	NA
Benzene:	3900 ppb	0.8 ppb	
lb/hr	7.12×10^{-2}	2.70×10^{-4}	99.62
Toluene:	26000 ppb	5.8 ppb	
lb/hr	5.60×10^{-1}	2.31×10^{-3}	99.59
Acetonitrile:	ND < 2300 ppb	ND < 2.3 ppb	
lb/hr	$< 2.21 \times 10^{-2}$	$< 4.07 \times 10^{-4}$	NA
m-xylenes:	13000 ppb	0.0 ppb*	
lb/hr	3.22×10^{-1}	$0.00 \times 10^{0*}$	NA
o+p xylenes:	10000 ppb	0.0 ppb*	
lb/hr	2.48×10^{-1}	$0.00 \times 10^{0*}$	NA
1,2-dibromoethane:	ND < 2900 ppb	ND < 2.9 ppb	
lb/hr	$< 1.27 \times 10^{-1}$	$< 2.35 \times 10^{-3}$	NA
Benzyl Chloride:	ND < 1000 ppb	ND < 1.0 ppb	
lb/hr	$< 2.96 \times 10^{-2}$	$< 5.46 \times 10^{-4}$	NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

* The detection of xylenes was impaired due to an interfering GC peak.



AIR MEASUREMENT SERVICES, INC.

S20-011-FR-A

**LOS ANGELES COUNTY SANITATION DISTRICT
TURBINE #1 (SOLAR)
PERMIT NO. M44592**

SCAQMD TEST NO. 94-CST011-A

FACILITY:

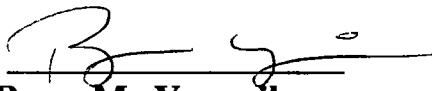
**LOS ANGELES COUNTY SANITATION DISTRICT
2800 SOUTH WORKMAN MILL ROAD
WHITTIER, CALIFORNIA 90601**

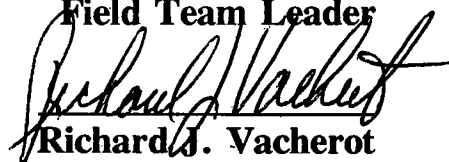
PARAMETERS OF INTEREST:

**CARBON MONOXIDE, OXIDES OF NITROGEN AND
HYDROGEN SULFIDE IN FUEL GAS**

TEST DATE:

NOVEMBER 11, 1994


**Ryan M. Yanagihara
Field Team Leader**


**Richard J. Vacherot
President**


**Gerry Meras
Contract Source
Testing Coordinator**

TABLE 2

Nov. 11, 94

LOS ANGELES COUNTY SANITATION DISTRICT (TURBINE #1)
RESULTS

SCAQMD TEST NO. 94-CST011-A

LACSD PUENTE HILLS

TEST CONDITIONS

Process Description	Gas Turbine
Stack Gas Flow Rate	20,167 dscfm
Rated Megawatts	3.0 MW 2.9 MW JOK
Megawatts During Test	2.6 MW
Fuel Flow	66,000 scfh
Type of Fuel	Landfill Gas

SOURCE TEST RESULTS

Contaminant	Units	Emissions Measured	Emissions Allowed	SCAQMD Applicable Rule
Carbon Monoxide	ppmv lb/hr	30.8 2.75	2000	407(a)(1)
Hydrogen Sulfide Content in Fuel Gas	ppmv	72.3	40	431.1(b)(3)
Oxides of Nitrogen	ppmv lb/hr	17.3 2.54	NA*	NA*

NA - For informational purposes only, no applicable standard.

EXPANSION AND F-FACTOR CALC. METHOD

Client: SCAQMD
 Location: LACSD PUENTE HILLS
 Unit: TURBINE #1 (SOLAR)

Date: 11-10-94
 Job #: S20-011
 Bomb#: TEDLAR BAG

Fuel temperature	<u>50.5</u>	deg F	Std. Temp.	<u>60</u>
Fuel Pressure	<u>175.0</u>	psi		
Fuel Flow Rate	<u>1100.0</u>	cfm	Fuel Flow	<u>1100.0</u> scfm
Exhaust Outlet O2	<u>16.5</u>	%		
Barometric Pressure	<u>29.49</u>			

COMPONENTS	MOLE %	HHV btu/ft3	LLV btu/ft3	Exp Factor dscf/scf fuel
Oxygen	<u>3.89</u>			0.039
Nitrogen	<u>21.06</u>			0.211
Carbon Dioxide	<u>37.04</u>			0.370
Methane	<u>38.01</u>	383.90	345.66	3.257
Ethane C2		0.00	0.00	0.000
Propane C3		0.00	0.00	0.000
Iso-Butane C4		0.00	0.00	0.000
N-Butane		0.00	0.00	0.000
Iso-Pentane C5		0.00	0.00	0.000
N-Pentane		0.00	0.00	0.000
Hexane C6		0.00	0.00	0.000
Heptane C7		0.00	0.00	0.000
Octane C8		0.00	0.00	0.000
Nonane C9		0.00	0.00	0.000
Total	100.00	383.90	345.66	3.88

CALCULATIONS

EXHAUST FLOW RATE, Q = (scfm*Exp Fac)*(20.92/(20.92-%O2))

20186.8 DSCFM

F - FACTOR = (Exp Fac*10^6)/(hhv*((460+Tstd)/528))

10255.3 SCF/MMBtu

Facility: LACSD PUENTE HILLS

Job No.: S20-011

Test Date(s): 11/10/94

SOURCE DESIGNATION	*****	TURBINE
RUN NUMBER	*****	1
DATE OF RUN	*****	11-10-94
LOAD CONDITION	*****	NORMAL

OXIDES OF NITROGEN

POLLUTANT CONCENTRATION	ppm	17.3
CONCENTRATION @ 15 %O2	ppm	23.2
POLLUTANT CONCENTRATION	lb/dscf	2.10E-06
STACK FLOWRATE	dscfm	20187
OXYGEN CONTENT	percent	16.5
EPA F-FACTOR	scf/MMBtu	10255
EMISSION RATE	lb/MMBtu	0.1021
EMISSION RATE	lb/hr	2.540

CARBON MONOXIDE

POLLUTANT CONCENTRATION	ppm	30.8
CONCENTRATION @ 15 %O2	ppm	41.3
POLLUTANT CONCENTRATION	lb/dscf	2.27E-06
STACK FLOWRATE	dscfm	20187
OXYGEN CONTENT	percent	16.5
EPA F-FACTOR	scf/MMBtu	10255
EMISSION RATE	lb/MMBtu	0.1107
EMISSION RATE	lb/hr	2.752

NOTE: Volumetric flowrate (dscfm) determined using expansion factor calculations.

Client: SCAQMD
Job No: S20-011
Site : LACSD
Unit : TURBINE #1 (SOLAR)

Date: 11-10-94
Run #: 1
Fuel: DG
Std O2:

	O2	CO2	NOx	CO	THC
	%	%	ppm	ppm	ppm
	%	%	ppm	ppm	ppm
Range:	25	15	100	100	
Span:	12.54	7.077	49.83	51.82	
Low:					
High:					

** POST-TEST DRIFT **

Values

Zero:	0.0	0.1	-1.0	0.0
Span:	12.5	7.1	50.2	51.5

Percent Drift

Zero:	0.0	0.7	-1.0	0.0	#DIV/0!
Span:	-0.2	0.2	0.4	-0.3	#DIV/0!

** AVERAGE CONCENTRATION **

Average:	16.5	4.0	17.3	30.8	0.0
O2 adjust:			81.8	145.6	0.0

		O2	CO2	NOx	CO	
		%	%	ppm	ppm	
S2011T1						
Date	Time	MT25	O2 MT18	CO MT26	NO MT19	Pt.
10-Nov-94	10:50:00	16.50	4.00	15.5	44.0	
10-Nov-94	10:53:00	16.50	4.00	16.0	35.5	A1
10-Nov-94	10:56:00	16.50	4.00	16.5	40.5	A2
10-Nov-94	10:59:00	16.50	4.00	17.0	40.5	A3
10-Nov-94	11:02:00	16.50	4.00	17.0	34.0	A4
10-Nov-94	11:05:00	16.50	4.00	17.0	38.5	A5
10-Nov-94	11:08:00	16.40	4.10	17.5	39.0	A6
10-Nov-94	11:11:00	16.40	4.00	18.0	36.0	A7
10-Nov-94	11:14:00	16.40	4.00	18.0	32.0	A8
10-Nov-94	11:17:00	16.40	4.00	18.0	22.0	A9
10-Nov-94	11:20:00	16.40	4.00	18.0	23.0	A10
10-Nov-94	11:23:00	16.50	4.00	17.0	33.5	B1
10-Nov-94	11:26:00	16.50	4.00	17.0	26.5	B2
10-Nov-94	11:29:00	16.50	4.00	18.0	22.5	B3
10-Nov-94	11:32:00	16.50	4.00	17.5	33.0	B4
10-Nov-94	11:35:00	16.50	4.00	18.0	21.0	B5
10-Nov-94	11:38:00	16.50	4.00	18.0	24.0	B6
10-Nov-94	11:41:00	16.50	4.00	17.5	24.0	B7
10-Nov-94	11:44:00	16.50	4.00	18.0	20.5	B8
10-Nov-94	11:47:00	16.50	4.00	18.0	24.0	B9
10-Nov-94	11:50:00	16.50	4.00	16.0	33.0	B10

**LOS ANGELES COUNTY SANITATION DISTRICT
TURBINE #2 (NATCO)
PERMIT NO. M44592**

SCAQMD TEST NO. 94-CST011-B

FACILITY:

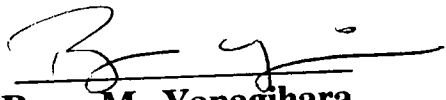
**LOS ANGELES COUNTY SANITATION DISTRICT
2800 SOUTH WORKMAN MILL ROAD
WHITTIER, CALIFORNIA 90601**

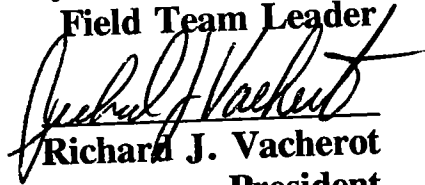
PARAMETERS OF INTEREST:

**CARBON MONOXIDE, OXIDES OF NITROGEN AND
HYDROGEN SULFIDE IN FUEL GAS**

TEST DATE:

NOVEMBER 11, 1994


**Ryan M. Yanagihara
Field Team Leader**


**Richard J. Vacherot
President**


**Gerry Meras
Contract Source
Testing Coordinator**

SCAQMD TEST NO. 94-CST01HB

TABLE 2

Nov. 11, 1994

LOS ANGELES COUNTY SANITATION DISTRICT (TURBINE #2)
RESULTS

LACSD PUENTE HILLS

TEST CONDITIONS

Process Description	Gas Turbine
Stack Gas Flow Rate	17427 dscfm
Rated Megawatts	11.5 MW X 1.25 JPR
Megawatts During Test	1.0 MW
Fuel Flow	66,000 scfh
Type of Fuel	Landfill Gas

SOURCE TEST RESULTS

Contaminant	Units	Emissions Measured	Emissions Allowed	SCAQMD Applicable Rule
Carbon Monoxide	ppmv lb/hr	543.9 41.96	2000	407(a)(1)
Hydrogen Sulfide Content in Fuel Gas	ppmv	72.3	40	431.1(b)(3)
Oxides of Nitrogen	ppmv lb/hr	9.1 1.15	NA*	NA*

NA - For informational purposes only, no applicable standard.

**EMISSION TESTS ON THE
SOLAR TURBINE AT PUENTE HILLS LANDFILL**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICT
Whittier, California**

Prepared By:

**Robert A. Finken
Craig H. Fry**

CARNOT

formerly the California Division of
ENERGY SYSTEMS ASSOCIATES

Tustin, California

JUNE 1990

CR 75400-2110R

TABLE 4-1
GENERAL RESULTS
SOLAR TURBINE

5/90

PH SOLAR

Parameter	Fuel Gas			Flare Exhaust		
	First Replicate	Second Replicate	Average	First Replicate	Second Replicate	Average
O ₂ , (% Dry)	4.7	—	4.7	17.01	16.54	16.78
CO ₂ , (% Dry)	28.0	27.8	27.9	3.83	3.95	3.89
H ₂ O, (%)	—	—	—	5.5	5.4	5.5
Flow Rate (dscfm)	1,852	—	1,852	30,642	30,476	30,559
Temperature (°F)	—	—	—	759	762	761
NO _x :						
ppm	—	—	—	19.6	21.4	20.5
ppm @ 3% O ₂	—	—	—	90.2	87.9	89.1
lb/hr	—	—	—	4.37	4.74	4.56
CO:						
ppm	16.4	14.9	15.7	30.3	30.1	30.2
ppm @ 3% O ₂	—	—	—	139	124	132
lb/hr	—	—	—	4.11	4.06	4.09
HC:						
CH ₄ ppm	356,000	323,000	339,500	<1	<1	<1
Total NMHC ppm	3,924	3,583	3,754	<1	<1	<1
as CH ₄						
Total NMHC as	—	—	—	<4.6	<4.1	<4.4
CH ₄ ppm @ 3% O ₂						
Total NMHC lb/hr as CH ₄	18.38	16.79	17.58	<0.08	<0.08	<0.08
Destruction Eff. %						>99.55
Particulate:						
Organic Fraction grains/DSCF				0.0003	0.0004	0.0004
Inorganic Fraction grains/DSCF				0.0015	0.0012	0.0014
Total Particulate grains/DSCF				0.0018	0.0016	0.0017
Total lb/hr				0.48	0.43	0.46
Sulfur Compounds						
H ₂ S, (ppm)			ND <.1			
Methyl Mercaptan (ppm)			ND <0.04			
Ethyl Mercaptan (ppm)			ND <0.04			
Dimethyl Sulfide (ppm)			0.1			
Carbonyl Sulfide (ppm)			0.2			
Carbon Disulfide (ppm)			2.1			

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
Methylene Chloride, ppb lb/hr	4,900 1.22×10^{-1}	ND <0.2 8.21×10^{-5}	>99.93
Chloroform, ppb lb/hr	ND <200 6.99×10^{-3}	ND <0.2 1.15×10^{-4}	N/A
1,1,1 trichloroethane, ppb lb/hr	860 3.36×10^{-2}	ND <0.2 1.29×10^{-4}	>99.62
Carbon Tetrachloride, ppb lb/hr	ND <200 9.01×10^{-3}	ND <0.2 1.49×10^{-4}	N/A
1,1-dichloroethene, ppb lb/hr	ND <200 5.68×10^{-3}	ND <0.2 9.37×10^{-5}	>98.35
Trichloroethylene, ppb lb/hr	2,000 7.69×10^{-2}	ND <0.2 1.27×10^{-4}	>99.83
Tetrachloroethylene, ppb lb/hr	3,100 1.51×10^{-1}	ND <0.2 1.60×10^{-4}	>99.89
Chlorobenzene, ppb lb/hr	ND <1,000 3.30×10^{-2}	ND <1 5.44×10^{-4}	N/A
Vinyl Chloride, ppb lb/hr	2,600 4.76×10^{-2}	ND <0.2 6.04×10^{-5}	>99.87
1,2-dichlorobenzene, ppb lb/hr	N/A 0.00	N/A 0.00	N/A
1,3-dichlorobenzene, ppb lb/hr	ND <200 8.61×10^{-3}	ND <0.4 2.84×10^{-4}	N/A
1,4-dichlorobenzene, ppb lb/hr	200 8.61×10^{-3}	ND <0.4 2.84×10^{-4}	N/A
1,1-dichloroethane, ppb lb/hr	1,700 4.93×10^{-2}	ND <0.2 9.56×10^{-5}	>99.81

Continued

TABLE 4-2
TRACE ORGANICS SPECIES RESULTS
TURBINE

Species	Intake	Exhaust	Destruction Efficiency, %
1,2-dichloroethane, ppb lb/hr	ND <200 5.80×10^{-3}	ND <0.2 9.56×10^{-5}	N/A
Benzene, ppb lb/hr	2,300 5.26×10^{-2}	1.3 4.91×10^{-4}	99.07
Toluene, ppb lb/hr	29,000 7.91×10^{-1}	77 3.47×10^{-2}	95.62
Acetonitrile, ppb lb/hr	ND <5,000 6.01×10^{-2}	ND <5 9.92×10^{-4}	N/A
Xylenes, ppb lb/hr	17,600 5.47×10^{-1}	16.9 8.67×10^{-3}	98.42
1,2-dibromoethane, ppb lb/hr	ND <400 2.20×10^{-2}	ND <2 1.82×10^{-3}	N/A
Benzyl Chlorides, ppb lb/hr	ND <400 1.48×10^{-2}	ND <1 6.12×10^{-4}	N/A

ND indicates that the species was not detected. Values in parenthesis indicate the detection limit for these species.

Corresponding lb/hr value of non-detect species is also less than (<) the calculated amount shown on table.

NA indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSION TESTS ON THE
NATCO TURBINE AT PUENTE HILLS LANDFILL
JULY, 1990**

Prepared For:

**LOS ANGELES COUNTY SANITATION DISTRICTS
Whittier, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

SEPTEMBER 1990

CR 78100-2156

EXPANSION AND F-FACTOR CALC. METHOD

Client: <u>SCAQMD</u>	Date: <u>11-10-94</u>
Location: <u>LACSD PUENTE HILLS</u>	Job #: <u>S20-011</u>
Unit: <u>TURBINE # 2 (METCO)</u>	Bomb#: <u>TEDLAR BAG</u>

Fuel temperature	_____	deg F	Std. Temp.	<u>60</u>
Fuel Pressure	_____	psi		
Fuel Flow Rate	_____	cfm	Fuel Flow	<u>1100.0</u> scfm
Exhaust Outlet O2	<u>15.8</u>	%		
Barometric Pressure	_____			

COMPONENTS		MOLE %	HHV btu/ft3	LLV btu/ft3	Exp Factor dscf/scf fuel
Oxygen		<u>3.89</u>			0.039
Nitrogen		<u>21.06</u>			0.211
Carbon Dioxide		<u>37.04</u>			0.370
Methane		<u>38.01</u>	383.90	345.66	3.257
Ethane	C2		0.00	0.00	0.000
Propane	C3		0.00	0.00	0.000
Iso-Butane	C4		0.00	0.00	0.000
N-Butane			0.00	0.00	0.000
Iso-Pentane	C5		0.00	0.00	0.000
N-Pentane			0.00	0.00	0.000
Hexane	C6		0.00	0.00	0.000
Heptane	C7		0.00	0.00	0.000
Octane	C8		0.00	0.00	0.000
Nonane	C9		0.00	0.00	0.000
Total		100.00	383.90	345.66	3.88

CALCULATIONS	
EXHAUST FLOW RATE, Q	= (scfm*Exp Fac)*(20.92/(20.92-%O2))
	17426.9 DSCFM
F - FACTOR	= (Exp Fac*10^6)/(hhv*((460+Tstd)/528))
	10255.3 SCF/MMBtu

Facility: LACSD PUENTE HILLS

Job No.: S20-011

Test Date(s): 11/10/94

SOURCE DESIGNATION	*****	TURBINE #2
RUN NUMBER	*****	1
DATE OF RUN	*****	11-10-94
LOAD CONDITION	*****	NORMAL

OXIDES OF NITROGEN

POLLUTANT CONCENTRATION	ppm	9.1
CONCENTRATION @ 15 %O2	ppm	10.5
POLLUTANT CONCENTRATION	lb/dscf	1.10E-06
STACK FLOWRATE	dscfm	17427
OXYGEN CONTENT	percent	15.8
EPA F-FACTOR	scf/MMBtu	10255
EMISSION RATE	lb/MMBtu	0.0464
EMISSION RATE	lb/hr	1.153

CARBON MONOXIDE

POLLUTANT CONCENTRATION	ppm	543.9
CONCENTRATION @ 15 %O2	ppm	629.2
POLLUTANT CONCENTRATION	lb/dscf	4.01E-05
STACK FLOWRATE	dscfm	17427
OXYGEN CONTENT	percent	15.8
EPA F-FACTOR	scf/MMBtu	10255
EMISSION RATE	lb/MMBtu	1.6864
EMISSION RATE	lb/hr	41.957

NOTE: Volumetric flowrate (dscfm) determined using expansion factor calculations.

Client: SCAQMD
 Job No: S20-011
 Site : LACSD
 Unit : TURBINE #2 (METCO)

Date: 11-10-94
 Run #: 1
 Fuel: DG
 Std O2:

	O2 %	CO2 %	NOx ppm ppm	CO ppm ppm	THC ppm ppm
Range:	25	15	100	100	
Span:	12.54	7.077	49.83	51.82	
Low:					
High:					

** POST-TEST DRIFT **

Values

Zero:	0.1	0.1	0.0	2.0
Span:	12.5	7.1	49.5	51.5

Percent Drift

Zero:	0.4	0.7	0.0	2.0	#DIV/0!
Span:	-0.2	0.2	-0.3	-0.3	#DIV/0!

** AVERAGE CONCENTRATION **

Average:	15.8	4.4	9.1	543.9	0.0
O2 adjust:			37.2	#####	0.0

		O2 %	CO2 %	NOx ppm	CO ppm	
S2011T1						
Date	Time	MT25	O2 MT18	CO MT26	NO MT19	Pt.
10-Nov-94	12:58:00	15.80	4.40	10.5	555.0	
10-Nov-94	13:01:00	15.80	4.40	9.5	550.0	A1
10-Nov-94	13:04:00	15.80	4.40	9.0	548.0	A2
10-Nov-94	13:07:00	15.80	4.40	9.0	545.0	A3
10-Nov-94	13:10:00	15.80	4.40	9.0	550.0	A4
10-Nov-94	13:13:00	15.80	4.40	9.0	555.0	A5
10-Nov-94	13:16:00	15.80	4.40	9.0	555.0	A6
10-Nov-94	13:19:00	15.80	4.40	9.0	555.0	A7
10-Nov-94	13:22:00	15.80	4.40	9.0	552.0	A8
10-Nov-94	13:25:00	15.80	4.40	9.0	552.0	A9
10-Nov-94	13:28:00	15.80	4.40	9.0	505.0	A10
10-Nov-94	13:31:00	15.80	4.40	9.0	550.0	B1
10-Nov-94	13:34:00	15.80	4.40	9.5	550.0	B2
10-Nov-94	13:37:00	15.80	4.40	9.0	550.0	B3
10-Nov-94	13:40:00	15.80	4.40	9.0	545.0	B4
10-Nov-94	13:43:00	15.80	4.40	9.0	545.0	B5
10-Nov-94	13:46:00	15.80	4.40	8.5	540.0	B6
10-Nov-94	13:49:00	15.80	4.40	8.0	540.0	B7
10-Nov-94	13:52:00	15.80	4.40	8.5	530.0	B8
10-Nov-94	13:55:00	15.80	4.40	9.0	525.0	B9
10-Nov-94	13:58:00	15.80	4.40	10.0	525.0	B10

**EMISSION TESTS ON THE NATCO
TURBINE AT PUENTE HILLS LANDFILL
NOVEMBER 1994**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

DECEMBER 1994

11/99

PH

TABLE 4-1
GENERAL RESULTS - NATCO TURBINE
NOVEMBER 16, 1994

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , % dry	5.14	4.75	4.95	15.48	15.76	15.62
CO ₂ , % dry	30.3	31.2	30.8	4.39	4.42	4.41
N ₂ , % dry	26.1	24.9	25.5	80.1	79.8	80.0
H ₂ O, %	3.8	3.5	3.7	4.4	4.6	4.5
Flow Rate, dscfm	1294	1328	1311	21186	21115	21151
Temperature, °F				964	976	970
NO _x :						
ppm				9.8	10.4	10.1
ppm @ 15% O ₂				10.7	11.9	11.3
lb/hr (as NO ₂)				1.51	1.60	1.55
CO:						
ppm				497	484	491
ppm @ 15% O ₂				541	556	548
lb/hr				46.6	45.2	45.9
SO ₂ :						
ppm				6.5	16.0	11.3
ppm @ 15% O ₂				7.1	18.4	12.7
lb/hr (as SO ₂)				1.39	3.42	2.41
HC:						
CH ₄ ppm	433000	432000	432500	89.2	81.3	85.3
TGNMO ppm	3580	3970	3775	5.86	6.24	6.05
TGNMO lb/hr (as CH ₄)	11.72	13.34	12.53	0.31	0.33	0.32
Destruction Eff. %	--	--	--	97.3	97.5	97.4
Particulate:						
Organic Fraction gr/dscf				0.0000	0.0000	0.0000
Inorganic Fraction gr/dscf				0.0059	0.0063	0.0061
Total Particulate gr/dscf				0.0059	0.0063	0.0061
Total Particulate gr/dscf @ 15% O ₂				0.0064	0.0072	0.0068
lb/hr				1.064	1.144	1.104
Sulfur Compounds:						
H ₂ S, ppm	75	86	80.5			
Methyl Mercaptan, ppm	1.3	1.4	1.4			
Ethyl Mercaptan, ppm	ND > 1.0	ND > 1.0	ND > 1.0			
Dimethyl Sulfide, ppm	1.7	1.8	1.8			
Carbonyl Sulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Carbon Disulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Disulfide, ppm	ND < 1.4	ND < 1.4	ND < 1.4			
Total Sulfur Compounds, ppm	< 85.0	< 96.2	< 90.6			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE, TEST NO. 1
NOVEMBER 16, 1994

Flow rate, Inlet dscfm	1294			
Flow rate, Exhaust dscfm	21186			
Species	Inlet	Exhaust		Destruction Efficiency, %
Methylene Chloride:	2800 ppb	ND < 0.4 ppb		
lb/hr	4.87×10^{-2}	$< 1.14 \times 10^{-4}$		99.77
Chloroform:	ND < 100 ppb	ND < 0.2 ppb		
lb/hr	$< 2.44 \times 10^{-3}$	$< 8.00 \times 10^{-5}$		NA
1,1,1-Trichloroethane:	160 ppb	ND < 0.2 ppb		
lb/hr	4.37×10^{-3}	$< 8.94 \times 10^{-5}$		> 97.95
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.2 ppb		
lb/hr	$< 3.15 \times 10^{-3}$	$< 1.03 \times 10^{-4}$		NA
1,1-Dichloroethene:	ND < 210 ppb	ND < 0.4 ppb		
lb/hr	$< 4.16 \times 10^{-3}$	$< 1.30 \times 10^{-4}$		NA
Trichloroethylene:	510 ppb	ND < 0.2 ppb		
lb/hr	1.37×10^{-2}	$< 8.80 \times 10^{-5}$		> 99.36
Tetrachloroethylene:	1500 ppb	ND < 0.4 ppb		
lb/hr	5.09×10^{-2}	$< 2.22 \times 10^{-4}$		> 99.56
Chlorobenzene:	290 ppb	ND < 0.4 ppb		
lb/hr	6.68×10^{-3}	$< 1.51 \times 10^{-4}$		97.74
Vinyl Chloride:	860 ppb	ND < 0.4 ppb		
lb/hr	1.10×10^{-2}	$< 8.37 \times 10^{-5}$		99.24
o-Dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb		
lb/hr	$< 1.26 \times 10^{-2}$	$< 3.94 \times 10^{-4}$		NA
m-Dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb		
lb/hr	$< 1.26 \times 10^{-2}$	$< 3.94 \times 10^{-4}$		NA
o+p Dichlorobenzene:	550 ppb	ND < 0.8 ppb		
lb/hr	1.65×10^{-2}	$< 3.94 \times 10^{-4}$		> 97.62
1,1-Dichloroethane:	860 ppb	ND < 0.4 ppb		
lb/hr	1.74×10^{-2}	$< 1.33 \times 10^{-4}$		> 99.24
1,2-Dichloroethane:	ND < 210 ppb	ND < 0.4 ppb		
lb/hr	$< 4.25 \times 10^{-3}$	$< 1.33 \times 10^{-4}$		NA
Benzene:	2900 ppb	2.9 ppb		
lb/hr	4.63×10^{-2}	7.59×10^{-4}		98.36

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-2 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE, TEST NO. 1
NOVEMBER 16, 1994

Flow rate, Inlet dscfm	1294			
Flow rate, Exhaust dscfm	21186			
Species	Inlet	Exhaust	Destruction Efficiency, %	
Toluene:	23000 ppb	1.0 ppb		
lb/hr	4.34×10^{-1}	3.09×10^{-4}		99.93
Acetonitrile:	ND < 5100 ppb	ND < 5.1 ppb		
lb/hr	$< 4.28 \times 10^{-2}$	$< 7.01 \times 10^{-4}$		NA
o-Xylenes:	5800 ppb	0.7 ppb		
lb/hr	1.26×10^{-1}	2.49×10^{-4}		99.80
m+p Xylenes:	14000 ppb	ND < 0.8 ppb		
lb/hr	3.04×10^{-1}	$< 2.84 \times 10^{-4}$		> 99.91
1,2-Dibromoethane:	ND < 210 ppb	ND < 0.4 ppb		
lb/hr	$< 8.07 \times 10^{-3}$	$< 2.52 \times 10^{-4}$		NA
Benzyl Chloride:	ND < 420 ppb	ND < 0.8 ppb		
lb/hr	$< 1.09 \times 10^{-2}$	$< 3.39 \times 10^{-4}$		NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE, TEST NO. 2
NOVEMBER 16, 1994

Flow rate, Inlet dscfm	1328		
Flow rate, Exhaust dscfm	21115		
Species	Inlet	Exhaust	Destruction Efficiency, %
Methylene Chloride:	3000 ppb	ND < 0.4 ppb	
lb/hr	5.35×10^{-2}	< 1.13×10^{-4}	99.79
Chloroform:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	< 2.51×10^{-3}	< 7.97×10^{-5}	NA
1,1,1-trichloroethane:	170 ppb	ND < 0.2 ppb	
lb/hr	4.76×10^{-3}	< 8.91×10^{-5}	> 98.13
Carbon Tetrachloride:	ND < 100 ppb	ND < 0.2 ppb	
lb/hr	< 3.23×10^{-3}	< 1.03×10^{-4}	NA
1,1-dichloroethene:	ND < 210 ppb	ND < 0.4 ppb	
lb/hr	< 4.27×10^{-3}	< 1.29×10^{-4}	NA
Trichloroethylene:	490 ppb	ND < 0.2 ppb	
lb/hr	1.35×10^{-2}	< 8.77×10^{-5}	> 99.35
Tetrachloroethylene:	1500 ppb	ND < 0.4 ppb	
lb/hr	5.22×10^{-2}	< 2.21×10^{-4}	> 99.58
Chlorobenzene:	280 ppb	ND < 0.4 ppb	
lb/hr	6.62×10^{-3}	< 1.50×10^{-4}	> 97.73
Vinyl Chloride:	830 ppb	ND < 0.4 ppb	
lb/hr	1.09×10^{-2}	< 8.35×10^{-5}	> 99.23
o-dichlorobenene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	< 1.30×10^{-2}	< 3.93×10^{-4}	NA
m-dichlorobenzene:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	< 1.30×10^{-2}	< 3.93×10^{-4}	NA
p dichlorobenzene:	510 ppb	ND < 0.8 ppb	
lb/hr	1.57×10^{-2}	< 3.93×10^{-4}	> 97.51
1,1-dichloroethane:	890 ppb	ND < 0.4 ppb	
lb/hr	1.85×10^{-2}	< 1.32×10^{-4}	> 99.29
1,2-dichloroethane:	ND < 210 ppb	ND < 0.4 ppb	
lb/hr	< 4.36×10^{-3}	< 1.32×10^{-4}	> NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

(continued)

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

TABLE 4-3 (continued)
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
NATCO TURBINE, TEST NO. 2
NOVEMBER 16, 1994

Flow rate, Inlet dscfm	1328		
Flow rate, Exhaust dscfm	21115		
Species	Inlet	Exhaust	Destruction Efficiency, %
Benzene:	2700 ppb	3.1 ppb	
lb/hr	4.43×10^{-2}	8.08×10^{-4}	98.17
Toluene:	19000 ppb	1.0 ppb	
lb/hr	3.68×10^{-1}	3.08×10^{-4}	99.92
Acetonitrile:	ND < 5100 ppb	ND < 5.1 ppb	
lb/hr	< 4.40×10^{-2}	< 6.99×10^{-4}	NA
o-xylenes:	5200 ppb	ND < 0.4 ppb	
lb/hr	1.16×10^{-1}	< 1.42×10^{-4}	> 99.88
m+p xylenes:	12000 ppb	ND < 0.8 ppb	
lb/hr	2.67×10^{-1}	< 2.84×10^{-4}	99.89
1,2-dibromoethane:	ND < 210 ppb	ND < 0.4 ppb	
lb/hr	< 8.28×10^{-3}	< 2.51×10^{-4}	NA
Benzyl Chloride:	ND < 420 ppb	ND < 0.8 ppb	
lb/hr	< 1.12×10^{-2}	< 3.38×10^{-4}	NA

ND < indicates that the species was not detected. Values indicate the detection limit for this species and the concentration is less than the presented value.

NA - indicates that the destruction efficiency cannot be calculated because the concentration is below detection limits.

**EMISSION TESTS ON THE SOLAR
TURBINE AT PUENTE HILLS LANDFILL
MARCH 1995**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

APRIL 1995

TABLE 4-1
GENERAL RESULTS - SOLAR TURBINE
MARCH 28, 1995

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	4.80	4.11	4.46	16.53	16.42	16.47
CO ₂ , %	30.6	31.1	30.9	4.09	4.02	4.06
N ₂ , %	23.2	21.4	22.3	79.4	79.6	79.5
H ₂ O, %	5.1	5.9	5.5	4.8	4.9	4.8
Flow Rate, dscfm	1,471	1,492	1,481	30,866	30,923	30,895
Temperature, °F				809	808	808
NO _x						
ppm				22.8	21.3	22.0
ppm @ 3% O ₂				93.4	85.1	89.3
ppm @ 15% O ₂				30.7	28.0	29.4
lb/hr (as NO ₂)				5.12	4.79	4.95
CO:						
ppm				22.9	23.4	23.1
ppm @ 3% O ₂				93.8	93.5	93.7
ppm @ 15% O ₂				30.9	30.8	30.8
lb/hr				3.13	3.20	3.16
SO _x						
ppm				5.4	5.1	5.2
ppm @ 3% O ₂				22.1	20.4	21.3
ppm @ 15% O ₂				7.3	6.7	7.0
lb/hr (as SO ₂)				1.68	1.59	1.64
HC:						
CH ₄ ppm	448,000	456,000	452,000	ND < 1	2.12	< 1.56
TGNMO ppm	3,060	3,090	3,075	ND < 1	ND < 1	ND < 1
TGNMO ppm @ 3% O ₂	—	—	—	< 4.10	< 4.00	< 4.05
TGNMO ppm @ 15% O ₂	—	—	—	< 1.35	< 1.32	< 1.33
TGNMO lb/hr (as CH ₄)	11.38	11.66	11.52	< 0.08	< 0.08	< 0.08
Destruction Eff. %	—	—	—	> 99.31	> 99.33	> 99.32
Particulate:						
Organic Fraction gr/dscf				0.0001	0.0000	0.0000
Inorganic Fraction gr/dscf				0.0032	0.0031	0.0032
Total Particulate gr/dscf				0.0033	0.0031	0.0032
gr/dscf @ 3% O ₂				0.0135	0.0124	0.0129
gr/dscf @ 15% O ₂				0.0045	0.0040	0.0043
gr/dscf @ 12% CO ₂				0.0095	0.0092	0.0093
lb/hr				0.858	0.813	0.836
Sulfur Compounds:						
H ₂ S, ppm	91	98	95			
Methyl Mercaptan, ppm	1.6	1.6	1.6			
Ethyl Mercaptan, ppm	ND > 1.0	ND > 1.00	ND > 1.0			
Dimethyl Sulfide, ppm	1.8	1.8	1.8			
Carbonyl Sulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Carbon Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	97.4	104.4	100.9			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 1
MARCH 28, 1995

Flow rate, Inlet dscfm		1,471					
Flow rate, Exhaust dscfm		30,866					
Species		Inlet		Exhaust		Destruction Efficiency, %	
Methylene Chloride:		2500	ppb	ND <	1.0	ppb	
lb/hr		4.94×10^{-2}		<	4.15×10^{-4}		>99.16
Chloroform:	ND <	100	ppb	ND <	0.3	ppb	
lb/hr	<	2.78×10^{-3}		<	1.75×10^{-4}		NA
1,1,1 Trichloroethane:		260	ppb	ND <	0.3	ppb	
lb/hr		8.07×10^{-3}		<	1.95×10^{-4}		>97.58
Carbon Tetrachloride:	ND <	100	ppb	ND <	0.3	ppb	
lb/hr	<	3.58×10^{-3}		<	2.25×10^{-4}		NA
1,1-Dichloroethene:	ND <	210	ppb	ND <	0.5	ppb	
lb/hr	<	4.73×10^{-3}		<	2.37×10^{-4}		NA
Trichloroethylene:		700	ppb	ND <	0.3	ppb	
lb/hr		2.14×10^{-2}		<	1.92×10^{-4}		>99.10
Tetrachloroethylene:		1700	ppb	ND <	0.3	ppb	
lb/hr		6.56×10^{-2}		<	2.43×10^{-4}		>99.63
Chlorobenzene:		280	ppb	ND <	0.5	ppb	
lb/hr		7.33×10^{-3}		<	2.75×10^{-4}		>96.25
Vinyl Chloride:		800	ppb	ND <	0.5	ppb	
lb/hr		1.16×10^{-2}		<	1.52×10^{-4}		>98.69
m-Dichlorobenzene:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.44×10^{-2}		<	7.89×10^{-4}		NA
o-Dichlorobenzene:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.44×10^{-2}		<	7.89×10^{-4}		NA
p-Dichlorobenzene:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.44×10^{-2}		<	7.89×10^{-4}		NA
1,1-Dichloroethane:		930	ppb	ND <	0.5	ppb	
lb/hr		2.14×10^{-2}		<	2.41×10^{-4}		>98.87
1,2-Dichloroethane:	ND <	100	ppb	ND <	0.3	ppb	
lb/hr	<	2.30×10^{-3}		<	1.45×10^{-4}		NA
Benzene:		2400	ppb		0.3	ppb	
lb/hr		4.36×10^{-2}			1.14×10^{-4}		99.74
Toluene:		28000	ppb	ND <	1.1	ppb	
lb/hr		6.00×10^{-1}		<	4.95×10^{-4}		>99.92
Acetonitrile:	ND <	5100	ppb	ND <	13	ppb	
lb/hr	<	4.87×10^{-2}		<	2.60×10^{-3}		NA
o-Xylenes:		6500	ppb	ND <	0.5	ppb	
lb/hr		1.60×10^{-1}		<	2.59×10^{-4}		>99.84
m+p Xylenes:		15000	ppb	ND <	1.1	ppb	
lb/hr		3.70×10^{-1}		<	5.70×10^{-4}		>99.85
1,2-Dibromoethane:	ND <	420	ppb	ND <	1.0	ppb	
lb/hr	<	1.83×10^{-2}		<	9.17×10^{-4}		NA
Benzyl Chloride:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.24×10^{-2}		<	6.79×10^{-4}		NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 2
MARCH 28, 1995

Flow rate, Inlet dscfm		1,492					
Flow rate, Exhaust dscfm		30,923					
Species		Inlet		Exhaust		Destruction Efficiency, %	
Methylene Chloride:		2200 ppb					
lb/hr		4.41×10^{-2}		1.6 ppb			
Chloroform:	ND <	100 ppb		6.64×10^{-4}		98.49	
lb/hr	<	2.82×10^{-3}		0.3 ppb			
1,1,1 Trichloroethane:		100 ppb		1.75×10^{-4}		NA	
lb/hr		3.15×10^{-3}		0.3 ppb			
Carbon Tetrachloride:	ND <	100 ppb		1.96×10^{-4}		> 93.78	
lb/hr	<	3.63×10^{-3}		0.3 ppb			
1,1-Dichloroethene:	ND <	210 ppb		2.26×10^{-4}		NA	
lb/hr	<	4.80×10^{-3}		0.5 ppb			
Trichloroethylene:		560 ppb		2.37×10^{-4}		NA	
lb/hr		1.74×10^{-2}		0.3 ppb			
Tetrachloroethylene:		1300 ppb		1.93×10^{-4}		> 98.89	
lb/hr		5.09×10^{-2}		0.3 ppb			
Chlorobenzene:		230 ppb		2.43×10^{-4}		> 99.52	
lb/hr		6.11×10^{-3}		0.5 ppb			
Vinyl Chloride:		790 ppb		2.75×10^{-4}		> 95.50	
lb/hr		1.16×10^{-2}		0.5 ppb			
m-Dichlorobenzene:	ND <	420 ppb		1.53×10^{-4}		> 98.69	
lb/hr	<	1.46×10^{-2}		1.1 ppb			
o-Dichlorobenzene:	ND <	420 ppb		7.91×10^{-4}		NA	
lb/hr	<	1.46×10^{-2}		1.1 ppb			
p-Dichlorobenzene:		520 ppb		7.91×10^{-4}		NA	
lb/hr		1.80×10^{-2}		1.1 ppb			
1,1-Dichloroethane:		800 ppb		7.91×10^{-4}		> 95.62	
lb/hr		1.87×10^{-2}		0.5 ppb			
1,2-Dichloroethane:	ND <	100 ppb		2.42×10^{-4}		> 98.70	
lb/hr	<	2.33×10^{-3}		0.3 ppb			
Benzene:		1900 ppb		1.45×10^{-4}		NA	
lb/hr		3.50×10^{-2}		0.4 ppb			
Toluene:		22000 ppb		1.53×10^{-4}		99.56	
lb/hr		4.78×10^{-1}		1.1 ppb			
Acetonitrile:	ND <	5100 ppb		4.95×10^{-4}		> 99.90	
lb/hr	<	4.94×10^{-2}		13 ppb			
o-Xylenes:		5200 ppb		2.61×10^{-3}		NA	
lb/hr		1.30×10^{-1}		0.5 ppb			
m+p Xylenes:		12000 ppb		2.60×10^{-4}		> 99.80	
lb/hr		3.01×10^{-1}		1.1 ppb			
1,2-Dibromoethane:	ND <	420 ppb		5.71×10^{-4}		> 99.81	
lb/hr	<	1.86×10^{-2}		1.0 ppb			
Benzyl Chloride:	ND <	420 ppb		9.19×10^{-4}		NA	
lb/hr	<	1.25×10^{-2}		1.1 ppb			
				6.81×10^{-4}		NA	

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

**EMISSION TEST RESULTS
ON THE SOLAR TURBINE AT
PUENTE HILLS LANDFILL
NOVEMBER 21, 1995**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California**

Prepared By:

**Craig H. Fry
John A. Furlong, R.E.A.**

**CARNOT
Tustin, California**

JANUARY 1996

PH SOLAR 17-95

PH

TABLE 4-1
GENERAL RESULTS
SOLAR TURBINE
NOVEMBER 21, 1995

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	5.48	4.71	5.10	16.32	16.15	16.23
CO ₂ , %	28.4	29.5	29.0	3.69	3.89	3.79
N ₂ , %	29.0	26.2	27.6	80.0	80.0	80.0
H ₂ O, %	3.2	4.4	3.8	5.9	6.2	6.0
Flow Rate, dscfm	1,902	1,902	1,902	30,896	30,601	30,748
Temperature, °F				768	802	785
NO _x :						
ppm						
ppm @ 15% O ₂				18.6	19.6	19.1
lb/hr (as NO ₂)				23.9	24.4	24.1
CO:				4.17	4.37	4.27
ppm						
ppm @ 15% O ₂				34.0	34.5	34.2
lb/hr				43.8	42.9	43.3
SO _x :				4.64	4.68	4.66
ppm						
ppm @ 15% O ₂				6.1	6.5	6.3
lb/hr (as SO ₂)				7.9	8.1	8.0
HC:				1.92	2.01	1.96
CH ₄ , ppm	393,000	408,000	400,500			
TGNMO ppm	3,500	3,820	3,660	2.00	2.16	2.08
TGNMO ppm @ 15% O ₂	—	—	—	1.50	2.90	2.20
TGNMO lb/hr (as CH ₄)	16.84	18.38	17.61	1.93	3.60	2.77
Destruction Eff. %	—	—	—	0.12	0.22	0.17
Particulate:				99.30	98.78	99.04
Organic fraction gr/dscf						
Inorganic fraction gr/dscf				0.0000	0.0000	0.0000
Total Particulate gr/dscf				0.0052	0.0058	0.0055
gr/dscf @ 15% O ₂				0.0052	0.0058	0.0055
gr/dscf @ 12% CO ₂				0.0067	0.0072	0.0070
lb/hr				0.0169	0.0179	0.0174
Sulfur Compounds:				1.379	1.525	1.452
H ₂ S, ppm	110	110	110			
Methyl Mercaptan, ppm	1.9	1.9	1.9			
Ethyl Mercaptan, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Sulfide, ppm	1.4	1.4	1.4			
Carbonyl Sulfide, ppm	1.1	1.1	1.1			
Carbon Disulfide, ppm	ND < 1.1	ND < 1.1	ND < 1.1			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	114.4	114.4	114.4			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 1
NOVEMBER 21, 1995

Flow rate, Inlet dscfm		1,902			
Flow rate, Exhaust dscfm		30,896			
Species		Inlet		Exhaust	Destruction Efficiency, %
Methylene Chloride:		1600 ppb	ND <	1.0 ppb	
	lb/hr	4.09×10^{-2}	<	4.15×10^{-4}	> 98.98
Chloroform:	ND <	210 ppb	ND <	0.5 ppb	
	lb/hr	7.54×10^{-3}	<	2.92×10^{-4}	NA
1,1,1 Trichloroethane:	ND <	410 ppb	ND <	1.0 ppb	
	lb/hr	1.65×10^{-2}	<	6.52×10^{-4}	NA
Carbon Tetrachloride:	ND <	210 ppb	ND <	0.5 ppb	
	lb/hr	9.72×10^{-3}	<	3.76×10^{-4}	NA
1,1-Dichloroethene:	ND <	410 ppb	ND <	1.0 ppb	
	lb/hr	1.20×10^{-2}	<	4.74×10^{-4}	NA
Trichloroethylene:		560 ppb	ND <	1.1 ppb	
	lb/hr	2.21×10^{-2}	<	7.06×10^{-4}	> 96.81
Tetrachloroethylene:		1400 ppb	ND <	0.5 ppb	
	lb/hr	6.98×10^{-2}	<	4.05×10^{-4}	> 99.42
Chlorobenzene:	ND <	420 ppb	ND <	1.1 ppb	
	lb/hr	1.42×10^{-2}	<	6.05×10^{-4}	NA
Vinyl Chloride:		970	ND <	1.0 ppb	
	lb/hr	1.82×10^{-2}	<	3.05×10^{-4}	> 98.33
m-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb	
	lb/hr	1.86×10^{-2}	<	7.90×10^{-4}	NA
o-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb	
	lb/hr	1.86×10^{-2}	<	7.90×10^{-4}	NA
p-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb	
	lb/hr	1.86×10^{-2}	<	7.90×10^{-4}	NA
1,1-Dichloroethane:		520 ppb	ND <	1.0 ppb	
	lb/hr	1.55×10^{-2}	<	4.83×10^{-4}	> 96.88
1,2-Dichloroethane:	ND <	210 ppb	ND <	0.5 ppb	
	lb/hr	6.25×10^{-3}	<	2.42×10^{-4}	NA
Benzene:		2900 ppb		1.2 ppb	
	lb/hr	6.81×10^{-2}		4.58×10^{-4}	99.33
Toluene:		14000 ppb		1.2 ppb	
	lb/hr	3.88×10^{-1}		5.40×10^{-4}	99.86
Acetonitrile:	ND <	5100 ppb	ND <	13 ppb	
	lb/hr	6.30×10^{-2}	<	2.61×10^{-3}	NA
o-Xylenes:		5500 ppb	ND <	0.5 ppb	
	lb/hr	1.76×10^{-1}	<	2.59×10^{-4}	> 99.85
m + p Xylenes:		11000 ppb	ND <	1.1 ppb	
	lb/hr	3.51×10^{-1}	<	5.70×10^{-4}	> 99.84
1,2-Dibromoethane:	ND <	2100 ppb	ND <	5.2 ppb	
	lb/hr	1.19×10^{-1}	<	4.77×10^{-3}	NA
Benzyl Chloride:	ND <	1100 ppb	ND <	2.7 ppb	
	lb/hr	4.19×10^{-2}	<	1.67×10^{-3}	NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 2
NOVEMBER 21, 1995

Flow rate, Inlet dscfm		1,902			
Flow rate, Exhaust dscfm		30,601			
Species		Inlet		Exhaust	Destruction Efficiency, %
Methylene Chloride:		1700 ppb	ND <	1.0 ppb	
lb/hr		4.34×10^{-2}	<	4.11×10^{-4}	> 99.05
Chloroform:	ND <	210 ppb	ND <	0.5 ppb	
lb/hr	<	7.54×10^{-3}	<	2.89×10^{-4}	NA
1,1,1 Trichloroethane:	ND <	410 ppb	ND <	1.0 ppb	
lb/hr	<	1.65×10^{-2}	<	6.46×10^{-4}	NA
Carbon Tetrachloride:	ND <	210 ppb	ND <	0.5 ppb	
lb/hr	<	9.72×10^{-3}	<	3.72×10^{-4}	NA
1,1-Dichloroethene:	ND <	410 ppb	ND <	1.0 ppb	
lb/hr	<	1.20×10^{-2}	<	4.69×10^{-4}	NA
Trichloroethylene:		540 ppb	ND <	1.1 ppb	
lb/hr		2.13×10^{-2}	<	6.99×10^{-4}	> 96.72
Tetrachloroethylene:		1300 ppb	ND <	0.5 ppb	
lb/hr		6.48×10^{-2}	<	4.01×10^{-4}	> 99.38
Chlorobenzene:	ND <	420 ppb	ND <	1.1 ppb	
lb/hr	<	1.42×10^{-2}	<	5.99×10^{-4}	NA
Vinyl Chloride:		730 ppb	ND <	1.0 ppb	
lb/hr		1.37×10^{-2}	<	3.02×10^{-4}	> 97.80
m-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb	
lb/hr	<	1.86×10^{-2}	<	7.82×10^{-4}	NA
o-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb	
lb/hr	<	1.86×10^{-2}	<	7.82×10^{-4}	NA
p-Dichlorobenzene:	ND <	420 ppb	ND <	1.1 ppb	
lb/hr	<	1.86×10^{-2}	<	7.82×10^{-4}	NA
1,1-Dichloroethane:		480 ppb	ND <	1.0 ppb	
lb/hr		1.43×10^{-2}	<	4.79×10^{-4}	> 96.65
1,2-Dichloroethane:	ND <	210 ppb	ND <	0.5 ppb	
lb/hr	<	6.25×10^{-3}	<	2.39×10^{-4}	NA
Benzene:		2900 ppb		1.2 ppb	
lb/hr		6.81×10^{-2}		4.53×10^{-4}	99.33
Toluene:		14000 ppb		1.3 ppb	
lb/hr		3.88×10^{-1}		5.79×10^{-4}	99.85
Acetonitrile:	ND <	5100 ppb	ND <	13 ppb	
lb/hr	<	6.30×10^{-2}	<	2.58×10^{-3}	NA
o-Xylenes:		5200 ppb	ND <	0.5 ppb	
lb/hr		1.66×10^{-1}	<	2.57×10^{-4}	> 99.85
m+p Xylenes:		10000 ppb	ND <	1.1 ppb	
lb/hr		3.19×10^{-1}	<	5.65×10^{-4}	> 99.82
1,2-Dibromoethane:	ND <	2100 ppb	ND <	5.2 ppb	
lb/hr	<	1.19×10^{-1}	<	4.73×10^{-3}	NA
Benzyl Chloride:	ND <	1100 ppb	ND <	2.7 ppb	
lb/hr	<	4.19×10^{-2}	<	1.65×10^{-3}	NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

**EMISSION TESTS ON THE SOLAR
TURBINE AT PUENTE HILLS LANDFILL
MARCH 1995**

Prepared For:

**COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
Whittier, California**

For Submittal To:

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California**

Prepared By:

Craig H. Fry

**CARNOT
Tustin, California**

APRIL 1995

TABLE 4-1
GENERAL RESULTS - SOLAR TURBINE
MARCH 28, 1995

Parameter	INLET			EXHAUST GAS		
	First Run	Second Run	Average	First Run	Second Run	Average
O ₂ , %	4.80	4.11	4.46	16.53	16.42	16.47
CO ₂ , %	30.6	31.1	30.9	4.09	4.02	4.06
N ₂ , %	23.2	21.4	22.3	79.4	79.6	79.5
H ₂ O, %	5.1	5.9	5.5	4.8	4.9	4.8
Flow Rate, dscfm	1,471	1,492	1,481	30,866	30,923	30,895
Temperature, °F				809	808	808
NO _x						
ppm				22.8	21.3	22.0
ppm @ 3% O ₂				93.4	85.1	89.3
ppm @ 15% O ₂				30.7	28.0	29.4
lb/hr (as NO ₂)				5.12	4.79	4.95
CO:						
ppm				22.9	23.4	23.1
ppm @ 3% O ₂				93.8	93.5	93.7
ppm @ 15% O ₂				30.9	30.8	30.8
lb/hr				3.13	3.20	3.16
SO _x						
ppm				5.4	5.1	5.2
ppm @ 3% O ₂				22.1	20.4	21.3
ppm @ 15% O ₂				7.3	6.7	7.0
lb/hr (as SO ₂)				1.68	1.59	1.64
HC:						
CH ₄ , ppm	448,000	456,000	452,000	ND < 1	2.12	< 1.56
TGNMO ppm	3,060	3,090	3,075	ND < 1	ND < 1	ND < 1
TGNMO ppm @ 3% O ₂	—	—	—	< 4.10	< 4.00	< 4.05
TGNMO ppm @ 15% O ₂	—	—	—	< 1.35	< 1.32	< 1.33
TGNMO lb/hr (as CH ₄)	11.38	11.66	11.52	< 0.08	< 0.08	< 0.08
Destruction Eff. %	—	—	—	> 99.31	> 99.33	> 99.32
Particulate:						
Organic Fraction gr/dscf				0.0001	0.0000	0.0000
Inorganic Fraction gr/dscf				0.0032	0.0031	0.0032
Total Particulate gr/dscf				0.0033	0.0031	0.0032
gr/dscf @ 3% O ₂				0.0135	0.0124	0.0129
gr/dscf @ 15% O ₂				0.0045	0.0040	0.0043
gr/dscf @ 12% CO ₂				0.0095	0.0092	0.0093
lb/hr				0.858	0.813	0.836
Sulfur Compounds:						
H ₂ S, ppm	91	98	95			
Methyl Mercaptan, ppm	1.6	1.6	1.6			
Ethyl Mercaptan, ppm	ND > 1.0	ND > 1.00	ND > 1.0			
Dimethyl Sulfide, ppm	1.8	1.8	1.8			
Carbonyl Sulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Carbon Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Dimethyl Disulfide, ppm	ND < 1.0	ND < 1.0	ND < 1.0			
Total Sulfur Compounds, ppm	97.4	104.4	100.9			

TABLE 4-2
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 1
MARCH 28, 1995

Flow rate, Inlet dscfm		1,471					
Flow rate, Exhaust dscfm		30,866					
Species		Inlet		Exhaust		Destruction Efficiency, %	
Methylene Chloride:		2500	ppb	ND <	1.0	ppb	
lb/hr		4.94×10^{-2}		<	4.15×10^{-4}		>99.16
Chloroform:	ND <	100	ppb	ND <	0.3	ppb	
lb/hr	<	2.78×10^{-3}		<	1.75×10^{-4}		NA
1,1,1 Trichloroethane:		260	ppb	ND <	0.3	ppb	
lb/hr		8.07×10^{-3}		<	1.95×10^{-4}		>97.58
Carbon Tetrachloride:	ND <	100	ppb	ND <	0.3	ppb	
lb/hr	<	3.58×10^{-3}		<	2.25×10^{-4}		NA
1,1-Dichloroethene:	ND <	210	ppb	ND <	0.5	ppb	
lb/hr	<	4.73×10^{-3}		<	2.37×10^{-4}		NA
Trichloroethylene:		700	ppb	ND <	0.3	ppb	
lb/hr		2.14×10^{-2}		<	1.92×10^{-4}		>99.10
Tetrachloroethylene:		1700	ppb	ND <	0.3	ppb	
lb/hr		6.56×10^{-2}		<	2.43×10^{-4}		>99.63
Chlorobenzene:		280	ppb	ND <	0.5	ppb	
lb/hr		7.33×10^{-3}		<	2.75×10^{-4}		>96.25
Vinyl Chloride:		800	ppb	ND <	0.5	ppb	
lb/hr		1.16×10^{-2}		<	1.52×10^{-4}		>98.69
m-Dichlorobenzene:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.44×10^{-2}		<	7.89×10^{-4}		NA
o-Dichlorobenzene:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.44×10^{-2}		<	7.89×10^{-4}		NA
p-Dichlorobenzene:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.44×10^{-2}		<	7.89×10^{-4}		NA
1,1-Dichloroethane:		930	ppb	ND <	0.5	ppb	
lb/hr		2.14×10^{-2}		<	2.41×10^{-4}		>98.87
1,2-Dichloroethane:	ND <	100	ppb	ND <	0.3	ppb	
lb/hr	<	2.30×10^{-3}		<	1.45×10^{-4}		NA
Benzene:		2400	ppb		0.3	ppb	
lb/hr		4.36×10^{-2}			1.14×10^{-4}		99.74
Toluene:		28000	ppb	ND <	1.1	ppb	
lb/hr		6.00×10^{-1}		<	4.95×10^{-4}		>99.92
Acetonitrile:	ND <	5100	ppb	ND <	13	ppb	
lb/hr	<	4.87×10^{-2}		<	2.60×10^{-3}		NA
o-Xylenes:		6500	ppb	ND <	0.5	ppb	
lb/hr		1.60×10^{-1}		<	2.59×10^{-4}		>99.84
m+p Xylenes:		15000	ppb	ND <	1.1	ppb	
lb/hr		3.70×10^{-1}		<	5.70×10^{-4}		>99.85
1,2-Dibromoethane:	ND <	420	ppb	ND <	1.0	ppb	
lb/hr	<	1.83×10^{-2}		<	9.17×10^{-4}		NA
Benzyl Chloride:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.24×10^{-2}		<	6.79×10^{-4}		NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.

TABLE 4-3
TRACE ORGANIC SPECIES DESTRUCTION EFFICIENCY RESULTS
SOLAR TURBINE, TEST NO. 2
MARCH 28, 1995

Flow rate, Inlet dscfm		1,492					
Flow rate, Exhaust dscfm		30,923					
Species		Inlet		Exhaust		Destruction Efficiency, %	
Methylene Chloride:		2200	ppb				
lb/hr		4.41×10^{-2}		1.6	ppb		
Chloroform:	ND <	100	ppb	ND <	6.64×10^{-4}		98.49
lb/hr	<	2.82×10^{-3}		<	1.75×10^{-4}		NA
1,1,1 Trichloroethane:		100	ppb	ND <	0.3	ppb	
lb/hr		3.15×10^{-3}		<	1.96×10^{-4}		>93.78
Carbon Tetrachloride:	ND <	100	ppb	ND <	0.3	ppb	
lb/hr	<	3.63×10^{-3}		<	2.26×10^{-4}		NA
1,1-Dichloroethene:	ND <	210	ppb	ND <	0.5	ppb	
lb/hr	<	4.80×10^{-3}		<	2.37×10^{-4}		NA
Trichloroethylene:		560	ppb	ND <	0.3	ppb	
lb/hr		1.74×10^{-2}		<	1.93×10^{-4}		>98.89
Tetrachloroethylene:		1300	ppb	ND <	0.3	ppb	
lb/hr		5.09×10^{-2}		<	2.43×10^{-4}		>99.52
Chlorobenzene:		230	ppb	ND <	0.5	ppb	
lb/hr		6.11×10^{-3}		<	2.75×10^{-4}		>95.50
Vinyl Chloride:		790	ppb	ND <	0.5	ppb	
lb/hr		1.16×10^{-2}		<	1.53×10^{-4}		>98.69
m-Dichlorobenzene:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.46×10^{-2}		<	7.91×10^{-4}		NA
o-Dichlorobenzene:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.46×10^{-2}		<	7.91×10^{-4}		NA
p-Dichlorobenzene:		520	ppb	ND <	1.1	ppb	
lb/hr		1.80×10^{-2}		<	7.91×10^{-4}		>95.62
1,1-Dichloroethane:		800	ppb	ND <	0.5	ppb	
lb/hr		1.87×10^{-2}		<	2.42×10^{-4}		>98.70
1,2-Dichloroethane:	ND <	100	ppb	ND <	0.3	ppb	
lb/hr	<	2.33×10^{-3}		<	1.45×10^{-4}		NA
Benzene:		1900	ppb		0.4	ppb	
lb/hr		3.50×10^{-2}			1.53×10^{-4}		99.56
Toluene:		22000	ppb	ND <	1.1	ppb	
lb/hr		4.78×10^{-1}		<	4.95×10^{-4}		>99.90
Acetonitrile:	ND <	5100	ppb	ND <	13	ppb	
lb/hr	<	4.94×10^{-2}		<	2.61×10^{-3}		NA
o-Xylenes:		5200	ppb	ND <	0.5	ppb	
lb/hr		1.30×10^{-1}		<	2.60×10^{-4}		>99.80
m+p Xylenes:		12000	ppb	ND <	1.1	ppb	
lb/hr		3.01×10^{-1}		<	5.71×10^{-4}		>99.81
1,2-Dibromoethane:	ND <	420	ppb	ND <	1.0	ppb	
lb/hr	<	1.86×10^{-2}		<	9.19×10^{-4}		NA
Benzyl Chloride:	ND <	420	ppb	ND <	1.1	ppb	
lb/hr	<	1.25×10^{-2}		<	6.81×10^{-4}		NA

ND < - indicates that the species was not detected. Values indicate the detection limit for this species and that the concentration is less than the presented value.
 NA - indicates that the destruction efficiency cannot be calculated because the concentration is below the detection limits.